

POLS 500B

Quantitative Research Methods

Spring 2014

Department of Political Science
Southern Illinois University

1 Instructor Information

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Office Hours: 11:00-12:00 M,W,F or by Apt
Class Location: Faner 3075
Course Time: Wednesday, 2:00-4:30

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2 Course Description

This course serves to introduce and strengthen students knowledge about quantitative research methods. In particular, students in this course will learn both theoretical and practical information about regression and other statistical models commonly used in political science. Upon completion of the course, students should...

- Understand basic statistic information (e.g., Mean, Standard Deviation, Confidence Intervals)
- Feel comfortable using bivariate statistical tests such as T-Tests, Chi-Square Tests, and Correlation.
- Have a basic understanding of probability
- Know how to use linear regression and understand the violations of the method
- Understand maximum likelihood estimation
- Know how to use regression analysis for non-linear dependent variables
- Feel comfortable using stata for data analysis
- Be proficient in applying the appropriate quantitative method to a given research question
- Gain skills necessary to read and critique quantitative work in social science journals

To accomplish these goals, the course will be divided into three sections. In the first section of the course, students will learn about basic statistics and probability. The second part of the course will focus on linear regression and how to identify and address problems with these models. The final part of the course will focus on how to estimate models with non-linear dependent variables and introduce students to maximum likelihood estimation.

3 Course Structure

The course meets once a week for 150 minutes (2.5 hours). As the course is split between learning about statistics and applying these lessons to analyze data, the course will usually be divided into roughly two halves. The first half of the course will focus on describing and explaining statistical methods and research design. The second half of the course will be more hands on, where students will analyze data using Stata. While statistic courses may not be as conducive to discussion as other courses, students are strongly encouraged to participate in class and ask questions as often as needed.

4 Stata

The program that we will use in this course to analyze quantitative data is Stata. Stata is a useful program for analyzing statistics because it can perform a wide variety of statistical functions. Stata is also one of the most commonly used statistical programs in political science. Students can purchase a Stata IC six month license from <http://www.stata.com/coursegp> for \$69 (use the code CS300 in Student ID field for special pricing). While the purchase of Stata is not required, it is strongly recommended. You will be required to use Stata for both final projects and for most homework assignments. Unfortunately, stata is only available in the political science lab which is not always accessible.

5 Books

- Required
 - A.H. Studenmund. 2010. *Using Econometrics: A Practical Guide 6th ed.* Pearson Press. ISBN-13: 978-0131367739
 - Diez, David, Christopher Barr, Mine Cetinkaya-Rindel. 2014. *OpenIntro Statistics*. Download from www.openintro.org
 - Pollock, Phillip. 2014. *A Stata Companion to Political Analysis*. CQ Press ISBN-13: 978-1608716715
- Recommended
 - Long, J. Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables* Sage.
 - Kennedy, Peter. 2008. *A Guide to Econometrics 6th ed.* Cambridge: MIT Press. ISBN 978-1-4051-8257-7.

6 Assessment

Problem Sets (50%)

After almost every class, there will be a problem set. Most problems sets will focus on the application of methods using STATA. Each problem set is weighted equally.

Research Presentation or Poster (20%)

Each student will conduct independent, original research using statistical methods covered in the course. The results of this research will be presented as either a poster or an in class presentation at the end of the semester.

Research Paper (30%)

One of the primary goals of this course is to train students to apply quantitative methods to important research questions in their sub-fields. To assess students progress in this area, students will be required to write a 15-20 page paper on a topic of their choosing. The paper should include at least one method learned in this course that is appropriate for the student's research question. This method would preferably be one other than OLS regression.

7 Course Schedule

All readings should be completed *prior* to the class and then reviewed after the class. Readings marked with a † are (highly) recommended, but not required. Any reading not from the text books will be posted online at Desire 2 Learn.

Bivariate Statistics

January 21 Descriptive Statistics and Introduction to Stata

- Open Intro Statistics Chapter 4
- A Stata Companion to Political Analysis Chapter 1 and 2

January 28 Basic Probability and Bernoulli Trials

- Open Intro Statistics Chapter 2
- Gill, Jeff. Essential Mathematics for Political and Social Research. Chapter 7 (Posted on Desire 2 Learn)

February 4 Test of Means

- Open Intro Statistics Chapter 5.1-5.4
- A Stata Companion to Political Analysis Chapter 6
- Mulligan, Kenneth, and Philip Habel. 2011. "An Experimental Test of the Effects of Fictional Framing on Attitudes." *Social Science Quarterly* 92: 79-99.

February 11 Chi-Square Tests

- Open Intro Statistics Chapter 6.3-6.4
- A Stata Companion to Political Analysis Chapter 7
- Licklider, Roy. 1995. The Consequences of Negotiated Settlements in Civil Wars, 1945-1993. *American Political Science Review* 89: 681-690.

