DATA ANALYSIS FOR ECONOMICS

**Grado en Administración de Empresas / Bachelor in
Business Administration BBA SEP-2024 DAFE-NBA.3.M.A**

Area Economics

Number of sessions: 30

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Degree course: THIRD

Number of credits: 5.0

Semester: 1º

Category: COMPULSORY

Language: English

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AINARA GONZALEZ DE SAN ROMAN ROSADO

Academic Background

- PhD. Economics, Universidad del País Vasco, March 2013.
- MPhil. Economics and Finance CEMFI, Spain. June 2009.
- MPhil. Economics: Empirical Applications and Policies, U. País Vasco, Spain. June 2007.
- Licenciado en Economía, Universidad del País Vasco, Spain. June 2006.

Academic Experience

- Researcher at Fundación Novia Salcedo (NSF), Research Laboratory in Social Innovation, Bilbao. 2013
- Teaching Assistant, Teoría Macroeconómica III (Undergraduate) for Professor Cruz Angel Echevarria, Universidad del País Vasco, 2011-2012
- Researcher at Queen Mary, University of London (with Ghazala Azmat). 2012
- Teaching Assistant, Statistical Methods in Econometrics (Graduate), for Prof. Stephane Bohonomme, CEMFI, Spain. Fall 2010
- Teaching Assistant, Introduction to Statistics (Graduate), for Prof. Pedro Mira, CEMFI, Spain. September 2010
- Teaching Assistant, Microeconomics (Graduate) for Prof. Guillermo Caruana, CEMFI, Spain. Fall 2009
- Researcher at CEMFI, Madrid (with Stephane Bohonomme). Summer 2008
- Teaching Assistant, El Mercado de Trabajo en España

Office Hours

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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.

Objectives to be attained along the course:
- Apply econometric techniques for making decisions with quantitative and categorical data within an economic and business context.
- 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.

Skills to be acquired during the course:

- Fostering a logic and rigorous reasoning when facing quantitative analysis.
- The analysis and critical assesment of numerical results.
- The ability to formulate, express and solve a problem or question with a model.
- The ability to identify the relevant elements when facing a business decision.

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:

Learning Activity	Weighting	Estimated time a student should dedicate to prepare for and participate in
Lectures	20.0 %	25.0 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

AI POLICY
Restricted use of GenAI

In today's world, generative artificial intelligence (GenAI) is changing how we work, study and, in general, how we get things done. However, in the context of this course, the use of GenAI is not permitted, unless it is otherwise stated by the instructor. The use of GenAI tools would jeopardize the students' ability to acquire fundamental knowledge or skills of this course.

If a student is found to have used AI-generated content for any form of assessment, it will be considered academic misconduct, and the student might fail the respective assignment or the course.

PROGRAM

SESSION 1 (LIVE IN-PERSON)

Sustainability Topics:

- Economic Development

PRESENTATION

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

SESSION 2 (LIVE IN-PERSON)

Sustainability Topics:

       - Economic Development

REVIEW OF STATS

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

BASIC CONCEPTS IN ECONOMETRICS

Lecture 3: Basic econometric model, key elements and definitions.

SESSION 4 (LIVE IN-PERSON)

Sustainability Topics:

       - Social Challenge

ESTIMATOR & ITS PROPERTIES

Lecture 4: Definition of estimator and its properties: unbiasedness, efficiency, consistency and sufficiency.

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

INTRODUCTION TO THE LINEAR REGRESSION MODEL

Lecture 5: The simple linear regression model and its assumptions.

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

ESTIMATION AND PROPERTIES OF THE REGRESSION COEFFICIENTS

Lecture 7: 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 10 (LIVE IN-PERSON)

Sustainability Topics:

- Social Challenge

TRANSFORMATION OF VARIABLES

Lecture 8: Transformation in a new variable. Logarithmic transformation

SESSION 11 (LIVE IN-PERSON)

Sustainability Topics:

- Social Challenge

MULTIPLE LINEAR REGRESSION MODEL

Lecture 9. Introduction to the MLRM

SESSION 12 (LIVE IN-PERSON)

Sustainability Topics:

- Social Challenge

CLASS

Problem Set 2: OLS estimation.

SESSION 13 (ASYNCHRONOUS)

Sustainability Topics:

- Environment

COMPUTER CLASS 2

Estimation of the regression model.

