

TECHNICAL SHEET OF THE SUBJECT

Data of the subject	
Subject name	Econometría Financiera / Financial Econometrics
Subject code	E000012135
Main program	Grado en Análisis de Negocios/Business Analytics
Involved programs	Grado en Administración y Dirección de Empresas y Grado en Análisis de Negocios/Business Analytics [Fifth year]
Level	Reglada Grado Europeo
Quarter	Semestral
Credits	6,0 ECTS
Type	Optativa (Grado)
Department	Departamento de Gestión Financiera
Coordinator	Elena María Díaz Aguiluz
Schedule	available in the intranet
Office hours	available in the intranet

Teacher Information	
Teacher	
Name	Elena María Díaz Aguiluz
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SPECIFIC DATA OF THE SUBJECT

Contextualization of the subject
<p>Contribution to the professional profile of the degree</p> <p>Financial econometrics represents the area in econometric studies that focuses on quantitative analyses and estimations within the context of financial markets. Valuing financial assets and effectively managing financial risk is made possible through the use of econometric models.</p> <p>In the past decades, technological and regulatory change has created the need for the expansion and development of financial products or assets. This has required an improvement in economic and statistical tools for valuation and decision-making in a growingly complex and varied market. Hence, financial econometrics facilitates the understanding of behaviors as well as measuring and estimating data.</p> <p>Through the use of Financial Econometrics, one can perform the valuation of different types of assets while taking different risk levels into account. To do so, it is necessary to create econometric models and financial time series that allow the calculation of different scenarios and the consequences of changes in the variables that exist in the financial world.</p> <p>In this context, it is important to know the different risk levels, as well as the algorithms and existing models for their estimation. This and</p>



other data can be collected in high-frequency and historical financial time series, which are the main element for econometric analyses.

Prerequisites

This course corresponds to the last year of the undergraduate program and needs to be taken after an initial course of Econometrics and Forecasting Techniques, and Financial Theory I or equivalent. The course assumes an initial level of knowledge of the different financial assets that exist in a market. The course in Financial Markets is also useful and complimentary, although not compulsory.

A good initial level of statistics and financial mathematics is important for properly following the course. Skills in Excel and its functions are fundamental, and knowledge in programming languages is highly advisable, particularly in Matlab (reference program for the course), Python, or R.

Competencies - Objectives

Competences

GENERALES

CG01	Capacidad de organización y planificación en la identificación de problemas en el contexto de datos masivos	
	RA1	Describe, relaciona e interpreta situaciones y planteamientos de nivel medio
	RA2	Selecciona los elementos más significativos y sus relaciones en las situaciones planteadas
CG03	Resolución de problemas y toma de decisiones en un entorno de datos masivos tanto cuantitativos como cualitativos	
	RA1	Saber seleccionar para cada problema la técnica o técnicas de análisis de datos más adecuada para poder convertir los datos ζ en bruto ζ en información y ésta en conocimiento que ayude a la toma de decisiones y a mejorar la gestión.
CG08	Capacidad crítica y autocrítica en la sociedad de la información	
	RA1	Identifica los supuestos y las limitaciones de métodos y teorías
	RA2	Identifica, establece y contrasta hipótesis, variables y resultados de manera lógica y crítica
	RA3	Es capaz de construir un discurso propio, en un contexto de intercambio de opiniones.

ESPECÍFICAS

CE19	Conocer los fundamentos de las principales técnicas tanto de la estadística clásica (descriptiva e inferencial) como del data mining	
	RA1	Conocer los fundamentos de las principales medidas y técnicas para describir un conjunto de datos desde un punto de vista univariante y bivariante.
	RA2	Conocer los fundamentos de los principales procedimientos de inferencia estadística: estimación y contrastación de hipótesis
	RA3	Conocer los fundamentos de las principales técnicas de data mining supervisado (predictivo).



CEO31	Conocer los fundamentos y las principales técnicas econométricas y saber aplicarlas al campo de las finanzas	
	RA01	Saber especificar un modelo econométrico apropiado para dar respuesta a un problema de carácter económico-financiero
	RA02	Saber estimar y validar un modelo econométrico empleando algún software adecuado para al fin
	RA03	Saber interpretar los resultados obtenidos en los modelos econométricos y emplearlos como herramienta de ayuda a decisión y gestión empresarial en el ámbito financiero

THEMATIC BLOCKS AND CONTENTS

Contents - Thematic Blocks
Introduction to Financial Econometrics
Financial Data and Sources
Profitability and Modelling in Finance
A review of the simple regression model. The Capital Asset Pricing Model (CAPM)
Multiple regression model. T ratios and hypothesis contrast. T test and performance.
Regression Tools in Matlab
The regression model in matrix form in Matlab
Univariate Analysis
Autoregressive (AR) and moving average (MA) processes
ARMA processes
Estimation of AR, MA and ARMA processes in Matlab
Multivariate Analysis
Simultaneous Equations in Finance
The Vector Autoregressive Model (VAR)
Estimation of a VAR in Matlab
Unit Roots and Cointegration
Stationarity and unit root tests. Market efficiency
Cointegration, mean reversion and Vector Error Correction Model
Cointegration, correlation and trading strategies
Modelling Volatility
Historical volatility and implicit volatility
ARCH and GARCH models
Stochastic Volatility Models



