HCMG 901: Applied Econometrics  
Spring 2020

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Overview

This course introduces econometric methods widely used in applied economics research. The main goal of the class is for you to make significant progress in your ability to conduct high quality, econometrically sound empirical analysis. Concepts, applications, and practice are emphasized, as opposed to technical derivations of estimators and their properties. The focus is on linear (least squares) and non-linear (e.g. quantile, discrete, count, two-part, and duration) regression models. We cover several modern research designs in detail - difference-in-differences, triple differences, selection on observables (matching, propensity score), instrumental variables, synthetic controls, regression discontinuity, regression kink, and bunching.

Readings

The reading list comprises published articles and some working papers, which should be read prior to class. The papers have been chosen to illustrate the application, generally recent, of different empirical methods and strategies. While the reading list is extensive, I will typically ask students to read 2-3 papers (thoroughly) per class. The remaining papers are listed as useful references. I will post required papers on Canvas. While there is no assigned text book for the class, we will closely follow Mostly Harmless Econometrics: An Empiricist’s Companion by Angrist and Pischke. In addition, you may refer to select chapters in Andrew Jones’ primer, Applied Econometrics for Health Economists: A Practical Guide (OHE Research, 2nd ed., 2007) and J. Wooldridge, Econometric Analysis of Cross Section and Panel Data.

Logistics

The class will meet every Monday 3-6 pm, Colonial Penn Center. Chestnut Room. Office hours by appointment.

Other Requirements and Grading

In addition to reading the assigned papers prior to class, you are required to:

- Complete 3-4 homework assignments. These will mainly involve hands-on data analysis using a supplied data set drawn from the Medical Expenditure Panel Survey or replicate existing papers.
- Attend selected research seminars as requested and possible.
- Data project - replicate analysis from a paper of your interest, or perform original analysis. Report your analysis and results in a 4-5 page write-up.
- Present to the class a paper from the reading list
- Final exam – this will draw on the class material and homework.

Grading: Project – 20%; participation and assignments – 40%; final – 40%
Course outline and Readings

* Indicates student presentation of a paper from the reading list for that class (45 min)
† Indicates papers to be read prior to the class

I. **Jan 15 - Introduction and background [**Note: This is a Wednesday**]**
   A. Course overview
   B. Potential outcomes and causal inference
   C. Recap of basic estimators (OLS, GLS, WLS) and inference

   MHE Chapter 2


Jan 20 – No class, MLK Day

II. **Jan 27 - Classical estimation and testing (Contd.)**
   A. Recap of basic estimators (OLS, GLS, WLS) and inference
   B. Weighting

   MHE Chapters 2, 3 (excl. 3.3)


III. **Feb 3 - Classical estimation and testing (contd.) and Matching**
   A. Log transformation
   B. Matching / propensity score

   MHE Chapter 3.3


**IV. Feb 10 - Instrumental variables (Part 1)**

A. Basic concepts

MHE Chapter 4


**V. Feb 17 - Instrumental variables (Part 2)**

A. LATE applications


VI. Feb 24 - Instrumental variables (Part 3) and Student proposals
   A. Marginal Treatment Effects
   B. Proposal presentations (10-15 min each)


March 3 - Spring Break

VII. March 10 - Panel data approaches (Part 1)
   A. Fixed effects, Random effects
   B. Differences in differences, triple differences

MHE Chapter 5


VIII. March 17 - Panel data approaches (Part 2)
   A. Synthetic controls
   B. Clustering


IX. March 24 – Density based designs
   A. RD, RD-DD
   B. RK

MHE Chapter 6


X. March 31 – Bunching and Quantile regression
   A. Bunching
   B. Quantile regression

MHE Chapter 7


XI. April 7 – Limited dependent variables
   A. Logit, Probit
   B. Count data models
      Jones Chapters 3-6, 9-10

XII. April 14 – Selection models and Duration models
   A. Selection models
   B. Duration models
      *Mauro Laudicella, Paolo Li Donni, and Peter Smith, Hospital Readmission Rates: Signal of
XIII. April 21 - Field experiments
A. Guest lecture - Profs. David Abrams (Penn Law) and Mark Neuman (Penn Med)


XIV. April 28 - Student project presentations

Final Exam (May TBD)