Time Series and Forecasting

Laura Mayoral
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CONTACT INFORMATION
Email: laura.mayoral@iae.csic.es
Office hours: by appointment

COURSE WEB

1 Description

This 20-hour course is an introduction to the theory and application of time series methods in econometrics. The course covers the basic theoretical foundations of time series analysis and provides tools for carrying out empirical work with time series data. Topics covered include univariate and multivariate stationary and non-stationary models. The course is mainly designed for students who will use time series data in their empirical macroeconomics analysis.

2 Prerequisites

The course assumes familiarity with probability and statistics. A good source for reviewing this material is A. S. Goldberger, “A course in Econometrics”, 1991, Harvard University Press, Chapters 1 to 10. Some notions of programming in Matlab will be useful.
3 Course outline

1. Preliminary concepts: Stochastic process; Stationarity; Autocovariance and autocorrelation function; Partial autocorrelation function; Asymptotic theory for dependent processes.


3. Model Selection and Information criteria; Estimation and Diagnostic checking.


4 Grading

The final grades will be based on a final exam (70%), and three problem sets (30%).

5 References

5.1 Textbooks

The main reference for this course is:


Other useful references:


5.2 Other interesting readings

The following is a list of references related to the topics that we will cover in the course. They are not mandatory, they are just additional references for those who wish to study specific topics in greater detail. "*" denote more relevant references.

- Stationary time series

  * Hamilton, Chs. 1-5, 7, 8.
  Brockwell and Davis, Chs. 1, 3, Sect. 5.7.

- Inference and model selection in linear time series models

  * Hamilton, Ch. 7; Hayashi, Chapter 2

- Univariate non-stationary processes
*Hamilton, Ch. 17.


• Structural breaks and non-linearity

*Hamilton (1994), Ch. 22.


- **Model selection and information criteria**


- **GARCH processes and estimation**


Hamilton (1994), Ch. 21.

- **Multivariate unit roots and cointegration**


- Vector Autoregressions. Impulse response functions, variance decompositions, inference


- Inference for impulse responses