PSC 531: Intermediate Statistics for Social Science
Spring 2009
502 Park Hall
Wednesday 9:30-12:20

Dr. Harvey D. Palmer
514 Park Hall
Office hours: Tuesday 9:30-12:30, and by appointment

This course covers multivariate statistical analysis of political outcomes and behavior, which is the central focus of the Political Methodology field in Political Science. All Ph.D. students in Political Science at UB are required to take this course or PSC 533 – Formal Theory. The field of Political Methodology has a peer-review journal, *Political Analysis*, sponsored by the Society for Political Methodology and the Political Methodology section of the American Political Science Association. While drawing heavily from econometric methods applied by economists and other social scientists, Political Methodology takes a unique approach to hypothesis testing due to the inherent differences between decision-making in political settings and decision-making in market and other social science settings. Hence, this course covers standard econometric methods in the specific research context of how they are applied in the political science literature.

The ultimate objective of this course is to prepare students to interpret and conduct statistical analyses applying multivariate methods that are standard in published research in political science. Therefore, the course adopts a "cookbook" approach placing emphasis on developing practical comprehension rather than an ability to derive estimators or prove theorems. A secondary goal of the course is to provide an adequate theoretical and mathematical foundation for those students who want to learn more advanced econometric methods in the future. The first third of the course will focus on estimation and inference with the classical linear regression model. Then the course will consider econometric analysis in the presence of data problems and violations of the classical assumptions. As time permits, the course will also survey more advanced methods for analyzing limited-dependent variables, time-series data, and simultaneous equations.

By the end of the semester, students are expected to have achieved the following learning outcomes:

- Comprehend rigorous expositions of statistical methods in summation notation
- Explain and assess statistical analyses conducted in published academic research in political science
- Interpret estimated parameters from multivariate regression models
- Conduct statistical tests of hypotheses using estimated parameters from multivariate regression models
- Prepare a research design that investigates the empirical validity of a theoretical argument
- Construct and format a multivariate data set for statistical analysis
- Estimate the multivariate regression models covered in the course
- Conduct independent empirical research using the multivariate regression methods taught in the course

The required texts for this course are: Damodar Gujarati's *Basic Econometrics* (4th edition), and Christopher Achen's *Interpreting and Using Regression* (Sage 1982). The Gujarati text serves as a comprehensive reference that supports the class lectures, while the Achen text provides (slightly) less rigorous, more intuitive discussions of regression analysis illustrated with political science applications. For those students in need of a "primer" on the mathematical foundations of statistics, I recommend Timothy Hagle's *Basic Math for Social Scientists* (Sage 1996). The schedule below also lists some

articles that will be distributed in class. Recommended readings are denoted with asterisks.

Since the Gujarati text is set within the economics field, lectures will place the methods within a political science context to which the students can more easily relate. In particular, in-class examples and homework assignments will apply the methods learned in this course to political science data sets provided by the instructor. In addition, during the course of the semester, we will review research in political science that applies these techniques in a manner that is tailored to the unique nature of political decision-making.

Coursework (and your grade) will consist of class participation (5%), homework assignments (30%), a take-home midterm exam (25%), a research design (10%), and a research paper (30%). There is no final exam, but the research paper will be due during final exam week. The research paper requires you to investigate a disciplinary question in political science (broadly defined) by using econometric methods to analyze a data set that you have collected. About a month before the paper is due, you will prepare a research design and present it to the class. All of the homework assignments will also require computer data analysis. Students should use STATA as their econometrics software package (which is available in the computer lab in 450 Park Hall), but other packages may be acceptable with the instructor's permission. During the semester, the instructor will distribute data sets formatted for STATA. These data will be employed in homework assignments and class examples.

