

POLS 571 Longitudinal Data Analysis

Fall 2007

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This course covers quantitative methods of time series, panel, time-series-cross-section, and duration data. I have three major goals for the course. First, I hope to cultivate a broad set of tools so that you can be more conversant with your colleagues and better engage the published material across the discipline. The methods covered in this course are used frequently, and your understanding for the cutting edge research will improve as you can better follow the empirical methodology. Second, I hope you will have a firm foundation on which you can further explore the topics that interest you in greater depth. In 12 class periods, I will be unable to cover everything as deeply as you might like, but I hope to at least expose you to the techniques and point you in the right direction for further exploration. Third, I hope that you will be able to use the methods in your own research. If your research questions call for the methods covered in this course, then you should be able to use them with confidence and analytic rigor.

This course is for students who have taken POLS 509, which covered a number of topics related to longitudinal data. While we will discuss issues such as autocorrelation, heteroskedasticity, unit roots, fixed effects and random effects, I will assume that you already have a basic understanding of these 509 topics and I will aim to provide a deeper understanding. We will not have time to thoroughly review the basic concepts.

The class periods will unfold in three parts. First, I will lecture on the assigned topics. The lectures will combine mathematical principles from the readings with general intuition on how it all applies to political science research. Second, you will take turns presenting an article from the literature for class discussion. Your presentation will include a summary of the article, a detailed assessment of how the methods used apply to the course concepts, and a commentary on the appropriateness of the methods and potential criticisms. The presenter should also come prepared with a handful of questions about the paper and the relevant methods for the class to discuss. Third, we will spend time exploring the course concepts in a laboratory environment. We will primarily use Stata, but I will also teach some of the applications in R. By the third week of the course, each student will have contributed a dataset to be used during the lab exercises. As a class, we will explore these data sets, and others that I provide as well.

Assignments

- Class Participation (10%)
Students are expected to come prepared to each class ready to discuss the assigned reading. Students will also lead part of the class twice during the semester, as described above.
- Problem Sets (50%)

Students will complete five assignments during the semester. The assignments will ask the students to demonstrate their mastery of the course material. Each assignment will have some questions related to the mathematical foundations of the course topics, some requiring the methods to be used, and some demanding an intuitive interpretation of the findings. Late problem sets will lose one point (out of ten) per day late, starting at the moment that the assignments are collected.

- Final Project (40%)
Students will complete a 15-20 page methods paper on a topic of their choosing, using longitudinal data. The paper can be a replication paper of a major work in the literature, or it can be a paper related to an ongoing research project. No more than 20% of the paper can be copied and pasted from an existing research project. In the papers, the students should present the hypotheses tested and a brief overview of why the hypotheses are both interesting and justified. The bulk of the paper will be on the research design and results, with a brief conclusion to sum up the findings. The point is to demonstrate mastery of the course concepts, so the students should explore many different facets of the appropriate methods. The write-up should be clear and concise, with all tables formatted neatly. On the third week of class, each student will turn in a one-page summary of the research project, along with the data set he/she intends to use for the project. Late projects will lose one letter grade per day late.

Books

Enders, Walter. 2004. *Applied Econometric Time Series*. Hoboken, NJ: Wiley.

Wooldridge, Jeffrey M. 2002. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press.

Box-Steffensmeier, Janet M. and Bradford S. Jones. *Event History Modeling: A Guide for Social Scientists*. New York: Cambridge University Press.

Schedule

29 August: Introduction to the Course

6 September: Math overview & finite differences
Enders, Ch. 1

Discuss: Sprague, John. 1981. One-party dominance in legislatures. *Legislative Studies Quarterly* 6(2):259-285.

13 September: No class, Professor Beardsley will be at a conference

20 September: ARMA, ARCH & GARCH
Enders, Chs. 2 & 3

Discuss: Haynie, Stacia L. 1992. Leadership and consensus on the US Supreme Court. *Journal of Politics* 54(4): 1158-1169

27 September: Unit roots and trends
Enders, Ch. 4

Discuss: Lebo, Matthew J. and Will H. Moore. 2003. Dynamic foreign policy behavior. *Journal of Conflict Resolution* 47(1): 13-32.

