UNIVERSITY OF VALENCIA
MASTER IN ECONOMICS

Course 2016-2017

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MECONO 44343 MACROECONOMETRICS

The purpose of this course is to introduce the students to the basics of contemporary time series analysis. The approach of the course is mostly applied, although the theoretical fundamentals will also be part of the teaching material and the classes. The students are expected to learn the main tools currently used by practitioners in Macroeconomics, as well as to interpret the results of research articles as they are published in scientific journals.

The program consists of four lessons that correspond to approximately 10-12 hours of theoretical and applied classes each. The course starts with a revision of the univariate analysis of stationary data, followed by the main concepts of non-stationary data and the most frequently applied tests for the determination of the order of integration of the variables. The third lesson will start with the definition of cointegration and single equation methods for testing and estimation. Finally, the last lesson will be devoted to the multivariate analysis of time series with VAR models

In the laboratory sessions the students will use econometrics software to apply to real data the concepts and methods already studied in class. We will choose mostly open-source software in our sessions, such as R and Gretl, although we cannot discard using other programs if they are more suitable for a particular topic or test.

OUTLINE OF THE COURSE:

1. Univariate analysis of stationary time series (ARIMA).
1.1. Introduction:
    a. Time series: definitions
    b. Estimated autocorrelation function
1.2. Models: AR, MA and ARMA
    a. Autoregressive AR(p) models
    b. Moving average MA(q) models
    c. ARMA(p,q) models
1.3. Non-stationary processes: ARIMA(p,d,q)
1.4. Application of the methodology

2. Non-stationary time series and testing for the order of integration
2.1. Concepts and definitions
2.2. Unit root tests
    a. Dickey-Fuller
    b. Phillips-Perron unit root tests
    c. Elliot-Rothenberg-Stock Tests
    d. Schmidt-Phillips Test
2.3. Stationarity KPSS test
2.4. Unit root tests with structural breaks
    a. Perron's exogenous break tests in trended variables
    b. Zivot and Andrews (1992) unit root test

3. Long-run relationships and cointegration
3.1. Introduction: definition of cointegration
3.2. Tests for no cointegration based on the residuals of the static regression
    a. DW test applied to the cointegration residuals (CRDW)
    b. ADF test by Engle and Granger (CRADF)
    c. Phillips-Ouliaris (1990) tests
    d. Cointegration test by Shin (1994)
3.3. Tests based on the Error Correction representation
3.4. The LSE approach to dynamic modeling

4. VAR models
4.1. Introduction and motivation
4.2. VAR models in reduced form
    1 Specification and Estimation
    2 Diagnostic Tests
    3 Causality Analysis
    4 Forecasting
    5 Moving average representation

6 Structural analysis (impulse response functions & Forecast Error Variance Decomposition)
4.3. Structural VAR models
1. Identification with short run restrictions
2. Identification with long-run restrictions
3. Extensions

Basic References

B. Pfaff (2011): *Analysis of Integrated and Cointegrated Time Series with R*, second edition. Springer.
Harris, R.I.D. (1995): *Using Cointegration Analysis in Economic Modelling*, Prentice Hall.

Econometric software

RStudio: http://www.rstudio.com

Gretl: http://www.LearnEconometrics.com/gretl.htlm.

Additional References

Adkins, L.C. (2014): Using gretl for Principles of Econometrics, 4th Edition. Version 1.041. http://www.LearnEconometrics.com/gretl.htlm.
Cottrell, A. and R. J. Lucchetti (2014): *Gretl Command Reference. Gnu Regression, Econometrics and Time-series Library*, October. http://gretl.sourceforge.net
Hayasi, Y. (2000): *Econometrics*, Princeton University Press.
R. C. Hill, W.E. Griffiths and G.C. Lim (2011): *Principles of Econometrics*, fourth edition. Ed. Wiley.
Kleiber, C. and A. Zeilleis (2008): *Applied Econometrics with R*, Springer.

Wooldridge, J.M. (2013). *Introductory Econometrics: A Modern Approach*, 5th edition. Cengage Learning (Previous editions: 2009, 2006, 2003).