

University of Alicante
Time Series: 2011-2012
Instructor: Garry Phillips

Objectives:

This course builds on an earlier course in univariate time series and has the following objectives:

1. To introduce the students to the main developments in time series econometrics which have assumed considerable importance in the last two decades.
2. To provide the students with an understanding of the relevant concepts which are fundamental to an understanding of time series econometrics.
3. To examine, in detail, the statistical models that are in use and the techniques and methods that are used in their analysis and to note their strengths and limitations.
4. To consolidate the knowledge gained by solving simple problems
5. To provide the student with an ability to critically assess the many applications of time series econometrics to problems in economics.

Teaching methods

The course will contain approximately 22 hours of lectures and 8 hours of classes. The classes will be devoted to dealing with the solution to problems that require the use of the methodology and theoretical developments covered in the lectures.

Outline of the Course

1. **Introduction:** Review of Maximum Likelihood estimation in time series models.

2. Multivariate Time Series: Vector Autoregressions. Characteristics and ML Estimation. Impulse Response Function, Orthogonalised Impulse Response Function, Weak exogeneity. Granger causality. Vector autoregressions and structural econometric models.

3. **Non-stationarity:** Properties of estimators and tests in non-stationary models. Super efficiency, Non-stationary time series. Integrated processes, Trend and difference stationarity. Testing for unit roots. Spurious regressions

4. **Cointegration and Error Correction Models:** Cointegration. Testing for cointegration. Estimating the cointegrating vector. Hypothesis: Testing. Cointegration and its implications.

5. **Cointegration in systems of equations:** Estimating cointegrating vectors in systems. Inference about the cointegration space. Asymptotic distributions of estimators of cointegrating vectors.

6. **Generalised Methods of Moments: Estimation by GMM.** Asymptotic distribution of GMM estimators. Instrumental variable estimation.

If time permits we shall also consider

7. **Time Series Models of Heteroscedasticity:** ARCH and GARCH Models. Maximum likelihood estimation for ARCH and GARCH models. Further extensions.

References

The most comprehensive textbook in the field is that by **Hamilton, J.D.** (1994) entitled, "Time Series Analysis", Princeton Univ Press. While it is over sixteen years since it first appeared, it is still the best book for our type of course. This book will also be important for any follow up course in semester 2. Numerous references will be made to this text but the more technical material will be avoided at this stage.

For some sections of the course **Enders, W.** (2004). "Applied Econometric Time Series", Second edition. John Wiley and Sons Inc, will be especially helpful.

Other useful books include

Kirchgassner G and J. Wolters (2007) "Introduction to Modern Time Series Analysis". Springer.

This is, as the title suggests, an introductory treatment but the book will be useful for its coverage, in relatively simple terms, of some of the more difficult areas in modern time series.

More established texts are:

Banerjee A. et al (1993),” Cointegration, Error Correction and the Econometric Analysis of Non-Stationary Data”.Oxford University Press.

Harvey A.C. (1993).”Time Series Models”.Second edition.Harvester Wheatsheaf.New York.

Hatanaka M. (1996).” Time Series Based Econometrics”.OUP.

Johansen S. (1995). “Likelihood-Based Inference in Cointegrated VectorAutoregressive Models”.OUP

Grading Criteria

The course will be assessed on the basis of a 3 hour examination. There is no provision for coursework assessment.

Timetable

For 2011-12 the course will meet on Wednesdays 15.00-18.00 in Aulio 1.

The course will not start in the first week of the semester and the first meeting is on 19 October. The course will run for 8 weeks which leaves two remaining sessions to be arranged at the first meeting.