Quantitative Macroeconomics

Academic Year: (2018 / 2019) **Review date: 22-06-2018**

Department assigned to the subject: Economics Department

Coordinating teacher: ESCRIBANO SAEZ, ALVARO

Type: Electives ECTS Credits : 6.0

Year : Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Basic courses of Economics (Microeconomics and Macroeconomics) and Econometrics

OBJECTIVES

This is an empirical macroeconomic course. The student will become familiar with univariate macroeconomic modeling, analyzing macroeconomic relationships using time series data.
The material taught in this course will lead the student to acquire the ability to use basic econometric programs (EVIEWS, GRETEL) for univariate time series data, for single and multiple equations (VAR models) stationary and non stationary (Cointegration). These abilities will give the student the capacity to construct empirical economic models and to test macroeconomic hypotheses based on econometric models. These models are commonly used in macroeconomics and finances, in particular those related to business cycles (booms and recessions), nonlinear models and determinants of economic growth.
Other skills that the student will acquire include familiarity with methods of analysis of the current state of the economy that are useful to interpret the movements of macroeconomic aggregates and of sectors in market economies.

DESCRIPTION OF CONTENTS: PROGRAMME

Part I: Univariate analysis of macroeconomic time series

I.1 Univariate Models

I.1a Evolution & descomposition of univariant time series

- Stationary and non-stationary variables. Integrated processes, random walks, martingales and unit root testing (Dickey-Fuller)
- Transformations of variables (logarithms & differencing)
- Trend and cyclical properties of macroeconomic variables
- Trend-Cycle decompositions: Beveridge-Nelson (BN) and the Hodrick-Prescott (HP) filter
- ARIMA Models: Impulse Response Functions and Forecasting

Empirical Applications:

- International evolution of income per capita and it's components
- Evolution of macroeconomic aggregates
- Purchasing power parity (PPP)
- Descriptive and graphical analysis of the current state of the economy
- Estimation and forecasting of Steel consumption in Spain
- Efficiency of financial markets, etc.

I.1b Non-linearity and Stationarity

- Seasonal filters, seasonally adjusted variables
- Non-linearity in parameters vs. Non-linearity in regressors,
- Structural change in the parameters and threshold variables
- Smooth Transition Autoregressive Models (STAR)
- Autoregressive Models with Conditional Heteroskedasticity (ARCH, GARCH)
- Non-linearity in the mean versus non-lineality in the variance

Empirical Applications:

- Modeling of energy prices in centralized markets (asymmetries and volatility)
- Asymmetries in the increases and decreases of petrol prices etc., Rockets and Feathers hypothesis, etc.
- Modeling inflation and its volatility
- Modeling of financial assets and their volatility

I.2 Single Equation Models
I.2a Specification and comparisons of single equation models
- Estimation & inference in static and dynamic regression models
- Specification of models from general to particular
- Specification testing: Consistency and nested models
- Exogeneity & Causality: Concepts & tests
- Error Correction Models (EC or EqCM) & Co-integration
- Spurious regression & cointegration

Empirical Applications:
- Micro-fundamentals of single-equation specification
- Production functions and growth accounting
- Determinants of growth
- Demand for Money in the UK (1878-1970)
- Hypothesis testing of finance models (CAPM), etc.

I.2b Non-linear single-equation Models
- Estimation & inference in dynamic non-linear regression models
- Non-linear error correction models (NEC)
- Smooth transition regression models (STR) & structural change

Empirical Applications:
- Money Demand in the UK (1878-1970)
- Inflation & unemployment: The Phillips Curve

Part II: Analysis of Mulitple Equation Models
II.1 The Vector Autoregression (VAR) model
a) Stationary Case:
- Structural form (SVAR) vs. Reduced form (VAR): Identification
- VMA Representation (Wold) & Impulse Response Functions
- Variance Decomposition and Forecasting
- Formulation, estimation, diagnostics, selection of lag length.
- The SVAR model, weak and strong exogeneity, Granger causality, the Lucas¿s critic, super-exogeneity

b) Non-stationary case without cointegration:
- Multivariate trend-cycle decomposition of Beveridge-Nelson (BN)
- Structural Vector Autoregression (SVAR) with I(1) & I(0) variables: Identification by use of long-run restrictions

Empirical applicacions:
-Analysis of the New York Fish Markets (Fulton): System of equations of supply and demand.
-Testing long-run neutrality
-Blanchard and Quah model with long-run restrictions: GDP and Unemployment

c) Non-stationary case with cointegration:
- Multivariante trend-cycle decomposition of Beveridge-Nelson (BN) & the representation of common trends
- Error Correction Mechanism & analysis of co-integration: Granger´s Representation Theorem
- Multivariate time series models/Vector Error Correction Models (VEqCM)
- The Maximum-Likelihood approach of Johansen for the estimation of the rank of cointegrated systems

Empirical application
-Money Demand

Part III: Student´s Empirical Project

LEARNING ACTIVITIES AND METHODOLOGY

The teaching method will be the following:
(1) Magistral classes, where the concepts will be developed in detail and the properties of macroeconomics models of time series will be covered. To facilitate understanding and learning of this material by the student, the students will have access to the class material (slides etc.) via the internet. They will also receive an ample list of complementary materials that will permit them to understand and go deeper into issues covered in class, and into some related issues of interest that may not have been covered in class.
(2) Discussion of the exercises done by the student, covering the estimation and specification of classic models in the literature, previously covered in class, such as the various exercises of estimation and forecasting with time series in various economies and different time periods.
(3) Comments on current economic issues to which the student can use the knowledge acquired in the course to deepen their understanding.
(4) Practical classes in reduced groups where the students will learn to make arguments and reason in public, to use the necessary econometric programs (above all E-Views) to do estimation and testing of macroeconomic models of time-series. This will be done by the use of both algebraic and empirical exercises in class, with an emphasis on the applied nature of this course.
(5) Complete an empirical project by the end of the course that demonstrates that the student understands how to apply with rigor and economic reasoning the econometric techniques studied. The project should be well written and have the basic structure of a short scientific article: Introduction, literature review, model and estimation, description of the data used and their quality, empirical results, evaluation of the model and hypothesis tests, conclusions & future extensions. Every student should give a formal oral presentation (in Power Point) of their empirical project in front of all students of the class and the professor.

ASSESSMENT SYSTEM

The final mark of the course will consist of two parts:
1) Continuous evaluation (70%): the weekly assignments, class participation and the oral defense of the empirical project carried out by the student (30%) and the written empirical project (40%).
2) The final exam (30%). Before doing the final exam the students must do the oral defense of the project and finish the written empirical project.

% end-of-term-examination:	30
% of continuous assessment (assigments, laboratory, practicals…):	70

BASIC BIBLIOGRAPHY

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- MILLS T.C. AND MARKELLOS R.N. THE ECONOMETRIC MODELLING FOR FINANCIAL TIME SERIES (3RD ED.), CAMBRIDGE UNIVERSITY PRESS. , 2010
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ADDITIONAL BIBLIOGRAPHY

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