

ECON 612 TIME SERIES ANALYSIS

Duke University, Fall 2013
Monday, Wednesday. 4:40-5:55, Soc Sci 229

INSTRUCTOR

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TEACHING ASSISTANT

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COURSE CONTENT

This course introduces fundamental knowledge and application of time series econometrics in a more formal manner than does an undergraduate econometrics class. Topics include stationary ARMA processes, non-stationary processes, Generalized Method of Moments (GMM) estimation, Vector Autoregressions (VAR) and forecasting. This course will also invite guest speakers to give lectures on topics in their own expertise, for instance the application of time series analysis in financial economics.

PREREQUISITE

Undergraduate calculus, statistics, linear algebra and a satisfactory completion of introductory level econometrics are required. Please contact the instructor to make sure you meet the minimum requirement and ask for permission code before enrolling

TEXTBOOK

There is no required textbook. I will mainly use class notes. The following list of textbooks provide a good reference for this course under ascending levels.

- Wooldridge, Jeffery: Introductory Econometrics: A Modern Approach, South-Western College Pub; 4th Edition
- Stock, James and Mark Watson: Introduction to Econometrics. 2nd Edition; Addison Wesley
- Hayashi, Fumio: Econometrics; Princeton University Press
- Hamilton, James: Time Series Analysis; Princeton University Press

Class notes with outline and major conclusions will be posted on Sakai before each lecture. Derivation details and specific examples will be given in class through lecture and will not be posted afterward unless otherwise notified.

GRADING

There will be 5-6 in-class quizzes and one final. Quizzes are given at the beginning of classes on days announced by the instructor. The final is scheduled by the Graduate School on Thursday, December 12, 7:00 PM - 10:00 PM. It is likely I will make a two-hour final exam instead of using all three hours. The (tentative) weight for the final grade is Quiz: 60%, Final: 40%. No makeup quiz or exam will be given. If you miss a quiz, the weight of that quiz will be prorated to the final.

TOPICS

1. Introduction

- conditional expectation and mean independence
- finite properties of OLS
- static models

2. Classic Assumptions for Time Series Models

- stationarity and ergodicity
- convergence
- large sample properties of OLS

3. Stationary ARMA Processes

- moving average (MA) processes
- autoregressive (AR) processes

4. Non-stationary Processes

- Unit root processes
- test for stationarity
- structural breaks

5. Estimation of ARMA Processes

- principles of maximum likelihood estimator (MLE)
- conditional and unconditional MLE
- properties of MLE, heteroskedasticity

6. Generalized Method of Moments (GMM)

- simultaneous equations
- derivation of GMM
- properties of GMM
- GMM and OLS

7. Vector Autoregressions (VAR)

- structural and reduced form models
- identification
- impulse response function

8. Forecasting*

- loss functions
- forecasting ARMA processes
- volatility forecast

9. Introduction to Stochastic Processes*