Doctoral Program in Economics

UNIVERSITÀ DEGLI STUDI FIRENZE   UNIVERSITÀ DI SIENA   UNIVERSITÀ DI PISA

Academic year 2025/26

TIME SERIES

Period:

VI term

Course hours:

20

Teachers:

Alessandro Palandri, Francesco Valentini

Exam method:

TBD

Prerequisites:

Passing grade in Econometrics I, Panel Data.

Program

The first part of the course introduces key features of time series data, with a focus on stationarity. In the stationary setting, students study static linear regressions and dynamic models such as ARIMA and ADL, along with lag operators, model selection, and forecasting. The course then addresses non-stationary processes, covering autoregressive unit-root models and unit-root testing. Concepts of economic equilibrium and error correction motivate the study of cointegration, leading to the Engle-Granger two-step method and the analysis of dynamic adjustments.

The second part of the course extends the notions and methods discussed above to multivariate analysis. Students are first introduced to multivariate stochastic processes, with a particular focus on VAR models. Subsequently, standard methods in macroeconomic empirical analysis, such as SVAR and Cointegration analysis, are presented from both theoretical and applied perspective.

The econometric software “gretl” will be used throughout the course.

Educational objectives

The course covers fundamental topics in time series and macroeconometrics. It will deliver a general overview of a comprehensive list of empirical methods that allow researchers to analyze time series data. Such tools are essential for PhD students who aspire to conduct state-of-the-art empirical research. In addition, the course will provide general guidance on formulating and executing (empirical) research ideas.

Bibliographical references

1. “A Guide to Modern Econometrics” Marno Verbeek, Wiley, 2017
2. “Time Series Analysis” James D. Hamilton, Princeton University Press 1994
3. “Econometric Analysis” William H. Green, Prentice Hall, 7th Ed.
4. “Time Series Econometrics, Learning Through Replication”, John D. Levendis, Springer, 2018.