Time Series Analysis

Overview: The specification, estimation, and diagnostic testing of dynamic models involving economic time series present a host of unique statistical problems requiring the use of specialized inference procedures. This course provides an overview of some of the most important of these procedures. The focus will be on results most relevant for practical applications rather than formal proofs of theorems, with the various econometric techniques illustrated through problems in both macroeconomics and asset pricing finance.

Requirements: I will assume that you have an understanding of econometrics and basic statistics at the level of the first two graduate level econometrics classes at Northwestern.

Class Schedule: Lectures will be held on Monday, 12-3 in room ???.

Office Hours: My office hours are on Monday, 3-5 in Room 4323.

Evaluation: Your grade for the course will be based on an equal weighting of your performance on the final exam and 6 problem sets. The final exam is officially scheduled for ?????, June ?, ?.?:??-?:??pm. I may also consider your participation in the classroom discussions when determining your final grade for the course.

TA for the class: Huidi Lin

Textbook:


Some other useful textbooks containing related material include:


Course Outline:

1. Univariate Stationary ARMA Models
   - Hamilton, chapters 1-4
   - Brockwell and Davis, chapters 3 and 5

2. Limit Theorems for Dependent Sequences: Stationary Case
   - Hamilton, chapter 7
   - Davidson, chapter 13-15, 24

3. ML and QML Estimation and Inference
   - Hamilton, chapter 5

4. Hypothesis Testing and Model Selection

5. Spectral Analysis and Filtering
   - Hamilton, chapter 6
   - Brockwell and Davis, chapters 4 and 10, 116-11.8

6. Vector Autoregressions
   - Hamilton, chapter 11
7. **GMM and Simulated Methods of Moments**  
Hamilton, chapter 14  

8. **Unit Roots**  
- Hamilton, chapters 15-18  

9. **Cointegration and Error Correction Models**  
- Hamilton chapter 19-20  

10. **Long-Memory and Fractional Differencing**  

11. **ARCH, GARCH, Stochastic Volatility Models, and Realized Volatility**  