POL-GA.2127.001
Quantitative Analysis II
Spring 2021

Lecture: Wednesdays 12:00-1:50 p.m., 19 West 4th Street, Room 217
Recitation/Lab: Wednesdays 5:00-6:00 p.m., Online

Professor Nicole Simonelli
nicole.simonelli@nyu.edu
Phone: (212) 992-8084
Office hours: Tuesdays 12:30-2:00 p.m., and by appointment
Access to virtual office hours: https://nyu.zoom.us/j/2520858329

Course Assistant: Felipe Balcazar
cfb310@nyu.edu
Office hours: Mondays 11 a.m. – 12 p.m.

Course Description:
This is a course in quantitative methods for political science. The purpose of this course is to enable students to apply regression analysis to the study of political phenomena. Following a brief review of statistics, we begin with basic hypothesis testing using Ordinary Least Squares regression. We will examine how to build more sophisticated models allowing us to test more complex hypotheses, and we will learn more sophisticated statistical tests enabling us to proceed with analysis even when the Gauss-Markov assumptions are violated. We will finish off with an introduction to logit and probit analysis.

The primary focus will be on identifying statistical techniques appropriate to the question being examined and correctly applying those techniques. While this course is designed to provide on-hands practical experience using data to carry out regression analysis, there is an emphasis on the theory behind the mechanics of regression analysis that is important for more advanced study at the graduate level.

Required Text:
Dougherty, Christopher. 2016. *Introduction to Econometrics*, 5th edition. Oxford University Press. (a copy of the 4th edition is fine)

There are additional required readings that are available on JSTOR, E-Journals, etc.

Course Requirements:

- ***Problem sets*** *(35% of final grade)*: There will be approximately 7 to 10 problem sets, which will consist of a mix of analytical problems and computer-based problems based on the techniques covered in class. You may work is small groups on these problem sets if you wish, but you must run any code yourself and write up and turn in your own problem set. Your responses should reflect your own thinking - sets of verbatim copies of problem sets will not receive credit. You should submit your problem sets through email prior to the start of class. Assignments may be handwritten or typed.

- ***Mid-term exam*** *(30% of final grade)*

- ***Final exam*** *(35% of final grade)*

- ***Attendance:*** Class attendance is mandatory. In addition to the lecture, there is a weekly recitation to introduce Stata, familiarize you with working data and review material from lecture.

Schedule:
The following schedule is tentative. If it takes more or less than the allotted time for a particular topic, we will adjust accordingly.

Week 1 (February 3)
Introduction
- econometrics, data

Week 2 (February 10)
Random Variables, Sampling and Estimation
- expected values of random variables
- variance, covariance, correlation
- sampling and estimation, unbiasedness, efficiency, consistency

- Dougherty, Review Chapter

Week 3 (February 17)
The Basic Linear Model: Two Variable Ordinary Least Squares Regression
- parameters vs. estimates, deriving OLS estimates
- properties of least-squares estimators
- assumptions underlying least squares, Gauss-Markov Theorem

- Dougherty, Chapter 1

Lab #1 Stata basics; Constructing and analyzing data

Week 4 (February 24)

- statistical properties of OLS estimators, variance of OLS estimators
- interpreting OLS estimators
- hypothesis testing, confidence intervals, one-sided and two-sided *t*-tests, *p*-values
- R-squared, F test goodness of fit

- Dougherty, Chapter 2 and section 1.6
- Segal, Jeffrey A. and Albert D. Cover. 1989. "Ideological Values and the Votes of U.S. Supreme Court Justices." *American Political Science Review* 83(2): 557-565.
- Nagler, Jonathan. 1995. "Coding Style and Good Computing Practices." *PS: Political Science and Politics* 28(3): 488-492.

Lab #2 Regression output and analysis

Week 5 (March 3)

The General Linear Model: K Variable OLS Regression

- deriving OLS estimates, interpreting OLS estimates in multiple regression
- variance of OLS estimates
- R-squared, goodness of fit

- Dougherty, Chapter 3 (skip section 3.4 pp. 171-180)

Week 6 (March 10)

Multiple regression analysis continued

- Achen, Christopher H. 1977. "Measuring Representation: Perils of the Correlation Coefficient." *American Journal of Political Science* 21(4): 805-815.
- King, Gary. 1990. "Stochastic Variation: A Comment on Lewis-Beck and Skalaban's 'The R-Squared'." *Political Analysis* 2: 185-200.

Lab #3 Bias and consistency

Week 7 (March 17)

More on Multiple Regression

- multicollinearity
- testing a linear restriction (F tests)

- Dougherty, sections 3.4 and 6.5

Review

Lab #4 Midterm review

Week 8 (March 24)
Midterm Exam

Lab #5 Multicollinearity; Joint significance tests; Overview of logarithms

Week 9 (March 31)
Model Specification

- overspecification, omitted variable bias
- functional form, logarithmic model, log-linear model

- Dougherty, Chapters 4 and 6

Lab #6 Model specification and logarithmic transformations

Week 10 (April 7)
Dummy Variables & Interaction Terms

- categorical variables, dummy right-hand-side variables
- multiplicative interaction terms

- Dougherty, Chapter 5

Week 11 (April 14)
Dummy variables and interaction terms continued

- Clark, William Roberts, Michael J. Gilligan and Matt Golder. 2006. "A Simple Test for Asymmetric Hypotheses." *Political Analysis* 14: 311-331.
- Brambor, Thomas, William Roberts Clark and Matt Golder. 2006. "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14: 63-82.

Lab #7 Dummy variables and interaction terms

Week 12 (April 21)
Heteroscedasticity

- consequences of heteroscedasticity
- detection of heteroscedasticity
- weighted least squares

- Dougherty, Chapter 7
- Downs, George W. and David M. Rocke. 1979. "Interpreting Heteroscedasticity." *American Journal of Political Science*" 23(4): 816-828.

Lab #8 TBA

Week 13 (April 28)

Measurement Error & Instrumental Variables

- consequences of measurement error
- instrumental variables
- instrumental variable estimation, two-stage least squares

- Dougherty, Chapter 8
- Addock, Robert and David Collier. 2001. "Measurement Validity: A Shared Standard for Qualitative and Quantitative Research." *American Political Science Review* 95(3): 529-546.
- Leighley, Jan. 1991. "Participation as a Stimulus of Political Conceptualization." *The Journal of Politics* 53(1): 198-211.

Week 14 (May 5)

Beyond OLS Regression: Limited Dependent Variables

- logit analysis, probit analysis
- overview of other limited dependent variable applications

- Dougherty, Chapter 10
- Clawson, Rosalee A., Elizabeth R. Kegler and Eric N. Waltenburg. 2003. "Supreme Court Legitimacy and Group Centric Forces: Black Support for Capital Punishment and Affirmative Action." *Political Behavior* 25(4): 289-311.
- Abrajano, Marisa A. 2005. "Who Evaluates a Presidential Candidate by Using Non-Policy Campaign Messages." *Political Research Quarterly* 58(1): 55-67.
- 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): 341-355.

Lab #9 Final exam review

***** Final Exam – Wednesday, May 12 *****