Economics 518B
Seminar on Applied Econometrics II: Time Series Techniques and Applications
TTh 1:00-2:30, Seigle Hall 103
Class Website: [http://artsci.wustl.edu/~morley/Courses/Econ518B.html](http://artsci.wustl.edu/~morley/Courses/Econ518B.html)

Syllabus

Course Description

This is a survey course on time series econometric techniques, with applications in macroeconomics, international finance, and finance. Topics include ARMA models, the Box-Jenkins methodology, and forecasting; VARs and impulse response functions; time trends, unit roots, and structural breaks; spurious regressions; trend/cycle decomposition methods, including Kalman filtering; spurious cycles; cointegration; ARCH models of volatility, and Markov-switching models. Following the bulk of the applied literature, we will mostly, but not exclusively, work with the classical framework in the time domain. While there is a textbook, a lot of emphasis will be put on readings from economics journals.

Objectives

An important objective of this course is to survey the core literature in applied time series econometrics. However, the primary objective is to stimulate interest in the time series approach, with the ultimate aim of providing students with the necessary tools to conduct original research in the area. To that end, the course requires a research project rather than any written exams.

Prerequisites

A good grasp of basic mathematical statistics and linear algebra is necessary for the course. The mathematical appendix in the Hamilton textbook provides a good summary of useful mathematical and statistical tools. I will assume everyone has taken the first year econometrics sequence.
Requirements

There will be a series of homework assignments that will involve generating and interpreting computer output from EViews and GAUSS. There will also be a major research project. There are no exams for the class.

The research project will have three stages. In the first stage, you will make an appointment and meet with me in order to propose a topic. While original research that applies the time series techniques discussed in the course would be acceptable, it is expected that you will take an existing empirical study and extend it by changing, or at the very least updating, the data used in the original study. (In time series analysis, replication is often harder than it sounds.) Potential source papers are denoted with asterisks in the reading list below. Other papers will be allowed, but must be cleared by me first. I will allow you to work in pairs, if you choose. However, if you do, you must make it clear to me how you plan to “divvy up” the work in an equitable manner. The second stage of the project will be an in-class presentation. The presentations will be sometime around the middle of the semester. Therefore, it is not expected that you will report on any final results. Instead, you should try to motivate why their project is interesting and teach some of the details of its implementation in a way that engages others in the class. For the final stage, you will submit a 6-10 page paper that motivates the issue, presents in detail the implementation of the econometric techniques, and summarizes the results.

Textbooks

There is one required text for the course:


There is also a very useful optional text that is mentioned in the reading list:


Other texts that you may find useful are the following:


Outline

I. Stationary Time Series Analysis

*Stochastic Difference Equations, ARMA Models, Forecasting, Maximum Likelihood Estimation, Prediction Error Decomposition, State-Space Form, Kalman Filter, Spectral Analysis, Measures of Persistence, Inference*

- Hamilton 1-6, 13
- Kim and Nelson 2-3

II. Structural Analysis

*VAR Models, Granger Causality, Identification, IRFs*

- Hamilton 10-11
- Uhlig, H., 2005, What are the effects of monetary policy on output? Results from an agnostic identification procedure, *Journal of Monetary Economics* 52, 381-419.

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III. Unit Roots and Structural Breaks

Unit Roots, Structural Breaks, Trend/Cycle Decomposition, Spurious Regressions, Cointegration

- Hamilton 15-20
IV. Nonlinearity

ARCH, Markov switching, Threshold Models, Time-Varying Parameters, Gibbs sampling, Particle Filtering, Identification through Heteroskedasticity

- Hamilton 21-22
- Kim and Nelson 3-5, 7-10

RP denotes that the article is available in the course reading package. * denotes paper is appropriate for replication project.