Political Science 271
Quantitative Methods

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Office Hours: Tuesdays, 3-5pm, SSB 369	Tuesdays 1:30-2:50pm, Thursdays 3-4:20
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The goal of this course is to make you sophisticated shoppers in the mall of quantitative methods. You may not be able to sew your own clothes or recite every ingredient of a hotdog-on-a-stick, and we'll stay away from most of today's fads, but you should become intelligent consumers who are familiar with a broad range of approaches and models and know how to buy the one that is perfect for you. We'll talk about why the old hand me down of OLS might not fit your data anymore. Then the emphasis will be on matching substantive questions to appropriate methods, and trying a few on for size. I will expose you to some of the mathematical ideas and notations that drive different approaches, but I'll focus on training you as researchers rather than econometricians.

I will assume that your math skills are as rusty as mine, but that you are willing to sharpen them. The first part of the course, the survey of maximum likelihood models, builds on some basics of probability theory and uses high school-level calculus. The second part will involve learning the basics of linear algebra, which I'll teach you. None of the math here should be a barrier to entry, so please let know at any point if it becomes an obstacle. If you have taken 204b and math camp, you should be sufficiently prepared.

My goal is to alternate lectures that introduce a new method with ones that apply the method, using real data analyzed with R and Stata. The balance may not remain perfect, but each set of lectures will attempt to answer the following questions: How does the structure of this dataset differ from classical regression assumptions? What kinds of substantive issues would lead to this sort of data generating process? How can we determine what's going on with our data? What is the theory behind an alternative approach? How can we implement the alternative approach? What is the clearest and most informative way to interpret and present our results?

Where to Find the Readings

› I've assigned a number of different treatments of each subject in the hope that you will find the one that works best for you, and know where to find the others. So you should not think of it all as required reading, and you certainly will not be quizzed on it, but you should probably try to put your eyes on all of it at some point.

› Gary King's *Unifying Political Methodology* is a must-have for this class. It is available at the bookstore and on Amazon.

› William H. Greene's *Econometric Analysis* is **the** standard reference for economists and political scientists, and the seventh edition is available at the bookstore. It is expensive,

and not tremendously approachable, but worth it. You can hunt around for used versions since it is an investment (the page numbers listed here are for the 7th edition).

› Applied articles are available for download through JSTOR, and I'll post the ones that are not.

› We will both Stata and R in the labs and on problem sets.

› The course webpage, located at http://pscourses.ucsd.edu/ps271/ps271.htm, will contain information such as my lecture notes, assignment, and data sets.

› Your TA for this course will be Alex Hughes, who can be reached at dhughes@ucsd.edu

Course Assignments

› 80% from eight problem sets that mix a little math and substance with a lot of data
› 20% for class attendance and participation

Course Outline

Part I. More Maximum Likelihood

Tuesday, January 8. Course Introduction and The Logic (and Math) of Likelihood
      i.   *Unifying Political Methodology*. Read Chapters 1 and 2.
      ii.   Neal Beck's *Likelihood* notes.

Thursday, January 10. Linear and Dichotomous Variable Models in ML Framework
      i.   *Unifying Political Methodology,* skim chapter 3, read Chapter 4.
      ii.   Greene, Chapters 17 and 21.1-21.6, and Appendix E.6.

Tuesday, January 15. Interpreting the Results of Maximum Likelihood Estimations
      i.   *Unifying Political Methodology*, Chapter 5.1-5.2.
      ii.   King, Tomz and Wittenberg. 2000. Making the Most of Statistical Analysis. *AJPS* 44:341-355.

Thursday, January 17. Multiple Category Models: Multinomial Logit and Ordered Probit
      i.   *Unifying Political Methodology*, Chapter 5.3-5.6.
      ii.   Greene, Chapter 21.7-21.8.
      iii.   Neal Beck's *Limited Dependent Variables* notes.
      iv.   Jonathan Nagler's *Discrete Choice Models* notes.

