Financial Statistics

Academic Year: (2019 / 2020) **Review date: 06-11-2019**

Department assigned to the subject: Department of Statistics

Coordinating teacher: RUIZ ORTEGA, ESTHER

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

STUDENTS ARE EXPECTED TO HAVE COMPLETED

Any degree that allows you to be a student of the Master in Finance

COMPETENCES AND SKILLS THAT WILL BE ACQUIRED AND LEARNING RESULTS.

This course is classified in the area of quantitative methods.
The student leran about the basic concepts on the analysis of financial time series. Also, basic models to represent and forecast the evolution of these series are described. Instruments useful for theoretical financial models are also considered.

The first part of the course deals with basic concepts in the analysis of time series which are basic for the analysis of financial data. In particular, the students learn about the difference between independence and uncorrelatedness, white noise and martingale difference. In the second part of the course, the basic models to represent the evolution of the conditional mean of time series are described. Finally, the last part of the course deals with models to represent the evolution of volatilities which are central to many financial models.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction: Basic concepts
   - 1.1 Why quantitative tools are important for financial professionals
   - 1.2 Correlation and independence: differences between white noise, strict white noise and Gaussian white noise.
   - 1.3 Describing variables: Unconditional and conditional moments.
   - 1.4 Linear and non-linear models.
   - 1.5 Covariance stationarity and strict stationarity.

2. Univariate linear models
   - 2.1 Transformations to stationarity: random walks.
   - 2.2 Wold theorem: justifying the linearity
   - 2.3 Properties of ARIMA models
   - 2.4 Prediction

3. GARCH models
   - 3.1 Empirical properties of financial time series
   - 3.2 Properties of ARCH(1) models
   - 3.3 Properties of GARCH(1,1) models
   - 3.4 Testing for conditional heterocedasticity
   - 3.5 Estimating parameters and volatilities

LEARNING ACTIVITIES AND METHODOLOGY

The teacher will present the main theoretical concepts using Power Point slides which are available to the students previous to each lecture. On top of theoretical classes, the students will have weekly classes in the computer room where they have to program the contents using Matlab. In these computer classes, the students analyse both simulated and real data on financial returns. They will also do two homework with exercises with both theoretical and empirical contents. Finally, there will be an exam of the main issues.

ASSESSMENT SYSTEM

60% of the final mark is obtained in a final examination. 40% of the final mark is based in two home-works if the mark in the final examination is over 4.

Los estudiantes que no alcancen la calificación mínima para aprobar deben acudir al examen extraordinario. En caso de que se acuda a dicho examen, los criterios anteriores también se aplicarán.

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- González-Rivera Forecasting for Economics and Business, Pearson, 2013
- R.S. Tsay Analysis of Financial Time Series, Wiley, 2002
- Taylor, S.J. Modelling Financial Time Series, World Scientific Publishing, 2008

ADDITIONAL BIBLIOGRAPHY

- Campbell, J.Y, W. Lo and A.C. MacKinlay The Econometrics of Financial Markets, Princeton University Press, New Jersey, 1997
- Defusco, R.A., McLeavey D.W., J.E. Pinto and D.E. Runkle Quantitative Investment Analysis, CFA Institute, John Wiley & Sons, New Jersey, 2004