PS2030
POLITICAL RESEARCH AND ANALYSIS

Spring Semester 2025: 3600 WW Posvar Hall
Tuesday 12:30-2:55 PM

Professor Steven Finkel   Office Hours: Th 2:00-3:30 and appt.
4804 Posvar Hall
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Course Description

This course is the next helping of statistics and research methodology after PS2020. We will begin with a thorough investigation of regression and the general linear model, and then move on to more advanced techniques such as logit and probit analysis, models for ordinal dependent variables, and models for causal inference. Students will be exposed to the theory of these methods as well as to practical ways of using them in concrete research situations. There are two main goals of the course: to enable students to read, understand and critique existing quantitative literature in political science; and to have students acquire the skills to conduct original quantitative research in their own substantive field of interest.

Texts

Main Texts:
Gujarati, Damador, and Dawn Porter, *Basic Econometrics, 6th Edition*. McGraw-Hill Irwin, 2009.
Long, J. Scott, *Regression Models for Categorical and Limited Dependent Variables*. Sage Publications, 1997.
Angrist, Joshua, and Jörn-Steffen Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion.* Princeton University Press, 2009.

Useful:
Long, J. Scott, and Jeremy Freese. *Regression Models for Categorical Dependent Variables Using Stata*. 3rd Edition. Stata Press, 2014.
Joshua, and Jörn-Steffen Pischke, *Mastering 'Metrics.* Princeton University Press, 2015.
Mitchell, Michael, *Interpretation and Visualizing Regression Models Using Stata*. 2nd Edition. Stata Press, 2021.
Woolridge, Jeffrey, *Introduction to Econometrics: A Modern Approach*. 6th Edition. South-Western Cengage Learning, 2015.

Requirements

Grades will be based on a 20-25 page research paper (46%, including 10% for preparation of a poster presentation of the paper on April 22), and three homework exercises which relate to specific statistical methods and problems we will discuss (54% altogether). The paper (due April 18) will be a quantitative analysis, using multiple regression or some of the other methods we cover in the course, of data that you will collect or access from social science archives or other sources. Ideally, the paper should have some substantive interest to you or be relevant to your studies in the graduate program. The paper will discuss your basic theoretical framework, your hypotheses, statistical models, results, possible problems with the analysis, and what you may have done to correct or account for these problems. It will conclude with a discussion of the relevance of your findings for the general topic and for future research.

The homework exercises will be periodic problems or data sets to analyze and will illustrate aspects of the statistical techniques being covered in class.

Disability Resources and Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Office of Disability Resources and Services, 216 William Pitt Union, 4126487890/ 4123837355 (FTY), as early as possible in the term. Disability Resources and Services will verify your disability and determine reasonable accommodations for this course.

Academic Integrity

Cheating/plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity, noted below, will be required to participate in the outlined procedural process as initiated by the instructor. A minimum sanction of a zero score for the quiz, exam or paper will be imposed. For the full Academic Integrity Policy, go to http://www.as.pitt.edu/fac/policies/academic-integrity.

Course Outline

The course is organized by units and then topics within units. We will maintain a certain amount of flexibility with the schedule, so that we can spend more time on some topics/units and scale back on others as circumstances warrant.

Unit 1:   **Fundamentals of Linear Regression**
        (January 14, January 21, January 28, February 4)

        1. **Bivariate Regression**
        2. **Assumptions of Ordinary Least Squares**
        3. **Hypothesis Testing**

  Reading: Gujarati and Porter, Introduction, chapter 1-2, pp. 55-61 and 73-80 [Sections 3.1 and 3.5-3.6.]

        Gujarati and Porter, pp.61-73, 92-96, ch. 4 to 102, ch. 5 to p. 129. [Sections 3.2-3.4, 3A.1-3A.7, 4.1-4.4, 5.1-5.10.]

  Optional: Long and Freese, chapter 2.
        Mitchell, chapters 1 and 2, sections 2.1 and 2.2.
        Woolridge, chapter 2.

        4. Multiple Regression

  Reading: Gujarati and Porter, chapters 7-8, and pp.129-133, 157-159. [Sections 5.11-5.12, 6.3.]

  Optional: Woolridge, chapters 3-5.
        Mitchell, 2.3.

        5. Dummy Variable Regression

  Reading: Gujarati and Porter, chapter 9.
        Mitchell, chapters 7 and 10.
        Nguyen, T. Q., Schmid, I., & Stuart, E. A. 2021. "Clarifying causal mediation analysis for the applied researcher: Defining effects based on what we want to learn". *Psychological Methods*, 26(2), 255–271.

