

Time Series Analysis

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Course Overview

This course builds on your understanding of probability theory and regression analysis to consider time-series econometrics. Time-series data pose a number of problems over and above cross-section analysis: not only are there correlations between variables at a point in time, but there are also correlations over time. Furthermore, the data may not be stable but the data moments may instead vary over time. Hence, in this course we aim to analyze dynamic, multivariate interactions in evolutionary and non-stationary processes. We shall build up to this by first considering stationary univariate time-series processes and then extend the analysis to non-stationary processes and multivariate processes. We shall review a typology of linear dynamic time-series models and focus on the concept of cointegration, as many applications lend themselves to dynamic systems of equilibrium-correction relations. With these statistical tools at your disposal, we shall consider how to model and forecast macroeconomic and financial systems in practice.

Outline

In addition to the lecture notes provided, I list below the relevant chapters from Hamilton (1994).

1. Basic concepts of Time Series
 - Hamilton chap. 1 & 2
2. Stationary ARMA processes 1/2
 - Hamilton chap. 3
3. Stationary ARMA processes 2/2
 - Hamilton chap. 4 & 5
4. Unit Roots & Non-stationarity
 - Hamilton chap. 17.
5. VAR analysis
 - Hamilton chap. 11
6. Cointegration
 - Hamilton chap. 19

7. Macroeconometrics: SVARs, identification and Impulse Response Functions

- Hamilton chap. 11
- extra readings

8. Volatility Models

- Hamilton chap. 21
- extra readings

9. Forecasting

- extra readings

References

Lecture notes will be provided for the course. The main references are

Hamilton (1994). *Time Series Analysis*. Princeton University Press.

Doornik, J. (2009). Oxmetrics 6 PcGive 13. Timberlake. (this is also a good theoretical reference)

Also

Undergraduate

Baltagi, B. H. (2002). *Econometrics*. Springer.

Carter Hill, R., Griffiths, W. E. G. G. Judge (2001). *Undergraduate Econometrics*. Wiley Sons.

Enders, W. (2004). **Applied Econometric Time Series.** Wiley

Gujarati, D. N. (2003). *Basic Econometrics*. McGraw-Hill.

Hendry, D. F. B. Nielsen (2007). *Econometric Modeling*. Princeton University Press.

Madala, G. S. (2001). *Introduction to Econometrics*. Wiley Sons.

Thomas, R. L. (1997). *Modern econometrics : an introduction*. Addison-Wesley

Verbeek, M. (2008). **A Guide to Modern Econometrics.** Wiley

Graduate

Banerjee, A., J.J. Dolado, J.W. Galbraith, D.F. Hendry (1993). *Co-integration, Error Correction and the Econometric Analysis of Non-Stationary Data*. Oxford: Oxford University Press.

Dhrymes, P. (1998). *Time Series, Unit Roots and Cointegration*. Academic Press.

Harvey, A. C. (1993). *Time Series Models*. Prentice-Hall.

Hendry, D. F. (1995). *Dynamic Econometrics*. Oxford University Press.

Johansen, S. (1995). *Likelihood-Based Inference in Cointegrated Vector Auto-Regressive Models*. Oxford University Press. (*)

Juselius, K. (2007). *The Cointegrated VAR Model, Methodology and Applications*. Oxford University Press.