Advanced financial statistics

Academic Year: (2018 / 2019) **Review date: 26-04-2018**

Department assigned to the subject:

Coordinating teacher: LOPES MOREIRA DA VEIGA, MARIA HELENA

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Financial Statistics

OBJECTIVES

Financial econometrics is the intersection of statistical techniques and finance with the aim to ascertain how financial prices are determined and to test models that try to replicate how financial markets work. The course will cover the tools of financial econometrics and empirical finance with a moderate degree of sophistication, starting by introducing the extensions to the basic generalized autoregressive conditional heteroskedasticity model (GARCH) in terms of statistical properties, estimated parameters and volatilities. Then, we will discuss models of high-frequency financial data and present non parametric estimators of the integrated volatility. Finally, we present alternative models of the interest rate term structure and use the Kalman filter for the estimation of the unobserved components. In the two last weeks of the course there will be a heavy emphasis on applications.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Extensions of volatility models

1.1. GARCH models with leverage effect
1.2. Statistical properties of the new models
1.3. Estimating parameters and volatilities
1.4. Stochastic volatility models and its statistical properties
1.5. Estimation methods and some examples

2. Multivariate volatility models

2.1. Multivariate GARCH models
2.2. Multivariate stochastic volatility models
2.3. Estimation methods and some examples

3. Real examples proposed by the practitioner

3.1. The use of financial econometrics in the risk management process: The case of Repsol
3.2. Asymmetric densities and other topics associated to time series involved in the daily work of Repsol

LEARNING ACTIVITIES AND METHODOLOGY

Students will work with Excel and Matlab. Every class, the Professor will present the main theoretical concepts using PDF presentations. After 2hours of theory, the students solve exercises using matlab and excel for consolidating the concepts learnt before. The exercises are solved individually with the help of the Professor.

ASSESSMENT SYSTEM

There will be:
-- a final exam (60% of the grade). The minimum grade in the exam to pass the course is 4.
-- a homework assignment (40% of the grade).

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

BASIC BIBLIOGRAPHY

- Ruey S. Tsay Analysis of Financial Time Series, Wiley, 2010

- Taylor, S. Asset price dynamics, volatility and prediction, Princeton University Press, 2005

ADDITIONAL BIBLIOGRAPHY

- Aggoun L. and Elliot R. Measure theory and filtering, introduction with applications, Cambridge University Press, 2004

- Campbell, J. Y., Lo, A. W., and MacKinlay, A. C. The Econometrics of Financial Markets, Princeton University Press, New Jersey, 1997

- Dacarogna, M. M., Gencay, R., Muller, U. A., Olsen, R. B., and Pictet, O. V. An Introduction to High-Frequency Finance, Academic Press, 2001

- Dacarogna, M. M., Gen¿cay, R., M¿uller, U. A., Olsen, R. B., and Pictet, O. V. An Introduction to High-Frequency Finance, Academic Press, 2001

- Harvey A.C. Forecasting, structural time series models and the Kalman filter, Cambridge University Press, 1989

- James, J. and N. Webber Interest rate Modelling, John Wiley & Sons, 2002

- Silvennoinen, A. and Teräsvirta, T Multivariate GARCH models, Handbook of Financial Time Series, New York: Springer., 2008