Syllabus WWS 508c Spring 2011
Econometrics and Public Policy (Advanced)
Tuesday/Thursday, 9-10:30AM
Room 001

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Course Description

This is a course in applied econometrics, with a focus on the concepts and techniques most relevant to public policy analysis. The related goals of this class are for students to 1) learn a set of statistical tools and research designs that are useful in conducting good empirical research on public policy topics; 2) become more critical/skeptical consumers of public policy research; and 3) to gain some hands-on experience in using statistical software (i.e., STATA) to evaluate the effects of public policies using data.

The course will emphasize the importance of research design for the identification of causal effects, as well as the limitations in the applicability of many commonly used techniques. Accordingly, after discussing a conceptual framework for thinking about causality, we will discuss econometric issues and techniques arising in research designs appropriate for studying causal effects in a variety of settings.

While we will derive and study the statistical properties of a variety of common estimators, much of the required work of the class will involve analyzing real data often from published policy research papers in the hope that doing applied work will help you to learn the econometric theory behind it. We will occasionally work with data in class, and there will be approximately bi-weekly problem sets requiring you to implement econometric analyses using data that I will make available to you through the course website.

You will need access to the STATA statistical software package, which is available in the WWS computer clusters and available to purchase at www.stata.com (budget permitting, I recommend Stata 11/SE—please do not buy any lower version, as it may not be able to handle some of the empirical exercises for the class). If you are not familiar with Stata, I recommend the book Statistics with Stata by Lawrence C. Hamilton as an introduction and reference. The Stata help system is a useful way to figure out what particular commands do and the syntax they require if you already have some idea of what command you want. A more comprehensive set of online references can be found at: [http://www.stata.com/links/resources1.html](http://www.stata.com/links/resources1.html) In a pinch, type “Stata help how do I [your problem here]” into Google and iterate towards a solution.

Who should take this course?

Every MPP and MPA student can benefit from taking one of the 508 courses: understanding statistical evidence is invaluable in nearly every policy context. The level of math used to derive the properties of different estimators will be higher in 508c, an approach that will have different costs and benefits depending on your comfort level with math. While I will review some material at the beginning, I will assume familiarity with the statistics and inference procedures covered in 507c, as well as algebra and differential calculus. We will (sparingly) use some basic matrix algebra as well, but I will review the necessary material. If you are someone for whom math obscures complex ideas more than it clarifies, you may develop more intuition and big picture understanding in 508b. If you plan on being heavily involved in policy research in the future,
especially on the ‘production side’, then understanding econometrics at (at least) this level of rigor will be very helpful.

Please do not hesitate to talk with me about which course would be best for you, and if you find yourself regretting your choice please come talk to me earlier rather than later.

ASSIGNMENTS AND GRADING

Classroom participation is strongly encouraged, and will account for 10 percent of your grade. I will assign approximately bi-weekly problem sets during the semester requiring hands-on analysis of real data that will collectively form 30 percent of your grade. In addition, there will be an in-class midterm (25%) and a take-home final exam (35%). Problem set solutions will be posted shortly after each is due, so no late homework assignments will be accepted. You are encouraged to work together on the Stata portion of homework assignments in groups of up to three, and may turn in a single copy of Stata programs and log-files with the names of all participants. Each student, however, should submit individual answers to all ‘non-Stata’ questions. Moreover, since the final exam will require you to implement techniques explored in the problem sets on your own, you should be sure you understand all the material covered in the problem sets.

COURSE OUTLINE AND READINGS

A preliminary outline of topics to be covered and related readings is presented below. Note that this is preliminary and incomplete, and I will likely change things often as we go. In particular, I will ask you to read applied papers highlighting the techniques which we will discuss in class. I will attempt to announce coming readings for lecture at least two lectures in advance throughout the semester via the course webpage.

Note that no textbook is required for the class. I will assume you have access to Stock and Watson’s (SW) fine Introduction to Econometrics and also Angrist and Pischke’s (AP) fun (conditional on the ‘econometrics fixed-effect’) book, Mostly Harmless Econometrics. Both of these are references worth the money if you plan on making econometrics a significant part of your life in the future. Two more good references on the course website that I will occasionally reference are 1) a review article by Imbens and Wooldridge (IW), “Recent Developments in the Econometrics of Program Evaluation,” and 2) a .pdf of the out-of-print textbook Econometric Methods by Jack Johnston and John DiNardo (JD).

I. Introduction and Getting to Know You
   A. (on your own) Matrix Algebra Review.
      • JD Appendix A: Chapter 3.1-3.3.
   B. (on your own) Probability and Statistics Review

II. Overview of Causal Reasoning and Research Design
   • IW Section 2 (on Blackboard)
   • AP Chapters 1 and 2

III. Randomized Controlled Trials as the Gold Standard
IV. “Selection on Observables” Designs

A. Regression Adjustment: Uses and Abuses

1. Linear Regression Review. Estimation and Inference in Small and Large Samples.
   • SW Chapters 1-8, 17, 18.
2. Introduction to Monte Carlo Methods
   • JD 11.1
3. Causality in the Linear Regression Model.
4. Endogeneity - Omitted Variables, Simultaneity, and Measurement Error
5. Multiple Regression. FWL.
   • Davidson and MacKinnon Chapter 2. (on Blackboard)

B. Matching and the Propensity Score

   • SW 11, JD 13

C. Evaluating the Estimators: Does this work?!?


V. Selection on Unobservables Designs

A. Linear panel data models. Error component (fixed-effects and random effects) models.
   • SW 10

B. Difference-in-difference models.
C. Selection Bias and the Heckman Selection Correction

D. Instrumental Variables
   - SW 12

E. Regression Discontinuity Research Design

VI. Other Topics (time permitting)
   A. More reflection: Critiques of IV/Randomization Methodology

   B. Quantile Regression
References


