U823: Applied Micro-econometrics
Last Offered, Spring 2018

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Course Overview

This course is designed to the estimation of treatment effects in applied microeconomic topics. We will analyze which research designs and empirical methods should be applied in various circumstances in order to obtain credibly causal effects of an intervention or policy in the area of health, labor, public finance, and education. We will focus on randomized field experiments, difference-in-difference designs, and regression discontinuity. We will also use instrumental variables as well as propensity score methods to obtain causal estimates when randomization is not possible.

Learning Objectives

- To compare the internal validity of randomized designs relative to non-randomize research designs
- To analyze the strengths and limitation of instrumental variables to evaluate policy
- To demonstrate the ability to specify a difference-in-differences design to circumstances in which there are time- and geographic variations in policy implementations
- To demonstrate the circumstances in which a regression discontinuity would provide plausibly causal estimates of a policy change
- To be able to describe succinctly results from a synthetic control analysis and critically compare it to results from a difference-in-difference analysis
- To be able to present results orally results from various research designs to a broad audience that is less technically sophisticated
- To be able to develop the design of a novel research project, that is internally valid and that uses one of the random or quasi-random research design used in the course.

Lectures and Expectations

Each week, I will give you either questions from one or two key readings. I expect you to come to class prepared to answer. You won’t have to turn in the answers; you will get credit if you demonstrate that you grappled with the issues even if you did not get the correct answer. The point is to ensure that everyone has read the article.

Lecture notes and assignments will be posted to Blackboard. I will not always follow my notes in class. Their purpose is to give you a sense of what I will emphasize on the exam – I want time in class to be as interactive as possible. I want you to understand the intuition behind these methods, when to apply them,
and how to interpret the results. The assigned articles and questions from each are a key portion of the class. The class readings apart from those in textbooks are available on Zotero.

**Computer Assignments**

There are six computer assignments. Each due the week after the topic is covered. There will be two presenters of each assignment the day the assignment is due. Each presenter should take no more than 10 minutes and I will indicate which parts of the assignment should be presented.

**Grading**

Grades in the class are based on three inputs: your answers to questions assigned from readings each week (15%); six computer assignments (20%); your midterm exam (50%) and your research proposal (15%).

Late computer assignments will not be accepted because I will post the answers. Also, do not hand in a lot of output. Cut and paste the relevant portion of the answer below each question in the assignment. Make sure that it is easy to find your answer.

**Research Proposal**

In lieu of a final exam, I require that you turn in a proposal for a research project that would yield a plausibly causal estimate of a treatment effect. I do not expect you to gather data or to produce the estimates. You will each be asked to make a 5 minutes presentation of your proposal at the “Brown Bag” class on May 15. Both your classmates and I will comment on your proposal. The research proposal is due on May 29. No research proposals will be accepted after May 29.

**Readings and Lecture Topics**

Articles and other reading assignments are listed below. All articles are available in Zotero. The Zotero group for this class is https://www.zotero.org/groups/959116. You should have already received an invitation to join the Zotero group library via email. Zotero clients can be downloaded from http://www.zotero.org

There are a few general sources to which I will refer repeatedly throughout the course:


At the 2007 NBER Summer Institute, Professors Guido Imbens (Harvard) and Jeff Wooldrige (Michigan State) gave a series of lectures on applied econometrics. The videos of their lectures are available here: http://www.nber.org/minicourse3.html. They also published an article as a result of their lectures, which is an excellent reference:


The lecture topics and instructors for those topics are

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Week 1: The Limits of Non-Experimental Methods?

Some background. LaLonde’s seminal piece was a wake-up call to the profession and it is still cited today as a key junction in applied micro-econometrics (see Angrist and Pischke 2010). I have assigned a series of questions that I want you to be prepared to discuss in class. You do not have to turn in written work, but I will call on everyone to respond. I am not looking for the right answer necessarily. I am more interested in how you thought about it. See you on the 2nd.


Sources for notation and background as well as further readings (not required)
AP: Chapters 1 & 2, 3
MW: Chapter 2, 4, 6

Computer Assignment 1 due on February 6:
Objective: To demonstrate the ability to estimate a propensity score and to apply it to the estimation of the effect of the flu vaccine on adult health
Presenters: Allman, Bayani and Chen

Week 2: Propensity score matching

MW Chapter 7, pp.

Of interest

Computer Assignment 2 due on February 13
Objective: To replicate the work of Dehejia and Wahba (1999) and extend their analysis to new data demonstrating the utility of propensity score matching to generate causal estimates.
Presenters: Das, Demiralp and Hung

Week 3: Instrumental Variables and LATE

Introduction to Local Average Treatment Effects
MW: Chapter 7.

This is a more complete presentation of LATE
Examples of LATE in action

Week 4: Instrumental Variables and TOT


Week 5: Weak Instruments

For reference

Computer assignment 3 due on March 13
Objective: To critically evaluate the effect of weak instruments on causal estimates.
Presenters: Lin, Liu (Chuxin) and Liu (Yi)

Week 6: Difference-in-Differences I
AP: Chapter 5
CT: Chapter 25.5

Week 7: Difference-in-Differences II


Week 8: Synthetic Controls

AP: Chapter 5
CT: Chapter 25.5


Week 9: Regression Discontinuity Designs

AP: Chapter 6
CT: Chapter 25.6


For reference:

*Computer Assignment 6 due on April 24*
*Presenters: Yang, Zhou, Zhang*
*Objective:* To apply a regression discontinuity design to novel data and critically evaluate the internal and external validity of the estimates.

**Week 10: Midterm**

**Week 11: Randomized Field Experiments—I**

**Week 12: Randomized Field Experiments—II**

**Week 13: Controversy: Randomization, Instrumental Variables, & Structural Modeling**

*For Reference*

**Week 14: “Brown Bag” presentation of research proposals**
Objective: To develop a novel research design that would provide causal estimates of an important policy or intervention. To be able to summarize the research project and present it orally in 10 minutes. To describe the research design in a structured format of 5 pages that explains the question, data, methods and anticipated findings.