

Political Science 702
Advanced Techniques of Political Science Research
Wednesday 4:30-7:10, Bolton 293

Instructor: Shale Horowitz
Office: Bolton 622
Office hours: Wed. 7:10-8:10 pm, Thurs. 3:00-4:00 pm
Office telephone: 229-2399
E-mail: Shale@uwm.edu
Final Exam: Wed., May 14, 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 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 Wed., March 12. An outline of the research paper is due Wed., April 16. 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 Wed., May 9, at the beginning of class. 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 19, there will be no class because of spring break. On March 26, 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 March 26, class will be held for an extra 75 minutes on both March 12 and April 2. Please arrange your schedule so that you will be able to stay 75 minutes later on March 12 and April 2. I apologize for any inconvenience that this causes.

Readings

The following textbook is available in the bookstore:

Pindyck, Robert S. and Daniel L. Rubinfeld. (1998) *Econometric Models and Economic Forecasting*. 4th ed. Boston: Irwin McGraw-Hill.

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 <<https://millib.wisconsin.edu/cgi-bin/Pwebrecon.cgi?DB=local&PAGE=rbSearch>>:

Alvarez, R. Michael, Geoffrey Garrett, and Peter Lange. (1991) "Government Partisanship, Labor Organization, and Macroeconomic Performance," *American Political Science Review* 85, 2, 539-56. (JSTOR)

Heo, Uk. (2000) "The Defence-Growth Nexus in the United States Revisited," *American Politics Quarterly* 28, 1 (January), 110-27. (E-Reserve)

Horowitz, Shale. (2003) "War after Communism: Effects on Political and Economic Reform in the Former Soviet Union and Yugoslavia." *Journal of Peace Research* 40, 1, 25-48. (E-Reserve)

Kim, Woosang. (1991) "Alliance Transitions and Great Power War," *American Journal of Political Science* 35, 4, 833-50. (JSTOR)

Leamer, Edward E. (1983) "Let's Take the Con out of Econometrics," *American Economic Review* 73, 1, 31-44. (JSTOR)

Moore, Will H. and David R. Davis. (1998) "Transnational Ethnic Ties and Foreign Policy." In David A. Lake and Donald Rothchild, eds., *The International Spread of Ethnic Conflict: Fear, Diffusion, and Escalation*, 89-103. Princeton, NJ: Princeton University Press. (E-Reserve)

Rasler, Karen. (1986) "War, Accommodation and Violence in the United States, 1890-1970," *American Political Science Review* 80, 3, 921-45. (JSTOR)

Wallerstein, Michael. (1989) "Union Organization in Advanced Industrial Democracies,"
American Political Science Review 83, 2, 481-501. (JSTOR)

Course Schedule

The following schedule is subject to modification.

I. Review of the Linear Regression Model.

1. Basic Statistics. Two-Variable and Multi-Variable Regression. Using the Multiple Regression Model.

Reading: Pindyck and Rubinfeld, chaps. 1-5; Horowitz.

II. Generalizations and Refinements of the Linear Regression Model.

2. Heteroscedasticity. Serial Correlation. Generalized Least Squares.

Reading: Pindyck and Rubinfeld, chap. 6; Heo.

3. Instrumental Variables. Correlation of Independent Variables with the Error Term. Errors in Variables. Specification Error and Specification Tests.

Reading: Pindyck and Rubinfeld, chap. 7.

4. Tests for Causality. Missing Observations. Panel Data.

Reading: Pindyck and Rubinfeld, chap. 9.2-9.4; Alvarez et al.

5. Nonlinear Estimation. Maximum-Likelihood Estimation.

Reading: Pindyck and Rubinfeld, chap. 10.1-10.2.

6. Discrete Choice Models.

Reading: Pindyck and Rubinfeld, chap. 11.1-11.2; Kim.

III. Advanced Topics.

7. Simultaneous-Equation Estimation.

Reading: Pindyck and Rubinfeld, chap. 12; Moore and Davis; Wallerstein.

8. Properties of Stochastic Time Series. Linear Time-Series Models.

Reading: Pindyck and Rubinfeld, chap. 16, and if time permits, chap. 17; Rasler.

IV. Finale.

9. Conclusions and Review.

Reading: Leamer.

10. Class Presentations of Research Papers.