Political Science 702

Advanced Techniques of Political Science Research

Monday 4:30-7:10, Bolton 293

Instructor: Shale Horowitz
Office: Bolton 622
Office hours: Mon. 7:10-8:10 pm, Tues. 3:00-4:00 pm
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Final Exam: Mon., May 11, 4:30-6:30 p.m.

Course Description
After a review of basic statistics and the linear regression model, the course focuses first on a series of simpler generalizations of the linear model, and then on some more complex models. The assumptions of the linear regression model often fail in practice. How are these failures to be detected and corrected for? For example, what is to be done when independent variables are highly correlated (“multicollinearity”)? What if errors do not have the same variance (“heteroscedasticity”), or are correlated with one another (“serial correlation”)? What if an independent variable is correlated with the error term? What if there is a possibility that variables have been wrongly included or excluded, or that the wrong functional form has been chosen? To address situations where a linear functional form appears questionable, there is a brief discussion of non-linear regression. Often the dependent variable doesn’t vary continuously. A number of different “discrete choice” models exist to estimate such relationships. “Panel data” analysis involves estimation of coefficients where both cross-sectional and times series data are available. We will then move on to discuss some more complex models. What is to be done when there are multiple causal relationships among the variables? Finally, a number of time-series estimation techniques will be surveyed.

The course emphasizes the relationship between statistical theory and research practice. It is necessary to understand intuitively how the different techniques accommodate various special properties of the data. It is also necessary to be able to look at any given use of statistical techniques with a skeptical eye—to recognize the limitations of the techniques that are used or that might be used. Moving back and forth between these perspectives builds a well-informed but still practical understanding of the techniques. The textbook is therefore complemented with lab practice using the Stata software package, and with discussion of political science journal articles applying many of the estimation techniques.

The techniques are crutches for testing our causal intuitions more precisely. But social and political phenomena are too complex for any of them to be a magic bullet that gives the right answer. Rather, a number of related model specifications are often plausible. Causal relationships are more reliably indicated when reasonably strong results appear across a range of plausible model specifications.

Please do the reading in advance of class sessions, and bring the week’s reading materials to class.
Grades
Grades will be based on homework assignments (16.7%), participation (8.3%), a midterm exam (25%), a final exam (25%), and a research paper (25%). The midterm will be on Mon., March 9. An outline of the research paper is due Mon., April 13. This rough draft should briefly state the research question; briefly list possible theoretical answers, along with the corresponding hypotheses; and briefly describe how you propose to measure the relevant variables and gather the data. The rough draft can be written either in an essay format, or in an outline/bullet-point format. The completed research paper is due Mon., May 4, at the beginning of class. The final exam will be given on Mon., May 11, at 4:30 p.m., in Bolton 293. Without a written medical excuse, no late homework can be accepted, and no make-up exams or incomplete grades can be given. Please inform me as soon as possible if you require any special accommodation to complete the course requirements.

Scheduling Note: Class Breaks and Make-Up Times
On March 16, there will be no class because of spring break. On February 16, I will be out of town at a conference, so there will also be no class. To make up for the course material missed on February 16, class will be held for an extra 75 minutes on both February 9 and February 23. Please arrange your schedule so that you will be able to stay 75 minutes later on February 9 and February 23. I apologize for any inconvenience that this causes.

Readings
The following textbook is available in the bookstore:
The following illustrative articles are available either on JSTOR, or are on electronic reserve (listed under my name and Political Science 371) on the Golda Meir Library web page:

**Course Schedule**
The following schedule is subject to modification.

I. Review of the Linear Regression Model.
      Reading: Pindyck and Rubinfeld, chaps. 1-5; Horowitz.

II. Generalizations and Refinements of the Linear Regression Model.
      Reading: Pindyck and Rubinfeld, chap. 6; Heo.
      Reading: Pindyck and Rubinfeld, chap. 7.
      Reading: Pindyck and Rubinfeld, chap. 9.2-9.4; Alvarez et al.
      Reading: Pindyck and Rubinfeld, chap. 10.1-10.2.
      Reading: Pindyck and Rubinfeld, chap. 11.1-11.2; Fearon and Laitin; Kim.

III. Advanced Topics.
   7. Simultaneous-Equation Estimation.
      Reading: Pindyck and Rubinfeld, chap. 12; Moore and Davis; Wallerstein.
      Reading: Pindyck and Rubinfeld, chap. 16, and if time permits, chap. 17; Rasler.

IV. Finale.
   9. Conclusions and Review.
      Reading: Leamer.