February 18 Pearson's Correlation

- Open Intro Statistics Chapter 7
- A Stata Companion to Political Analysis Chapter 8
- Salkind, Peter. Statistics for People Who Think they Hate Statistics. Chapter 14 (Posted on Desire 2 Learn)

OLS Regression**February 25 Linear Regression Model**

- Open Intro Statistics Chapter 7.1
- Using Econometrics A Practical Guide Chapter 1
- A Stata Companion to Political Analysis Chapter 8

March 4 Inferences Using Linear Regression Model

- Mitchell, M. N. (2012). *Interpreting and visualizing regression models using Stata*. Stata Press books. Chapter 2
- King, Gary, Michael Tomz, and Jason Wittenberg. 2000. "Making the Most of Statistical Analyses: Improving Interpretation and Presentation." *American Journal of Political Science* 44(2):347-361. (Posted on Desire 2 Learn)
- Kastellec, Jonathan P., and Eduardo Leoni. 2007. "Using Graphs Instead of Tables to Improve the Presentation of Empirical Results in Political Science." *Perspectives on Politics* 5(4):755-771.

March 11-Spring Break**March 18 Assumptions of and Diagnostics for Linear Regression Models**

- Using Econometrics A Practical Guide Chapters 4, 8, 10
- King, Gary, and Roberts, Margaret. 2012. "How Robust Standard Errors Expose Methodological Problems They Do Not Fix" Working Paper.

March 25 Model Specification

- Using Econometrics A Practical Guide Chapter 6
- Achen, Christopher. 2002. "Toward a New Political Methodology: Microfoundations and ART." *Annual Review of Political Science* 5: 423-450. Read only 423-425, 438-450.
- Imai, Kosuke and Dustin Tingley. 2012. "A Statistical Method for Empirical Testing of Competing Theories" *American Journal of Political Science* 56(1): 218-236.
- Bartels, Larry M. 1997. "Specification Uncertainty and Model Averaging" *American Journal of Political Science* 41(2): 641-674.[†]

April 1 Multiplicative and Nonlinear Equations

- A Stata Companion to Political Analysis Chapter 8
- Brambor, Thomas, William Roberts Clark, and Matt Golder. 2006. Understanding Interaction Models: Improving Empirical Analyses. *Political Analysis* 14(1):63-82.
- Braumoeller, Bear. 2004. "Hypothesis Testing and Multiplicative Interaction Terms." *International Organization* 58(4): 807-820.[†]

Non-Linear Models

April 8 Modeling Dichotomous Outcomes

- Using Econometrics A Practical Guide Chapters 13
- Open Intro Statistics Chapter 8.4
- A Stata Companion to Political Analysis Chapter 10
- DeMaris, Alfred (1995). A Tutorial in Logistic Regression. *Journal of Marriage and the Family* 57(4):956-968
- Hammer, Michael J., Kerem Ozan Kalkan. 2013. "Behind the Curve: Clarifying the Best Approach to Calculating Predicted Probabilities and Marginal Effects from Limited Dependent Variable Models" *American Journal of Political Science* 57(1): 263-277.

April 15 Modeling Ordinal and Nominal Outcomes

- Jones, Bradford S. and Michael E. Sobel. 2000. "Modeling Direction and Intensity in Semantically Balanced Ordinal Scales: An Assessment of Congressional Incumbent Approval" *American Journal of Political Science* 44(1): 174-185.
- Alvarez, R. Michael and Jonathan Nagler. 1998. "When Politics and Models Collide: Estimating Models of Multiparty Elections" *American Journal of Political Science* 42(1): 55-96.
- Lacy, Dean and Barry C. Burden. 1999. "The Vote-Stealing and Turnout Effects of Ross Perot in the 1992 U.S. Presidential Election" *American Journal of Political Science* 43(1): 233-255.

April 22 Modeling Count Data

- King, Gary. 1988. "Statistical Models for Political Science Event Counts: Bias in Conventional Procedures and Evidence for the Exponential Poisson Regression Model" *American Journal of Political Science* 32(3): 838-863.
- Wallis, W. Allen. 1936. "The Poisson Distribution and the Supreme Court" *Journal of the American Statistical Association* 31(June): 376-380.[†]
- Ulmer, S. Sidney. 1982. "Supreme Court Appointments as a Poisson Distribution" *American Journal of Political Science* 26(1): 113-116.[†]

April 29 Panel Data and Time Series Data

- Beck, Nathaniel and Jonathan Katz. 1995. “What To Do (and Not To Do) with Time-Series Cross-Section Data” *American Political Science Review* 89: 634-647.
- Rabe-Hesketh, Sophia and Anders Skrondal. 2009. “Multilevel and Longitudinal Modeling Using Stata” Chapter 5
- Honaker, James and Gary King. 2010. “What to Do about Missing Values in Time-Series Cross-Section Data” *American Journal of Political Science* 54(2): 561-581.
- Box-Steffensmeier, Janet M. and Bradford S. Jones. 1997. “Time is of the Essence: Event History Models in Political Science” *American Journal of Political Science* 41(4): 1414-1461.

May 6 Time Series Models

- Kennedy, Peter. 2008. *A Guide to Econometrics 6th ed.* 18
- De Boef, Suzanna and Luke Keele. 2008. “Taking Time Seriously” *American Journal of Political Science* 52(1): 184-200.
- Wood, B. Dan. 2000. “Weak Theories and Parameter Instability: Using Flexible Least Squares to Take Time Varying Relationships Seriously” *American Journal of Political Science* 44(3): 603-618.[†]

Final Paper Due Thursday May 14th, 2015 at 5pm