Tuesday, January 22. Applications of Multiple Category Models

      i.   Alvarez, R. Michael, and Jonathan Nagler. 1998. When Politics and Models Collide: Estimating Models of Multiparty Elections. *American Journal of Political Science* 42:55-96.
      ii.   Alvarez, R. Michael, and Jonathan Nagler. 2000. Issues, Economics, and the Dynamics of Multi-Party Elections. *APSR* 94:131-49.
      iii.   Quinn, Martin, and Whitford. 1999. Voter Choice in Multi-Party Democracies. *AJPS* 43:1231-1247.
      iv.   Nagler. 1994. Scobit. *AJPS* 38:230-255.

Thursday, January 24. Censored and Truncated Data.
      i.   *Unifying Political Methodology,* Ch. 9.
      ii.   Greene, Chapter 22.1-22.4.
      iii.   Neal Beck's *Censored Data* notes.

Tuesday, January 29. Event Count Models
      i.   *Unifying Political Methodology,* Chapter 5.7-5.10.
      ii.   Greene, Chapter 21.9.
      iii.   Chris Zorn's *Event Count Models* notes.

Thursday, January 31. Event History I: Survival Functions and Hazard Rates
      i.   Greene, Chapter 22.5.
      ii.   Kousser, "The Stability of Leadership: How Long do First Among Equals Last?" pages 3-8, 18-19, 33-39.

Tuesday, February 5. Event History II: A Survey of Models
      i.   Neal Beck's *Duration Data* notes.

Thursday, February 7. Event History III: Applications of Models
      i.   King, Gary, James E. Alt, Nancy Elizabeth Burns, and Michael Laver. 1990. A Unified Model of Cabinet Dissolution in Parliamentary Democracies. *American Journal of Political Science* 34:846-71.
      ii.   Beck, Nathaniel, Jonathan N. Katz, and Richard Tucker. 1998. Taking Time Seriously: Time-Series—Cross-Section Analysis with a Binary Dependent Variable. *American Journal of Political Science* 42:1260-1288.
      iii.   Neal Beck's *Event History as Time Series* notes.

Part II. Regression in the Language of Linear Algebra

Tuesday, February 12. Linear Algebra 101
      i.   Greene, Appendix A.1-A.3.
      ii.   Neal Beck's *Linear Algebra* notes.

Thursday, February 14. The Classical Regression Model Restated
      i.   Greene, Chapters 2 and 3.
      ii.   Neal Beck's *OLS in Matrix Form* notes.

Tuesday, February 19. Heteroskedasticity Revisited: Tests and Ways to Leverage Information
        i.   Greene, Chapter 11.
        ii.   Alvarez and Brehm. 1995. American Ambivalence Towards Abortion Policy: Development of a Heteroskedastic Probit Model of Competing Values. *AJPS* 39:1055-1082.

Thursday, February 21. Instrumental Variables and Two-State Least Squares
        i.   *Unifying Political Methodology,* Chapter 8.1-8.2.
        ii.   Greene, Chapter 15.1-15.5.
        iii.   Jacobson, Gary. 1990. The Effects of Campaign Spending in House Elections: New Evidence for Old Arguments." *AJPS* 34:334-62.

Tuesday, February 26. Time Series I: Autoregression and Moving Average
        i.   Greene, Chapter 12.
        ii.   Quinn and Jacobson. 1989. Industrial Policy Through Restrictions on Capital Flows. *AJPS* 33:700-737.

Thursday, February 28. Time Series II: Stationarity, Nonstationarity, Cointegration.
        i.   Greene, Chapter 20.
        ii.   Neal Beck's *Time Series* notes.
        iii.   Neal Beck. 1994. The Time Series Method of Cointegration. *Political Analysis* 4:237-248.

Tuesday, March 5. Time Series, Cross Sectional Data: Fixed Effects and Random Effects
        i.   Greene, Chapter 13.
        ii.   Neal Beck's *Longitudinal Data* notes.

Thursday, March 7. Applications of Time Series, Cross Sectional Data.
        i.   Chris Zorn. 2001. Estimating Between and Within Cluster Covariate Effects, with an Application to Models of International Disputes. *International Interactions* 27:433-445.
        ii.   Neal Beck and Jonathan Katz. 1995. What to Do (and What Not to Do) With Time Series, Cross Section Data. *APSR* 89:634-47.

Tuesday, March 12 and Thursday, March 14: Finishing up prior topics or new topics (matching, regression discontinuity, etc.)