Estimating Volatility Models in Matlab

Asset Pricing

Fama French Model

Factor Investing

Factor Investing in Matlab

TEACHING METHODOLOGY

General methodological aspects of the subject

The course is held in the classroom and imparted through lectures, exercise solving, and classes in the computer lab or through personal laptops, based in Matlab programming languages.

The students have to prepare the material before each class.

In-class Methodology: Activities

The number of lectures is approximately half of the hours of class devoted to the course, where the professor will define and explain the concepts and technical terminology, illustrate the theory and analytical frames with examples, and will identify the topics for debate in the discipline.

The role of the student will be active listening, trying to understand the arguments and theories, relating the class content with his/her existing knowledge, and taking structured notes of the most important contents.

The second half of the classes will consist of programming practices in Matlab on the studied models. Previous preparation of the student is a necessary condition for making maximum profit from the lecture. The student will be able to follow the lectures by bringing a personal laptop to the classroom.

CEO31, CE19, CG01,
CG08, CG03

Non-Presential Methodology: Activities

Students will have to complete the practices in Matlab for the estimation of models, which will then be discussed in class and graded by the professor.

CG08, CE19, CEO31,
CG01, CG03

SUMMARY STUDENT WORKING HOURS

CLASSROOM HOURS		
Lecciones de Carácter expositivo	Ejercicios y resolución de casos y de problemas	
30.00	30.00	
NON-PRESENTIAL HOURS		
Ejercicios y resolución de casos y de problemas	Estudios individual y/o en grupo, y lectura organizada	Trabajos monográficos y de investigación, individuales o colectivos
30.00	60.00	30.00

EVALUATION AND CRITERIA

Evaluation activities	Evaluation criteria	Weight
Final Exam	Resolution of a case in the computer and interpretation of results (60% Matlab code and 40% questions)	50
Practices in Matlab and model estimation	The ability to collect data from the web, estimate models in Matlab and interpret results will be graded	30
Research Project	The ability to collect data from the web, estimate models in Matlab, and interpret results will be graded.	10
Participation and Attendance	The activity of students in making (and answering) questions, as well as solving class exercises, will be graded	10

Ratings

In order to add the grade obtained in continuous evaluation, it is necessary to obtain a minimum of 5 in the final exam.

For students with a school waiver, the final exam will constitute 100% of the grade. This will also be the case for all students on the second call and up, as well as for exchange and extraordinary students that need to take this course in ICADE.

According to the General Regulations of the University, art. 168.2.e: "carrying out actions tending to falsify or defraud the academic performance evaluation systems", the improper use of ChatGPT or another IAG will be considered a serious offense. The consequences of this will include "temporary expulsion of up to three months or the prohibition to take the exam in the next call to the imposition of the sanction, in one or several subjects in which the student is enrolled, [...] apart from assuming the grade of fail (0) in the respective subject, [...] [and] the prohibition to take the exam in that subject in the next call." Specifically, in this subject, the teacher may allow the use of IAG for specific activities of the subject; where the student is obliged to do the following:

- That the student clearly indicates why he has used IAG (ChatGPT). All content created with generative AI must be labelled as such. All content that uses generative AI and is adapted, must be labelled in the same way as authors are cited.
- It includes as additional material (annexes) the complete prompt (questions and answers) of your conversation with IAG (ChatGPT) to generate the task.

In case of not complying with the above obligations, the use of IAG by the student will be considered improper use for the purposes mentioned above.

BIBLIOGRAPHY AND RESOURCES

Basic Bibliography



COMILLAS

UNIVERSIDAD PONTIFICIA

ICAI

ICADE

CIHS

Syllabus
2023 - 2024

Brooks, C. (2019). *Introductory Econometrics for Finance* (4th ed.). Cambridge: Cambridge University Press. doi:10.1017/9781108524872

Complementary Bibliography

Campbell, John; Lo, Andrew; MacKinlay, Andrew (1997). *The Econometrics of Financial Markets*. Princeton: Princeton University Press. ISBN 9780691043012.

Gujarati Damodar N. (2004). *BASIC ECONOMETRICS, FOURTH EDITION*. McGraw-Hill

Hill, Griffiths, Lim (2011) *Principles of Econometrics 4a Edición (International Student Version)*, Wiley

Greene, William H. (2018). *Econometric Analysis*, 8th Edition, Pearson

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