SESSION 14 (LIVE IN-PERSON)

Sustainability Topics:

- Economic Development

MID-TERM REVIEW

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

SESSION 15 (LIVE IN-PERSON)

Sustainability Topics:

- Social Challenge

 MID-TERM EXAM

SESSION 16 (LIVE IN-PERSON)

Sustainability Topics:

- Social Challenge

HYPOTHESIS TESTING IN THE SLRM

Lecture 10: Individual and overall tests.

SESSION 17 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

HYPOTHESIS TESTING IN THE MLRM

Lecture 11: Individual and overall tests.

SESSION 18 (LIVE IN-PERSON)

Sustainability Topics:

- Social Challenge

DISCUSSION CLASS

Discussion of the results of the mid term exam

SESSION 19 (LIVE IN-PERSON)

Sustainability Topics:

- Social Challenge

CLASS

Problem Set 3: Hypothesis testing.

SESSION 20 (ASYNCHRONOUS)

Sustainability Topics:

- Social Challenge

COMPUTER CLASS 3

Hypothesis testing

SESSION 21 (LIVE IN-PERSON)

Sustainability Topics:

- Social Challenge
DUMMY VARIABLES
Lecture 12: Definition, application, types and interpretation.

SESSION 22 (LIVE IN-PERSON)

Sustainability Topics:
- Social Challenge
DUMMY VARIABLES
Lecture 13. Chow Test

SESSION 23 (LIVE IN-PERSON)

Sustainability Topics:
- Economic Development
CLASS
Problem Set 4: Dummy variables.

SESSION 24 (ASYNCHRONOUS)

Sustainability Topics:
- Economic Development
COMPUTER CLASS 4
Dummy variables and validation.

SESSION 25 (LIVE IN-PERSON)

Sustainability Topics:
- Social Challenge
- Economic Development
ESTIMATION PROBLEMS
Lecture 14: Specification errors. Definition and detection of the multicollinearity problem.

SESSION 26 (LIVE IN-PERSON)

Sustainability Topics:
- Economic Development
ESTIMATION PROBLEMS
Lecture 15: Other estimation problems. Non-linearity. Outliers

SESSION 27 (LIVE IN-PERSON)

Sustainability Topics:
- Social Challenge
- Economic Development
CLASS

Problem Set 5: Estimation problems.

SESSION 28 (ASYNCHRONOUS)

Sustainability Topics:

- Social Challenge
- Economic Development

COMPUTER CLASS 5

Estimation Problems

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

Ordinary evaluation

Your final grade in the course will be based on a combination of different items that are described in the following table:

criteria	percentage	Learning Objectives	Comments
Class Participation	10 %		Participation
Intermediate Tests	35 %		Mid-term exam
Workgroups	15 %		Workgroups
Final Exam	40 %		FInal Exam

RE-SIT / RE-TAKE POLICY
CLASS PARTICIPATION (10%)

Participation in class will be evaluated positively if students: (1) attain a threshold quantity of contributions that is sufficient for making a reliable assessment of comment quality. Additionally, (2) participation will be evaluated in quality terms. A high quality comment reveals depth of insight, rigorous use of case evidence, consistency of argument, and realism. A high quality presentation of ideas must consider the relevance and timing of comments, and the flow and content of the ensuing class discussion. It demands comments that are concise and clear, and that are conveyed with a spirit of involvement in the discussion at hand.

MID-TERM EXAM (35%)

The mid-term exam will take place in Session 15 and will cover Units 1 and 2 of the content of the course. More details about this exam will be provided in advance in class.

WORKGROUP (15%)

The grade for the group assignment will be the average of the five computer sessions (asynchronous classes). It will consist of an interpretation exercise using R-Studio results for each session, which will be given as a take-home assignment to be completed within 48 hours after the start of the corresponding asynchronous class. Each short exercise will comprise multiple-choice questions with penalties and represents 3% of the final grade. Attendance to these asynchronous classes will be recorded through the submission of these exercises.This part of the evaluation is in groups (no more than 3 students per group). More details about the asynchronous clases will be provided in advance in class.

FINAL EXAM (40%)

The final exam will take place in session 30 and will cover all the content of the course. More details about this exam will be provided in advance in class.

IMPORTANT: In order to pass the course, you need a minimum grade of 4 in the final exam. If your grade in the final exam do not reach the threshold value of 4, you will fail the course, even in the case in which your weighted average of the course exceeds 5.

Given that the dates of exams are provided in advance, no excepcions will be made. If you do not attend the exams (for whatever reason), this will automatically imply a 0 in this part of the course. Please take this into consideration when planning your semester.

RE-SIT / RE-TAKE POLICY

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 80% 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 Edition. Cengage. ISBN 9781337558860 (Printed)

   Any edition

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.