27545 - Statistical Analysis for Finance

Información del Plan Docente

Academic Year	2017/18
Faculty / School	109 - Facultad de Economía y Empresa
Degree	449 - Degree in Finance and Accounting
ECTS	6.0
Year	4
Semester	Second semester
Subject Type	Optional
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

There will be theoretical and computer practical sessions. In theoretical sessions the concepts and mathematical foundations of the statistical techniques will be exposed by means of slides and theoretical notes. Practical sessions will be taught with the computer in the computer classroom. In these sessions simulated and real financial time series will be analyzed by applying the statistical tools explained in the theoretical sessions. To that aim we will use some libraries of R specialized in the selection, estimation and validation of ARMA-GARCH models.

In these classes some illustrative simulated and real time series will be set-up by the teacher and will be solved by the different teams during half hour with a posterior half an hour to discuss among all the groups, the obtained results.

Platform *Moodle 2.0* will be used to publish all the theoretical and practical materials and all the information about the development of the subject along time.

5.2.Learning tasks

There are programmed several types of learning activities in order to achieve the objectives of the subject.

- Theoretical sessions:

These sessions will be taught by means of participative master classes where a set of slides will be used in order to explain the theoretical part of the subject. The aim of these sessions will be to establish the theoretical foundations of each theme, illustrating the studied concepts and ideas by means of illustrative practical examples. The teacher will use his computer to illustrate in these examples, the application of the explained statistical techniques. It is recommended to attend to these sessions because, in our experience, the theoretical part of the subject is the more difficult part to understand and study.

- Computer Practical sessions:

These sessions will be carried out in the computer rooms with the students working by teams. In these classes some simulated and real series will be set-up by the teacher and will be solved by the different teams during half hour with a posterior half an hour to discuss among all the groups, the obtained results. The R statistical package will be used to solve these practical problems.

5.3.Syllabus

Lesson 0: Introduction

Course objectives. Evaluation. Teaching program. Bibliography

Lesson 1: Empirical characteristics of the financial time series

Assets returns. Empirical characteristics of the returs: mean, median, skewness, kurtosis, normality, autocorrelation. Introduction to R: installation, basic commands, libraries.

Lesson 2: Dynamic linear models for financial time series

Stationary series. Autocorrelation. White noise. AR, MA and ARMA models: identification, estimation, goodness of fit and prediction. Non-stationary series: unit roots tests, ARIMA models.

Lesson 3: Statistical analysis of volatility (I)

Introduction. ARCH, GARCH and ARMA-GARCH models: properties, identification, estimation, goodness of fit and

prediction. Applications: dynamic estimation of correlations and beta coefficients: minimum variance portfolios.

Lesson 4: Statistical analysis of volatility (II)

IGARCH models. Asimmetric effect: GJRGARCH, EGARCH and APARCH models. Components GARCH. GARCH in mean. Insampling and outsampling validation of models.

Lesson 5: Value at Risk

Measuring risk. Coherence. Value at Risk. Conditional Value at Risk. Risk Metrics. Backtesting techniques.

5.4.Course planning and calendar

The course planning and calendar will be announced in the website of the Faculty and in the website of the subject in Moodle.

5.5.Bibliography and recommended resources

[BB: Bibliografía básica / BC: Bibliografía complementaria]

- [BB] Tsay, Ruey S.. An introduction to analysis of financial data with R / Ruey S. Tsay. . Hoboken, N.J. : Wiley, c2013.
- [BC] Brooks, Chris. Introductory econometrics for finance / Chris Brooks . 3rd ed. Cambridge : Cambridge University Press, 2014
- [BC] Christoffersen, Peter F.. Elements of financial risk management / Peter F. Christoffersen Amsterdam [etc.] : Academic Press, cop. 2003
- [BC] Daníelsson, Jón. Financial risk forecasting : the theory and practice of forecasting market risk, with implementation in R and Matlab / Jón Daníelsson. . West Sussex : John Wiley and Sons, cop. 2011.
- [BC] Hubbert, Simon. Essential mathematics for market risk management / Simon Hubbert. . Chichester, West Sussex, UK : Wiley, 2012.
- [BC] Ruppert, David. Statistics and finance : an introduction / David Ruppert New York, [etc.] : Springer, cop. 2004