ECON 3660/3050: ADVANCED ECONOMETRICS II/ ECONOMETRIC THEORY II

(Spring 2023)

Yiru Wang

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Classes: M-W 09:00 – 10:15, 4940 Wesley W Posvar Hall

Office hours: Wednesday 15:00 – 17:00 or by appointment

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Class meetings: Classes will take place fully in person. All announcements will be posted in Canvas.

Course description: This course examines the models and statistical techniques used to study time series data in economics, especially focusing on (i) the state-of-art models and techniques used to study time series data with a special emphasis to applications in macroeconomics, and (ii) the econometric theory of time series analysis with an emphasis on recent developments.

The course does not follow closely any textbook. General references are listed below:

1. *Hamilton, J., 1994. Time series econometrics. Princeton: Princeton University Press.*
2. *Kilian and Lutkepohl, 2018. Structural VAR Analysis, Cambridge*
3. *Hayashi, F., 2000. Econometrics. Princeton: Princeton University Press.*
4. *Canova, F., 2007. Methods for applied macroeconomic research. Princeton: Princeton University Press.*
5. *White, H., 2000. Asymptotic theory for econometricians. Revised ed. Orlando: Academic Press.*
6. *Lutkepohl, 2007. New Introduction to Multiple Time Series Analysis. Springer Verlag.*

List of topics, including

1. *Filters and business cycle estimation*
2. *Heteroskedasticity and autocorrelation consistent (HAC) variance estimation*
3. *Models with Stochastic Time Variation: Structural Breaks and Instabilities*
4. *The Kalman filter, Nonlinear Filters, Threshold Models, STAR, Markov Switching and Applications*
5. *GMM and Weak Instruments/Weak Identification, Many Instruments*
6. *Vector Autoregression and SVARs*

7. *Modeling of and inference for persistent time series*
8. *Big data: Dynamic Factor Models, FAVAR, Combinations, BVARs*
9. *Model Evaluation and Forecast Comparison*

Note that this syllabus is preliminary, and the contents of the course may change during the semester. I will augment this list from time to time with additional and more current methods. *Not all topics may be discussed in class. The topics discussed will be selected by the instructor. Besides, for each topic, I select some papers for your interest. Please refer to the reading list.

Grading: Grades will be based on problem sets (30%), short presentations (20%), and a final exam (50%).

Problem Sets: There will be 4-5 problem sets, which are designed to augment and compliment the lectures. Each problem set is a mix of theory, computational and empirical exercise. The empirical part requires programming. You can use whatever language you prefer. I recommend Matlab and discourage Stata. Problem sets will be due on specified dates. Late submissions will not be accepted. Working in groups is encouraged, but please write your own solutions. Problem sets will not be graded, but I will read through them. To get full credit on a problem set you must show a serious attempt to solve them.

Short presentations by students: It is very important to critically read and understand papers. Every two weeks (depending on how many students register in the course), we will have a short (10~15 min) student presentation on one paper I will select. Please prepare 5-10 slides to discuss the background, contribution, main results/findings, and your thoughts.

Final exam: A long Problem Set (take home exam)

Academic integrity: Sharing class materials, including exams, on the internet is a violation of academic integrity.