Lecture Topics and Readings

January 14: Review of Statistical Foundations of Regression Analysis
      Gujarati, chapters 1-6, appendix A

January 21: Multiple Regression Analysis – Theory and Estimation
      Gujarati, chapter 7

January 28 & February 4: Multiple Regression Analysis – Inference
      Gujarati, chapter 8
      Achen, entire book

Optional Class (TBA): Multiple Regression Model in Matrix Form
      Gujarati, appendices B & C

February 11: Model Specification I: Dummy Variables, Interactions, and Functional Form
      Gujarati, chapter 9 and pp. 175-93
      Mirer, Thad. *F* Tests and Dummy Variable Outcomes. *Economic Statistics and Econometrics*, 3rd
         edition, chapter 14.
      Friedrich, Robert J. 1982. In Defense of Multiplicative Terms in Multiple Regression Equations.
         American Journal of Political Science 26: 797-833.

February 18: Model Specification II: How Do I Choose the "Best" Model?
      King, Gary. 1986. How Not to Lie with Statistics: Avoiding Common Mistakes in Quantitative
         Political Science. *American Journal of Political Science* 30: 666-87.
      Luskin, Robert. 1991. Abusus Non Tollit Usum: Standardized Coefficients, Correlations, and R^2s.
         American Journal of Political Science 35: 1030-46.
      King, Gary. 1991. "Truth" Is Stranger than Prediction, More Questionable than Causal Inference.
         American Journal of Political Science 35: 1047-53.

February 25: Model Specification III: Multicollinearity, Proxy Variables, and Specification Errors
    Gujarati, chapters 10 & 13, and section 8.8

February 25-March 4: Midterm Exam

March 4: Heteroscedasticity, Autocorrelation, and GLS
    Gujarati, chapters 11 & 12
    *Palmer, Harvey D., and Guy D. Whitten. 1999. The Electoral Impact of Unexpected Inflation and Economic Growth. *British Journal of Political Science* 29: 623-39.

March 11: No Class – Spring Break

March 18: Limited-Dependent Variables: Binomial and Ordered Logit/Probit Models
    Gujarati, chapter 15
    *Palmer, Harvey D., and Ronald J. Vogel. 1995. Political Opportunity for Federal Appointment: The Case of Departing Members of the U.S. House of Representatives, 1961-1992. *Journal of Politics* 57: 677-95.

March 25: Limited-Dependent Variables: Review of More Advanced Models
    Gujarati, chapter 15
    *Whitten, Guy D., and Harvey D. Palmer. 1996. Heightening Comparativists' Concern for Model Choice: Voting Behavior in Great Britain and the Netherlands. *American Journal of Political Science* 40: 231-60.

April 1: No Class – Midwest Political Science Association Conference

April 8: Research Design Presentations

April 15: Panel Data and Time-Series Analysis
    Gujarati, chapters 16, 17, 21 & 22 (skim)
    *Beck, Nathaniel, and Jonathan Katz. 1995. What to Do (and Not to Do) with Time-Series Cross-Section Data in Comparative Politics. *American Political Science Review* 89: 634-47.

April 22: Measurement Error, Simultaneity, and 2SLS
    Gujarati, pp. 524-27, and chapters 18-20 (skim)
    *Markus, Gregory B. 1988. The Impact of Personal and National Economic Conditions on the Presidential Vote. *American Journal of Political Science* 32: 137-54.

May 6: Research paper is due (by 4 PM)

year. PSC531 Autocorrelation Stata. 100% (1) Pages: 2 year: 2008/2009. 2 pages. Â None. PSC531 Homework 2 - Homework 2. None Pages: 1 year: 2008/2009. 1 page. Â Social. Facebook. Twitter. assumptions of statistical tests; how to calculate and interpret effect sizes for intermediate statistics, including discriminant analyses and odds ratios for logistic; how to compute and interpret post-hoc. power; and an overview of basic statistics for those who need a review. Unique chapters on multilevel. linear modeling; multivariate analysis of variance (MANOVA); assessing reliability of data; multiple. psc 531 homework pencil and paper exercises gujarati 2.16, 3.10, 3.16 3.25, (these assignment questions are from the 4th edition of gujarati. if you have. Â command that will provide summary statistics of this variable and its component(s). ï,· In the .do file write a command that will provide summary statistics of five of the substantive variables in the data set (i.e., variables that might be used as dependent or independent variables in a regression). ï,· Run a bivariate regression on two variables in your data set. ï,· Save the .