4 October: VAR
Enders, Ch. 5

Freeman, John R., John T. Williams, and Tse-min Lin. 1989. Vector autoregression and the study of politics. *American Journal of Political Science* 33(4):842-877.

Discuss: Enders, Walter, and Todd Sandler. 1993. The effectiveness of antiterrorism policies: A vector-autoregression-intervention analysis. *American Political Science Review* 87(4): 829-844.

11 October: Cointegration and error correction models
Enders, Ch. 6

Beck, Nathaniel. 1993. The methodology of cointegration. *Political Analysis* 4: 237-248.

Discuss: Voeten, Erik and Paul R. Brewer. 2006. Public opinion, the war in Iraq, and presidential accountability. *Journal of Conflict Resolution* 50(5): 809-830.

18 October: Panel & TSCS data
Wooldridge, 128-132, Ch. 7

Wilson, Sven E. and Daniel M. Butler. 2007. A lot more to do: The sensitivity of time-series cross-section analyses to simple alternative specifications. *Political Analysis* 15(2): 101-123.

Beck, Nathaniel and Jonathan N. Katz. 1995. What to do (and not to do) with time-series cross-section data. *American Political Science Review* 89 (3): 634-647.

Discuss: Beck, Nathaniel, Jonathan Katz, Michael Alvarez, Geoffrey Garrett, and Peter Lange. 1993. Government, partisanship, labor organization and macroeconomic performance: A corrigendum. *American Political Science Review* 87(4): 945-48.

25 October: Random Effects and Fixed Effects
Wooldridge, Ch. 10

Plumper, Thomas and Vera E. Troeger. 2007. Efficient estimation of time invariant and rarely changing variables in finite sample panel analyses with unit fixed effects. *Political Analysis* 15(2): 124-139.

Discuss: Green, Donald P., Soo Yeon Kim and David H. Yoon. 2001. Dirty pool. *International Organization* 55(2):441-468.

1 November: BTSCS & Dynamic Panel Data

Wooldridge, 482-497

Beck, Nathaniel, Jonathan N. Katz and Richard Tucker. 1998. Taking time seriously: time-series-cross-section analysis with a binary dependent variable. *American Political Science Review* 42(4): 1260-1288.

Wawro, Gregroy. 2002. Estimating dynamic panel data models in political science. *Political Analysis* 10(1): 25-48.

Discuss: Oneal, John R. and Bruce Russett. 1999. Assessing the liberal peace with alternative specifications: Trade still reduces conflict. *Journal of Peace Research* 36(4): 423-442.

8 November: Spatial Autocorrelation & GEE

Franzese, Robert J. and Jude C. Hays. 2007. Spatial econometric models of cross-sectional interdependence in political science panel and time-series-cross-section data. *Political Analysis* 15(2): 140-164.

Zorn, Christopher. 2001. Generalized estimating equation models for correlated data: A review with applications. *American Journal of Political Science* 45(2): 470-90.

Discuss: Ward, Michael D. and Kristian Skrede Gleditsch. 2002. Location, location, location: An MCMC approach to modeling the spatial context of war and peace. *Political Analysis* 10(3): 244-260.

15 November: Overview of Event History Models

Wooldridge, Ch. 20

Box-Steffensmeier and Jones, Chs. 2-5

Discuss: Alt, James E. and Gary King. 1994. Transfers of governmental power: The meaning of time dependence. *Comparative Political Studies* 27(2):190-210.

29 November: Event History Model Selection and Specification

Box-Steffensmeier and Jones, Chs. 6-8

Discuss: Box-Steffensmeier, Janet M., Dan Reiter, and Christopher Zorn. 2003. Nonproportional hazards and event history analysis in international relations. *Journal of Conflict Resolution* 47(1): 33-53.

6 December: Frailty and Variance-Corrected Models

Box-Steffensmeier and Jones, Chs. 9&10

Box-Steffensmeier, Janet M., Suzanna De Boef, and Kyle A. Joyce. 2007. Event dependence and heterogeneity in duration models: The conditional frailty model. *Political Analysis* 15: 237-256.

Discuss: Jones, Bradford S. and Regina P. Branton. 2005. Beyond logit and probit: Cox duration models of single, repeating, and competing events for state policy adoption. *State Politics and Policy Quarterly* 5: 420-43.