

**Universidad Torcuato Di Tella**  
**Maestría en Economía**  
**Series de Tiempo 2012**

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Profesor de Practico: Martin Tronbetta.

**Aims**

This course aims to familiarise students with modern econometric techniques relating to the analysis of time series. The interaction between economic theory and econometric analysis is emphasised, and students will be trained in formulating, estimating and testing models for time series.

**Learning Outcomes**

At the end of the course, students will be able to demonstrate that they can:

- Understand the principles and applications of VAR modelling and use them in practice.
- Develop and analyse simple models of dynamic heteroscedasticity.
- Understand the implications of structural breaks and unobserved components in econometric modelling.
- Understand the Principles of Markov Chain Monte Carlo.
- Use standard econometrics packages and interpret their output.
- Understand and critically assess empirical findings reported in the applied economics and finance literature.

**Teaching Arrangements**

The course is taught over 10 weeks. There are a lectures (Mondays) and classes to go through problem sets.

**Course Assessment**

There will be a take home that will involve the use of standard econometric packages.

**Reading**

Typed lecture notes are provided but students should also refer to the following texts for more detailed discussions on the various topics:

*Recommended Textbooks*

Hamilton, J.D (1994), *Time series Analysis*, Princeton University Press.  
Hayashi, F. (2000), *Econometrics*, Princeton University Press.  
Kim C. J. and Nelson (1999) *State Space Models with Regime Switching* MIT Press.

*Easier Treatment of the Material*

ENDERS, W. (1995), *Applied Econometric Time Series*, New York: Wiley.

FRANSES, P. H. (1998), *Time Series Models for Business and Economic Forecasting*, Cambridge: Cambridge University Press.

HARVEY, A. C. (1993), *Time Series Models*, 2nd Ed., New York: Harvester Wheatsheaf.

MILLS, T. C. (1999), *The Econometric Modelling of Financial Time Series*, 2nd Ed., Cambridge: Cambridge University Press.

PATTERSON, K. (2000), *An Introduction to Applied Econometrics: A Time Series Approach*, London: Macmillan.

## **Lecture Schedule**

### 1) GENERALIZED METHOD OF MOMENTS

Lecture notes

Hamilton (1994), Ch. 14.

Hayashi, F. (2000), Ch 3 and 4.

### 2) VECTOR AUTOREGRESSIVE MODELS

VAR model building; impulse-response analysis; Granger causality.

Lecture notes

Hamilton (1994) Chs. 10-11.

Also:

Enders (1995), Ch. 5.

Franses (1998), Ch. 9.

Harvey (1993), Ch. 7.

Mills (1999), Ch. 6.

### 3) TIME-SERIES MODELS OF HETEROSCEDASTICITY

ARCH, GARCH, and EGARCH models; maximum-likelihood estimation; model selection.

Lecture notes

Hamilton (1994), Ch. 21.

Also:

Enders (1995), Ch. 3.

Franses (1998), Ch. 7.

Harvey (1993), Ch. 8.

Mills (1999), Ch. 4.

Patterson (2000), Ch. 16.

### 4) MULTIVARIATE NON-LINEAR STOCHASTIC MODELS

Lecture notes

Hamilton (1994), Ch. 21.

Also:

Enders (1995), Ch. 3.

Franses (1998), Ch. 7.

Harvey (1993), Ch. 8.

Mills (1999), Ch. 4.

Patterson (2000), Ch. 16.

7) THRESHOLD MODELS

Threshold, STAR and C-STAR models.

Lecture Notes

6) MARKOV SWITCHING MODELS.

Lecture notes

Hamilton (1994), Ch. 22.

7) THE KALMAN FILTER

Lecture notes

Hamilton (1994), Ch. 13.

8) Markov Chain Montecarlo

Lecture notes

Kim and Nelson (1999), Chs. 7, 9.