Course Description

This course is designed for second year graduate students who have taken the first year graduate econometric courses. The aim of the course is to provide a theoretical background that is used for theoretical and applied research utilizing econometric methods. The course covers both technical topics and tools for applied work, focusing on micro-econometric issues.

This course consists of three parts. The first part introduces theoretical issues regarding linear/nonlinear estimation methods. We review standard linear models and linear estimators, and talk about nonlinear models with various nonlinear estimators. The general M-estimation approach will be introduced with various examples: Generalized Method of Moments (GMM), Minimum Distance (MD), and Maximum Likelihood (ML). The second part covers some tools in applied econometrics, focusing on labor/public applications: panel data models with Difference-In-Difference (DID) method, Instrumental Variables (IV), and Regression Discontinuity Design (RDD) will be discussed. In the last part we make emphasis on IO applications, and particularly talk about limited dependent variable models including binary/discrete choice models. The game theoretic models and truncated/censored regression models will also be discussed if time allows.

Course Requirements

1. Midterm (30%): Tuesday, October 16
2. Final (50%): Thursday, December 13
3. Problem sets (20%): No late submission will be accepted
   (a) Assignment 1 (10%), due October 9, 11:59 pm
   (b) Assignment 2 (10%), due December 6, 11:59 pm

The assignment should be submitted via email (yoon22@uwm.edu): attach an electronic copy of your answer and program codes. Using LaTeX to write up your assignment is highly recommended.
Computer Programs

Problem sets will occasionally involve simulation or application of the methods using actual dataset. You may choose a programming language that you feel comfortable with. The commonly used programs are MATLAB, STATA, R, Python, GAUSS, SAS or even Fortran and C. You are expected to learn at least one of those programs/languages by yourself or with the help of the computer lab staff. Some exemplary MATLAB or STATA codes will be uploaded on our course webpage.

Readings

The lecture slides will be uploaded on the course webpage. There is no required textbook but some recommended books or articles are below.


2. Econometrics, by Bruce E. Hansen, https://www.ssc.wisc.edu/~bhansen/econometrics/


Course Outline

1. Review of the Linear Models

   • Main Text
     – Hansen (2018), Ch 1 ~ Ch 7
   • Supplementary Material
     – Wooldridge (2010), Ch 4 and Ch 7
   • OLS, WLS, GLS estimators

2. Extremum Estimators

   • Main Text
     – Newey and McFadden (1994): Handbook of Econometrics Ch 36
       https://doi.org/10.1016/S1573-4412(05)80005-4
   • Supplementary Material
     – Wooldridge (2010), Ch 12 ~ Ch 14
     – Newey (1991), Uniform Convergence in Probability and Stochastic Equicontinuity, Econometrica
– Andrews (1992), Generic Uniform Convergence, *Econometric Theory*

• ML, GMM, MD estimators

3. Panel Data Models

• Main Text
  – Wooldridge (2010), Ch 10 – Ch 11

• Supplementary Material
  – Hansen (2018), Ch 16
  – Bertrand, Duflo, and Mullainathan (2004), How Much Should we Trust Difference in Differences, *Quarterly Journal of Economics*

4. Instrumental Variables

• Main Text
  – Wooldridge (2010), Ch 5 and Ch 8 / Hansen (2018), Ch 11

• Supplementary Material
  – Bound, Jaeger, and Baker (1995), Problems with instrumental variables estimation when the correlation between the instruments and the endogenous explanatory variable is weak, *Journal of the American Statistical Association*

5. Regression Discontinuity

• Main Text
  – Lee and Lemieux (2010), Regression Discontinuity Designs in Economics, *Journal of Economic Literature*
• Supplementary Material
  – Hahn, Todd, and Van der Klaauw (2001), Identification and Estimation of Treatment Effects with a Regression Discontinuity Design, *Econometrica*
  – Porter (2003), Estimation in the Regression Discontinuity Model, Mimeo
  – Calonico, Cattaneo, and Titiunik (2014), Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs, *Econometrica*

6. Limited Dependent Variable Models

• Main Text
  – Wooldridge (2010), Ch 15, Ch 16, and Ch 19

• Supplementary Material
  – Hansen (2018), Ch 21
  – Honoré (1992), Trimmed LAD and least squares estimation of truncated and censored regression models with fixed effects, *Econometrica*

• Binary / Discrete choice models
• Truncated / Censored data
• Extensions: Dynamic discrete choice / Game theoretic models

**Note**

For information on the University’s policies for religious observances, incompletes, academic misconduct, grade appeal procedures, final examination policy, students called to military service, discriminatory conduct, and complaint procedures, please access the following link:

http://www4.uwm.edu/secu/SyllabusLinks.pdf

*Participation by Students with Disabilities*

The University of Wisconsin Milwaukee supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a
disability has been incurred or recognized. Faculty will work either directly with the student or in coordination with the Accessibility Resource Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student’s educational record, is confidential and protected under FERPA.

**Academic Misconduct**

The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Student academic misconduct information can be found at:

http://www4.uwm.edu/acad_aff/policy/academicmisconduct.cfm

**Workload Statement**

This class meets twice weekly for 75 minutes, for a total of 37.5 hours of required lecture time. You should expect to take at least 67.5 hours over the course of the semester reading the textbook and other required texts. There are also 2 homework assignments which you should expect to require at least 10 hours each. You should reserve at least 10 hours to study for and take the midterm/final exam. All told, this class is likely to take 145 hours of your time.