Economics 395E  
Treatment Effects and Causal Inference

Syllabus:

Goals

In this course, we will examine some of the literature on Causal Inference in economics. Much of this work goes under the heading of Treatment Effects and/or Program Evaluation. At the heart of this literature is the “Selection Problem.” The selection problem in economics is as follows: The fact that the actions or choices of agents and their effects on the actions of others – because these agents are assumed to be optimizers, or at least purposeful decision-makers – are endogenously, rather than exogenously, determined. Selection complicates our ability to make inferences about the (causal) effects of treatments, whatever they may be. We will consider this problem, examining both experimental and non-experimental strategies for dealing with selection. We will focus primarily on the ideas behind these various methods, although, where appropriate, we will examine aspects of their formal properties. Finally, we will examine a number of empirical studies that these methods and critically assess their appropriateness.

Course Requirements

The course will be a mix of lecture, discussion, student presentations and computer exercises. I will provide you with an introduction and overview of the various topics we will consider in my lectures. In addition, students will prepare presentations and lead discussions of some specific papers, typically ones that apply the methods or use the concepts I have been lecturing on. In these presentations, students will be expected to critically assess papers, trying to highlight their strengths and weaknesses with respect to improving our understanding of various phenomena. Finally, there will be computer exercises in which students will use and compare the various statistical methods on sample data sets. Each student taking the course for credit will make one presentation during the course. The computer exercises are optional but doing them will be extremely useful in making sure you understand and see how to use the concepts we develop in class. Whether during my lectures or the presentations of your classmates, I expect you to participate in the course by asking questions or providing insights into the topics that we consider. I cannot overemphasize the importance of asking questions and probing new ideas as an essential mode of learning. I expect students to read the papers on the reading list and will resort to “putting you on the spot” in class about the readings in class if it appears students are not doing them.
Course Website

I have established a website for the course on Blackboard. You can obtain the following materials from the website: this syllabus, and its updates, handouts, and some of the course readings and/or their location on the web. Most of the readings for the course can be obtained from JSTOR (www.jstor.org) or the websites for the various papers. If you have trouble finding papers on the reading list, please let me know and I’ll put copies of the papers up on Blackboard.
Course Outline:


2. Randomized Experimental Designs

   3.1 Overview
   3.2 Matching Methods and the Propensity Score
   3.3 Regression Discontinuity
   3.4 Instrumental Variable Methods
   3.5 Control Function Estimators
   3.6 Panel Data Methods: Fixed Effect Estimators
   3.7 Difference-in-Difference Methods
   3.8 Bounding Treatment Effects

4. Using Experimental Data to Evaluate Selection Bias and Alternative Non-Experimental Methods

5. Structural & Dynamic Treatment Effect Models
Course Outline:

Comprehensive and Background Readings

There are a number of papers and/or readings that provide comprehensive discussions and treatments of the material on treatment effects, causal inference and program evaluation. I list them below and suggest that you try to look at them throughout the course. I also provide you with a set of lecture notes that I wrote several years ago and have revised periodically. I will use these notes to structure most of my lectures. I suggest that you print a copy of these notes – they are available on Blackboard – and bring them to class.


2. **Randomized Experimental Designs**


3.1 **Overview**


### 3.2 Matching Methods and the Propensity Score


Wooldridge (2002), Chapter 18, Sections 18.1 to 18.3. [On Blackboard]

### 3.3 Regression Discontinuity Methods


### 3.4 Instrumental Variable Methods


Cameron and Trivedi (2005), Sections 4.8, 4.9, 6.4, 8.3, 8.4. [On Blackboard]


Wooldridge (2002), Chapter 5. [On Blackboard]

### 3.5 Control Function Estimators


Wooldridge (2002), Section 17.4. [On Blackboard]

3.6 Panel Data Methods: Fixed Effect Estimators


Cameron and Trivedi (2005), Chapter 21. [On Blackboard]


3.7 Difference-in-Difference Methods


Cameron and Trivedi (2005), Sections 22.6 and 25.5. [On Blackboard]


3.8 Bounding Treatment Effects


4. Using Experimental Data to Evaluate Selection Bias and Alternative Non-Experimental Methods


5. **Structural & Dynamic Treatment Effect Models**


