Instructor: Ji Hyung Lee, DKH 101E, E-mail: jihyung at illinois.edu.

Time and Location: MW 8:00 - 9:20, DKH 222.
Office Hours: MW 11:00 - 12:00 (DKH 101E; sign-up required), or by appointment (Fridays, send me an email by Thursday). I also encourage to post your questions to our class discussion page if you cannot make the office hours.

Main Textbooks

- *Econometric Modelling with Time Series* by Vance Martin, Stan Hurn and David Harris (2013), Cambridge University Press.
  - Computer code written in GAUSS, MATLAB and R is available from a companion website to reproduce examples in this textbook:
  - http://www.cambridge.org/features/econmodelling/computation.htm

- *Econometrics* by Bruce Hansen, available at Course Webpage.


Exams: Quiz 1 is on Feb 15th (in class) and Quiz 2 is on Mar 16th (in class). The final exam will be take home exam - see below.

Grading: There will be occasional assignments, Quiz 1 & 2 and a final take home exam. They will count toward the grade as follows.

- Assignments 20%
- Quiz 1&2 40%
- Final Take Home Exam 40%

Assignments
You can submit through course webpage (electronic filing) or hand in to the instructor in class by due date. If you have handwritings for analytical problems, please scan your handwriting and submit through course webpage, together with other computation results (statistical output) if any.
Final Take Home Exam
You will have the following two options:

1. Tackle the question(s), provided by the instructor - these will be posted by the end of April.

2. A short research paper from your own interest. It may include (i) theoretical econometrics or (ii) empirical econometrics or (iii) both. You may be given a chance to present your intermediate results in class (if time allows). At this time, you can do some (or all) of the followings

   - you may provide a literature review for your own interested topic - 1 or 2 most influential paper and some recent development that follows.

   - if you intend to write an empirical paper, you may replicate the original paper with different data (e.g., more recent data, or from different countries).

   - if you plan to write a theoretical paper, you may carefully read 1 or 2 benchmark paper and explain what you can do further beyond this.

Description of the Course
This course is a part of applied econometrics course sequences, designed for Econ Ph.D students (2nd year or above). We study time series econometric theory and inferential tools. The course will be useful for the dissertation of Econ Ph.D students whose focus includes (but not limited to) theoretical/applied econometrics and/or empirical macro/finance. Understanding (i) the fundamental concepts/principle of popular time series methods and learning (ii) how to actually use those methods (by replicating the results from literature) will be equally emphasized. Starting from the basic principle, we aim to reach the on-going research level questions later in the semester.
Course Schedule

Part I (Week 1-9) - fundamental concepts and methods in time series

- Week 1-4: Course introduction, fundamental concepts in time series econometrics.
  - Introduction to Time Series: information sets, stationarity and ergodicity, weak dependence concepts
  - Linear Time Series: ARMA Models, Vector Autoregressions, Beveridge-Nelson Decomposition

- Quiz 1: Feb 15th

- Week 5-8: GMM, Endogeneity, HAC inference and some volatility models.
  - GMM - estimation and inference
  - Weak Instrumentation and Identification
  - HAC and HAR inference for moment condition models

- Quiz 2: Mar 16th

Part II (Week 10-16) - frontier research topics in time series and financial econometrics

- Predictive regressions, persistent time series modelling (long-memory and unit root), heavy-tailed time series, quantile regression and some volatility models.

- Quantile dependence in macro/finance: quantilogram, quantile periodogram and some systemic risk measures


– Lee, J. H., Linton, O. B., & Whang, Y. J. (2016; *working paper*). Quantilograms under strong dependence


* Introduction to empirical process with dependent data, financial networks theory and applications


* Some further topics

* Final Take Home Exam: 1st and 2nd week of May.