Econometrics for Financial and Macroeconomic Time Series

Overview: The specification, estimation, and diagnostic testing of dynamic models for economic and financial time series present a host of unique challenges, in turn requiring the use of specialized statistical models and inference procedures. This course provides a selective overview of some of the most important of these procedures. The discussion will be focused on the practical implementation of the different techniques, including specific applications in both macroeconomics and asset pricing finance, rather than formal proofs and theorems.

Requirements: I will assume that you have an understanding of econometrics and basic statistics at the level of first-year graduate econometrics, equivalent to Econ.703D (341D) and Econ.707D (342D) at Duke.

Class Schedule: Lectures will be held in Room 105, Tuesdays and Thursdays, 1:25-2:40pm.

Office Hours: My office hours are Wednesdays, 10:00-11:30am in Room 313.

Webpage: http://www.econ.duke.edu/~boller/Econ.883

Evaluation: Your grade for the course will be based on an equal weighting of your performance on the final exam and four problem sets. Then final exam will be on Tuesday, April 30, 1:25-3:25pm. You are encouraged to work on the problem sets in teams of up to four people. If you do work in a team, each team should hand in only one solution to the assignment. I may also consider your participation in the classroom discussions when determining your final grade for the course.

Books: The main textbook for the course is:

James D. Hamilton (1994). Time Series Analysis. Princeton, NJ: Princeton University Press. (This is a classic. It provides an exceptionally detailed and comprehensive discussion of the most important ideas in time series econometrics as of ~twenty years ago. Parts of the discussion are a bit dated by now. It is a great general reference book, however.)

Other useful textbooks:


Torben G. Andersen, Tim Bollerslev, Peter Christoffersen, and Francis X. Diebold (201?). Volatility and Correlation: Practical Methods for Financial Applications. Princeton University Press. (Keep looking, this is going to be a great book ...)


Andrew C. Harvey (1990). *Econometric Analysis of Time Series, 2nd Ed*. MIT Press (*First published more than two decades ago, it is still a good reference for many of the basic topics.*)


**Course Outline and Readings:**

In addition to the relevant chapters in the book by Hamilton, we will also discuss several journal articles and Handbook chapters. The papers that we will cover in some detail are marked with a (*) below. In general, however, I will mostly rely on my own notes and interpretation.
1. Univariate Stationary ARMA Models

(*) Hamilton, Chapters 3, 4.

Hamilton, Chapters 1, 2 (this is review material about difference equations and lag operators).

Anderson, Chapters 5-7.
Box and Jenkins, Chapters 1-9.
Brockwell and Davis, Chapters 1, 3, 5, 7, and 9.
Enders, Chapters 1, 2.
Taylor, Chapter 3.
Tsay, Chapter 2.

2. MLE and QMLE

(*) Hamilton, Chapter 5.


Brockwell and Davis, Chapter 8.
Harvey, Chapters 3-4.

3. Hypothesis Testing and Model Selection


Hamilton, Chapter 5.

4. Spectral Analysis and Filtering

(*) Hamilton, Chapter 6 and Sections 10.4-10.5.


Anderson, Chapters 8-9.
Brockwell and Davis, Chapters 4, 10, and Sections 11.6-11.8.
Priestley, Chapters 1, 4-11.

5. **Vector Autoregressions**

(*) Hamilton, Sections 10.1-10.3 and Chapter 11.


Enders, Chapter 5.
Gourieroux and Jasiak, Chapters 3, 4.
Tsay, Chapter 8.

6. **GMM and Simulated Methods of Moments**


Hamilton, Chapter 14.

7. **Unit Roots**

(*) Hamilton, Chapters 15-18.

Hamilton Chapter 7 (contains review material on standard asymptotic distribution theory for stationary processes).

8. Cointegration

(*) Hamilton, Chapters 19-20.


Enders, Chapter 6.

9. Long-Memory and Fractional Differencing


10. Time-Varying Volatility


Enders, Chapter 3.
Hamilton, Chapter 21.
Jondeau, Poon and Rockinger, Chapters 4-6.
Gourieroux and Jasiak, Chapter 6.
Taylor, Chapters 8-12.
Tsay, Chapters 3 and 9.