Estimating Impacts in Policy Research

Spring 2017

**Instructor:** Emily A. West
**Time:** Wed. 6:45pm – 8:25pm
**Email:** eaw301@nyu.edu
**Classroom:** 25 W. 4th Rm. C-17
**Office Hours:** Wednesdays 4pm-6pm
**Office:** 19 W. 4th St., 419

Office Hours:
19 W. 4th St., 4th Floor, Office 419.
After class, during open office hours Wednesdays 4pm-6pm, or by appointment (just email me). I usually need a couple of days notice (but always just email me and we will figure something out!).

**Main References:** We will use Angrist & Pischke’s *Mastering Metrics* (henceforth *MM*) as our primary text. We will also read selections from the following *Supplemental* books.

Required:

Supplemental:

**Grading Policy:**
- Assignment 1 (due Feb. 22nd): Regression Basics, Omitted Variables Bias (15%)
- Assignment 2 (due Mar. 8th): Limited Dependent Variables (5%)
- Assignment 3 (due Apr. 12th): Heterogeneity and Diff-in-Diff (15%)
- Assignment 4 (due Apr. 26th): Putting it all together, Panels, FEs (15%)
- Final Exam (take home due May 10th) (35%)
- Class Preparation and Participation (15%): Grades will be docked 1/2 letter grade (A becomes A-, e.g.) for each day that anything is late.
Objectives:
- Develop a deep understanding of causality, challenges to estimating causal relationships, and the importance of causality for understanding policy impacts.
- Familiarity with both consuming (reading, comprehending and analyzing) academic papers/policy research as well as executing your own data analysis
- Enrich your professional vocabulary–learn how to use terms from program evaluation and econometrics

Skill Prerequisites: STATA is used, and I assume you are familiar with basic data analysis using STATA. You are welcome to use R if you wish, but not SPSS. For assistance, I recommend Lawrence C. Hamilton’s *Statistics with STATA* (I have version 12, but we use STATA 14). I also assume you are capable with algebra and pre-calculus (i.e. you understand algebraic notation, understand what a function is, etc.).

Course Prerequisites:
- Program Evaluation and Analysis (PADM-GP 11.2171)
- Statistical Data Analysis (PADM-GP 11.2902)

Tentative Course Outline:
1. What is causality? What parameters do we generally “estimate”? Why?
   How? What is an RCT? How do we estimate a causal impact in a perfect world? What is validity (internal, external, ecological)? What is sampling?

2. What is a regression? Anatomy of a regression? How do we use it?
   *Ceteris Paribus*? Observables? Unobservables? Problems with “matching”?

3. In an imperfect world, how can we get closer to a causal estimate?
   Instrumental Variables? Regression Discontinuity Design?
   Differences-in-Differences?

4. What are the main ethical issues to consider in social science research?
   What is IRB? What defines a human subject? What is a pre-analysis plan?
   What does it mean to “pre-register”?

Getting Help with Assignments: I am happy to take email questions at any time, please attach as a Word, or .pdf any output, tables, etc. that I need to reference in order to answer your question. Please don’t send anything that I cannot read on my phone. Always attach the relevant assignment sheet, so that I have it for reference in answering your question.

Other options for getting STATA help are: (a) through the consultants at NYU ITS Data Service Studio (DSS) at Bobst or (b) by asking a fellow student. You are welcome to work together on assignments, though each of you must do your own STATA runs (i.e. your do files need to be your own), and write your own papers.

Activity in Class: *Please bring a laptop if at all possible.* In addition to lecture and discussion of non-graded assignments, we will do exercises in groups during class. These test and consolidate your understanding of the lecture content, and prepare you for your graded assignments.

A Note on Journal Articles: Articles used in the course are taken from journals representing an array of sectors and disciplines. They are available via Bobst Online Journal access. There is variation in emphasis,
presentation, and statistical approaches. Some articles are dense and complex, and may take hours to digest. You should keep at it, because reading journal articles is a skill that you can only learn by doing. The primary purpose of these readings is to introduce you to the methods used, and get comfortable analyzing them in terms of causal inference.

**Keeping Up/Missed Classes:** Please keep up with all readings and material, as the course moves quickly. I will cover a lot of material in each class. Students who miss a class should consult a partner student. Lecture slides will be posted the day after class.

**Class Policy:** Regular attendance is essential and expected.

**Preparation for Class:** So that we can use class time efficiently, I will post a number of resources and exercises for review before class, including non-graded assignments. I will assume that you are prepared; come ready to contribute. Bring your answers to the non-graded assignments as hardcopies.

**Academic Honesty:** Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation.
Please complete all readings listed for any given day before coming to class that day.

**Week 1 Wednesday 1/25:**

- **Class:** Introductions, Goals of the Course, Impacts, Outcomes, and the Counterfactual, Causality and Obstacles to Estimating Causality. Review 11 Points document (under Resources → Core Course Documents on NYU Classes).

- **Review:** Take two hours to review your class notes and textbooks from Stat 1, Stat 2, and Program Analysis and Evaluation. Pay attention to (and study!):
  - parameter, sample, population, estimate, confidence intervals, sampling distribution, standard deviation, standard error
  - Review these things with reference to MM Ch. 1 Appendix (I will expect you to come to Class 2 with full knowledge of everything in that Appendix).