  Optional: Woolridge, chapter 7 to p. 223.
        Mitchell, chapter 8.

Stata Corp., *Stata Causal Inference and Treatment-Effects Estimation Reference Manual Release 18*, pp. 188-219.

*****HOMEWORK 1 HANDED OUT FEBRUARY 5; DUE FEBRUARY 14*****

Unit 2:   **Regression Models: Extensions and Problems
(February 11, February 18, February 25)**

1. Functional Form: Non-Linear and Non-Additive Models

Reading: Gujarati and Porter, pp. 159-175, 470-482, 486-498.
[Sections 6.4-6.9, 13.3-13.4, 13.6-13.10.]
Brambor, Thomas, William R. Clark, and Matt Golder. 2006.
"Understanding Interaction Models: Improving Empirical Analyses".
Political Analysis 14:63-82.
Mitchell, chapters 3, 5.

Optional: Woolridge, chapter 6.
Mitchell, chapter 11.

2. Violations of Assumptions: Multicollinearity, Heteroskedasticity, Autocorrelation

Reading: Gujarati and Porter, chapters 10-12.

Optional: Woolridge, chapters 8, 10-11.

3. Endogenous Regressors

Reading: Gujarati and Porter, pp. 482-486. [Section 13.5.]
Woolridge, chapter 15.

Optional: Woolridge, chapter 16.
Maydeu-Olivares, Shi, and Fairchild, "Estimating Causal Effects in
Linear Regression Models With Observational Data: The Instrumental
Variables Regression Model", *Psychological Methods* (2020)

*****HOMEWORK 2 HANDED OUT FEBRUARY 26; DUE MARCH 12*****

Unit 3:   **Models for Non-Continuous Dependent Variables
(March 11, March 18, March 25)**

1. Introduction to Logit and Probit Models

Reading: Long, *Regression Models for Categorical and Limited Dependent
Variables,* chapter 1 and chapter 3 to 52.
Mitchell, chapter 18, sections 18.1, 18.2.

2. Estimation and Interpretation of Logit and Probit Models

Reading: Long, chapter 2 (especially 25-33), pp. 52-end, and chapter 4.
Hanmer, Michael, and 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.

Optional: Long and Freese, chapters 3-6.

3. Models for Ordinal and Nominal Outcomes

Reading: Long, chapters 5 and 6.
             Mitchell, chapter 18, sections 18.3 and 18.
Optional: Long and Freese, chapters 7 and 8.

*****HOMEWORK 3 HANDED OUT APRIL 8; DUE APRIL 15 *****

Unit 4:   **Models for Causal Inference**
                     (April 1, April 8, April 15)

1.   Counterfactuals, Potential Outcomes, and Causal Inference

Reading: Angrist and Pischke, *Mostly Harmless Econometrics*, chapters 1-2.

2. Selection on Observables: Regression and Matching

Reading: Angrist and Pischke, *Mostly Harmless Econometrics*, chapter 3
             Gangl, Thomas. 2015. "Matching Estimators for Treatment Effects",
             chapter 12 in Henning Best and Christof Wolf, editors, *The Sage
             Handbook of Regression Analysis and Causal Inference*. Sage
             Publications; London, pp. 251-276.

Optional: Winship, Christopher and Stephen Morgan. 2007. *Counterfactuals and
             Causal Inference*, chapters 3-4.

3. Selection on Unobservables: Instrumental Variables and Difference-in-Differences

Reading: Angrist and Pischke, *Mostly Harmless Econometrics*, chapters 4-5.

Optional: Sovey, Alllison, and Donald P. Green. 2011. "Instrumental Variables
             Estimation in Political Science: A Reader's Guide", *American Journal of
             Political Science* 55: 188-200.
             Muller, Christopher, Christopher Winship, and Stephen Morgan. 2015.
             "Instrumental Variables Regression", chapter 13 in Henning Best and
             Christof Wolf, editors, *The Sage Handbook of Regression Analysis and
             Causal Inference*. Sage Publications: London, pp. 277-299.

4. Fixed Effects and Panel Models

Reading: Allison, Paul. *Fixed Effects Regression Models*. Sage Publications,
             2009, chapter 2.
             Bell, Andrew, and Kelvyn Jones, 2015. "Explaining Fixed Effects:
             Random Effects Modeling of Time Series Cross-Section and Panel
             Data", *Political Science Research and Methods* 3 (1) 133-153.

PAPERS DUE APRIL 18*

**POSTERS DUE APRIL 21

POSTER PRESENTATIONS APRIL 22