

Dept of Economics
UNC-Chapel Hill

Spring 2007

Syllabus Econ 871
TIME SERIES ANALYSIS

Meeting time and place:

MWF 9:00-9:50 AM, Gardner 307

Professor:

Eric RENAULT

How to reach me:

My office is located in Gardner Hall 300G, my office phone number is #6-5326.

I will hold office hours on Monday and Wednesday from 10:00am to 11:00am.

My email address is renault@email.unc.edu

Prerequisites:

Economics 770 (271) "Introduction to Econometric Theory"

Economics 771 (272) "Econometrics"

Goals:

This course will cover statistical models for the temporal dependence in economic time series. For statistical inference, the main idea is that samples are not generally independent, but that stationarity and short memory arguments yield a close analogue of the classical asymptotic analysis under independence. Besides asymptotic analysis of estimators, the time series context raises a bunch of specific modeling issues: auto-regressions/ moving averages, forecasting, time domain/frequency domain, unit roots, structural models with latent components, causality, cointegration, conditional heteroskedasticity.

Evaluation:

The grade for the course will be based on three homework sets, each with weight of 10%, a midterm exam (30%) and a final exam (40%). The two exams require that you derive theoretical results from theorems proven in class. The focus will be not only on mathematical derivations, but also on discussion of modeling issues and relevance of assumptions. The final will be cumulative, i.e. cover all the chapters since the beginning of the semester. The homework sets will include an applied part with computer work.

Textbook and Readings:

Required:

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

Covers all the important topics in time series but is a bit succinct in terms of mathematical proofs.

Other books of interest are:

Peter J. Brockwell and Richard Davies (1991), *Time series: Theory and Methods*, Springer Verlag.

Useful to get the details of the mathematical proofs and assumptions that are skipped in Hamilton.

Christian Gouriéroux and Alain Monfort (1997), *Time Series and Dynamic Models*, Cambridge University Press.

The mathematical level is intermediary between the former two references. Emphasis on modeling issues.

Helmut Lutkepohl (1991), *Introduction to Multiple Time Series Analysis*, Springer Verlag.

The focus is set on multivariate ARMA processes and matrix calculus.

Overview of the course:

1. Introduction to (stationary) time series
2. Estimation of the Mean and the Auto-Covariance function
3. Spectral representation of a stationary process
4. Stationary ARMA processes: modeling and prediction.
5. Estimation of ARMA models.
6. Vector Autoregressions
7. Unit Roots and cointegration
8. State-Space Models
9. Conditional heteroskedasticity