**Week 2 Wednesday 2/1:**

- **Class:** Potential Outcomes Framework, RCTs, Treatment effects, Validity (internal, external, ecological).

- **Readings:**
  - MM Chapter 1 (including Appendix)
  - Chapter 1 Morgan & Winship

- **To Prepare:**
  - Study Appendix to MM Chapter 1!
  - Watch Statistical Power Video (NYU Classes Week 2 Folder)
  - Review QMSS Validity and Reliability site in NYU Classes
  - Complete Non-graded assignment on Newcomb reading (also on NYU Classes in Week 2 Folder)

**Week 3 Wednesday 2/8:**

- **Class:** Ceteris Paribus, Regression Framework (what does a regression do, what does a regression not do), Propensity Score, Matching, and what they do (and do not) accomplish.

- **Readings:**
  - MM Chapter 2

- **To Prepare:**
  - Complete 11 points review of Devaney et al article
  - Watch video on Adding Third Variables and Complete Non-graded Assignment
Week 4 Wednesday 2/15: Data Assignment # 1 posted at 5pm (due next week)

- **Class**: In class lab to prepare for Assignment # 1

- **To Prepare**:
  - Review bivariate statistics from Stat 1 (also Ch. 2 of MM and/or Ch. 2 of Freedman).
  - Watch videos
  - Complete non-graded assignment; bring to class ("Commands" document on Classes for reference).
  - Bring your laptop!

Week 5 Wednesday 2/22: Data Assignment # 1 Due at 11:59pm!

- **Class**: Instrumental Variables (IV) approach.

- **Readings**:
  - *MM* Ch. 3

- **To Prepare**:
  - Watch the video on Classes
  - Complete Non-graded assignment; bring to class.

Week 6 Wednesday 3/1: Data Assignment # 2 Posted at 5pm (due next week)

- **Class**: Limited DVs, Heterogenous Treatment Effects, Interaction Terms.

- **Readings**:

- **To Prepare**:
  - Watch three course videos on interactions
  - Complete BOTH Non-graded assignments
  - Bring In-Class Heterogenous Effects Worksheet from Classes
  - Bring laptop to class!
Week 7 Wednesday 3/8: Data Assignment # 2 Due at 11:59pm

- **Class:** The Regression Discontinuity Design (RDD) approach

- **Readings:**
  - *MM* Ch. 4; Angrist

- **To Prepare:**
  - Complete non-graded assignment and bring to class
  - Take a look at the “RD Porn” link on NYU Classes

Week 8 Wednesday 3/22:

- **Class:** Panel Data, True Panels vs. Pooled Cross Sections, Periods, Fixed Effects.

- **Readings:**
  - Wooldrige Ch. 10
  - Stock and Walton Regression with Panel Data Chapter (posted on NYU Classes)

- **To Prepare:**
  - Watch the course video on NYU Classes.
  - Complete Non-graded assignment and bring to class

Week 9 Wednesday 3/29:

- **Class:** Panel Data Workshop, Implementing Fixed-Effects.

- **To Prepare:**
  - Review class notes from Week 8, as well as readings (*Wooldridge* Ch. 10 and Xu et. al. paper).
  - Bring your laptop to class!
Week 10 Wednesday 4/5: Data Assignment # 3 Posted at 5pm (due next week)

• **Class:** Logic of Differences-in-Differences: Assumptions; Tests of Assumptions; Parallel Trends.

• **Readings:**

• **To Prepare:**
  - Watch the DinD video
  - Complete an 11 points analysis of the Currie and Walker paper; bring to class.
  - Complete the non-graded assignment; bring to class.

Week 11 Wednesday 4/12: Data Assignment # 3 Due at 11:59pm!

• **Class:** In-class Data Workshop–Merging Datasets, Making Regression Tables, and Marginal Effects

• **To Prepare:**
  - Watch video on merging datasets in Stata
  - Watch videos on interactions
  - Download data and worksheet needed for class
  - Bring laptop to class!

Week 12 Wednesday 4/19: Data Assignment # 4 posted at 5pm (due next week)

• **Class:** Randomized Experiments, Sampling Theory, Clustering, Spillover.

• **Readings:**
  - Gerber and Green (2012) Chs. 1-3 and 8

• **To Prepare:**
  - Complete 11 Points Document for Cilliers et. al. and bring to class
**Week 13 Wednesday 4/26:** Data Assignment # 4 Due at 11:59pm!

- **Class:** Ethics, IRB, Pre-Analysis Plans, Pre-Registration, Replication (and failure to replicate).

- **Readings:**
  - Oakes, JM. “Risks and wrongs in social science research: An evaluator’s guide to the IRB. *Evaluation Review.*
  - This Atlantic article on replication (link also on NYU Classes)

- **To Prepare:**
  - Complete the Required Human Subjects Training Program via Citiprogram through NYU (NYU website with instructions and link to Citiprogram here).
  - Bring proof of certification to hand in (screen shot or email confirmation).
  - Complete Non-graded assignment and bring it to class

**Week 14 Wednesday 5/3:**

- **Class:** Review

- **Readings:** *MM* Ch. 6

**Wednesday 5/10:**

- **Class:** No Class; Take-home final posted on NYU Classes.