Econ 506-Econometrics (Online Course)
Spring 2022

Instructor Contact:

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Office Hours: By appointment, through Zoom

Class Information:

Location: Online course.

Time: Every week, we will have hybrid lectures. Some weeks will have small problem sets and Stata applications. I will upload the lecture slides for each week along with the lecture videos.

Course Description

This course introduces the student to the core techniques employed in econometrics: regression analysis, panel data models, instrumental variables and binary models. The course combines theoretical discussions and applied work. The idea is to equip you with the theoretical and practical background required to do modern econometrics.

Course Materials

Text Book:

The main text books I will be using for the course are below. The Wooldridge book will be the main theoretical sourcebook. The Cameron and Trivedi book will be used for applications while the Angrist and Pischke book will be used for the discussion on causality.

For part I:

* Wooldridge, J.M. (2011): Econometric Analysis of Cross Section and Panel Data, MIT press
* Angrist, J. And J-R. Pischke, Mostly Harmless Econometrics, MIT Press.
* Cameron, A. C., & Trivedi, P. K. (2010). Microeconometrics using stata (Vol. 2). College Station, TX: Stata press.

<u>Readings:</u>

I will be updating the reading list throughout the course. The suggested readings for the first part are at the end of the syllabus.

Grading

Mid-term Exam: 30%
Presentation: 20%
Final Exam: 30%
Homework: 20%

Presentation:
Each student will select a research question to analyze from datasets made available in the shared drive and provide an analysis for the question alongside a review of the relevant literature including a discussion on the econometric techniques used in that literature.

Homework:

Theory Exercises. I will provide two theoretical problem sets that will help with the preparation for the two exams.

Applied Exercises. I will upload datasets to our shared drive that you can use to apply what we learn in class. We will be using STATA for estimation. STATA commands will be a part of the lecture when appropriate.

Course Outline:

I Introducing Linear Regression Models (Week 1-5)

1. Background
   - Conditional expectations
   - Basic asymptotic theory
   - Random sampling and hypothesis testing.
   - Introduction to regression analysis.
2. Linear models
   - CEF and regression population functions.
   - Asymptotic properties of OLS

3. Standard errors and causality
   - Standard errors and heteroscedasticity correction
   - Randomized experiments
   - Concept of causality and types of bias (non-technical treatment)

II Panel Data Models and Unobserved Heterogeneity (Week 6-9)

4. Random effects models and FGLS
   - Unobserved effects
   - Strict exogeneity assumption
5. Fixed effects and omitted variable bias
   - Asymptotic inference
   - Serial correlation and robust variance matrix estimation
   - Fixed effects GLS
   - First-difference models
   - Chamberlain / Hausman treatments of FE
   - Policy analysis
6. Comparison of RE, FE and FD models
   - What is the difference?
   - Which model is appropriate?

III Measurement bias and IV (Week 10-13)

7. Measurement Bias
   - Definition of Measurement Bias
   - Classification of Measurement Error
   - Measurement Bias Control
8. Introduction to IV analysis.
   - 2SLS
   - GMM
   - Weak instruments problems and diagnostics
9. Average and Local Average Treatment Effects
   - Introducing ATE TTE and LATE
   - Using propensity score matching to measure ATE
   - ATE and LATE in IV models

IV A short intro to Non-linear models (Week 14)

10. Discrete response models

- Binary response models – LPM, logit, probit
- Multinomial response models

Readings (will be updated as we go along):

Chapters 2-4 Wooldridge

Pischke, J. S. (2007). The Impact of Length of the School Year on Student Performance and Earnings: Evidence From the German Short School Years. *The Economic Journal,* 117(523), 1216-1242.

Solon, G., Haider, S. J., & Wooldridge, J. M. (2015). What are we weighting for?. *Journal of Human resources*, 50(2), 301-316

Kennedy, P. E. (2002). Sinning in the basement: What are the rules? The ten commandments of applied econometrics. *Journal of Economic Surveys,* 16(4), 569-589.

Rajan, R. G., & Subramanian, A. (2008). Aid and growth: What does the cross-country evidence really show?. *The Review of economics and Statistics*, *90*(4), 643-665.

Black, S. E., Devereux, P. J., & Salvanes, K. G. (2005). The more the merrier? The effect of family size and birth order on children's education. *The Quarterly Journal of Economics*, *120*(2), 669-700.

Akcigit, U., Grigsby, J., & Nicholas, T. (2017). Immigration and the rise of american ingenuity. *American Economic Review*, *107*(5), 327-31.

Arulampalam, W., & Stewart, M. B. (1995). The determinants of individual unemployment durations in an era of high unemployment. *The Economic Journal*, *105*(429), 321-332.

Grade Categories

A	85
A-	80
B+	75
B+	70
B-	65
C+	60
C	55
C-	50
D+	45
D	40
F	0