POL 605 - Political Methodology II: Causal Inference

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Office Hours: TBD
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Class Hours: T 3:00-5:50 pm
Class Room: TBD

Course Description

This course will cover the design, implementation, and interpretation of statistical methods used for establishing causal relationships in political science and the social sciences more generally. Building on the first course (POL 501), which covered basic principles of research design, statistics and probability, this second class will provide a survey of advanced empirical tools. We will focus on statistical methods for causal inference. These are methods designed to answer research questions about the effect or the impact of a cause (e.g., an intervention, an economic shock, the adoption of a new policy) on an outcome (e.g., vote choice, levels of violence, political attitudes).

We will cover a variety of causal inference designs, including randomized, survey, and natural experiments, instrumental variable estimation, regression discontinuity designs, difference-in-differences, synthetic control methods, and matching. We will discuss the strengths and weaknesses of these empirical strategies, and students will learn how to apply and interpret them.

In this course, we will use R for computation and data analysis. However, students do not need to know this language in advance to take this class. The first problem set is designed to get students started with R. I strongly believe that the best way to learn statistics is by doing statistics, and therefore the homework will provide an opportunity to apply the empirical tools discussed in class.

Readings

We will read chapters from the following textbooks. Most of the readings will be posted in My Blackboard.

- Angrist J. and J.S. Pischke. (2008). Mostly Harmless Econometrics: An Empiricist's Companion. Princeton University Press.

- Gerber, A. S., and Green, D. P. (2012). Field experiments: Design, analysis, and interpretation. WW Norton
- Dunning, T. (2012). Natural experiments in the social sciences: a design-based approach. Cambridge University Press.
- Rosenbaum, P. R. (2017). Observation and Experiment: An Introduction to Causal Inference. Harvard University Press.

Course Requirements

- Participation (10%): Students should actively participate in class.
- Problem sets (20%): There will be six problem sets during the semester. The problem sets provide an opportunity for students to implement the empirical tools discussed in class. Collaboration is permitted, but students must write up the code and answers on their own.
- Midterm exam (20%): There will be one open-book in-class midterm exam. Students will have to applied concepts and tools discussed in class and use R to analyze data.
- Final exam (20%): There will be one open-book in-class final exam. Students will have to applied concepts and tools discussed in class and use R to analyze data. This exam will only cover the materials discussed in the second part of the semester.
- Research proposal (30%): The final (and most important) assignment for this class will be a short research proposal using one (or combining more than one) of the empirical strategies discussed in class. Students will present their proposal in week 15, and the final version should be submitted no later than two weeks after that presentation.

Schedule

Week 1: Introduction

- Angrist, J. D. and Pischke, J. S. (2009). Mostly harmless econometrics: An empiricist's companion. Princeton University Press. Chapter 1 and 2.
- Gelman, A., and Imbens, G. (2013). Why ask why? Forward causal inference and reverse causal questions (No. w19614). National Bureau of Economic Research.
- Gelman, A. (2011). Causality and statistical learning. American Journal of Sociology, 117(3), 955-966.
- Huber, J. (2013). Is theory getting lost in the "identification revolution". The Political Economist, 1-3.

Week 2: Review of Statistical Concepts

- Angrist, J. D. and Pischke, J. S. (2009). Mostly Harmless Econometrics. Princeton: Princeton University Press. Chapter 3.
- Woodbridge, J.M. (2013). Introductory Econometrics. A Modern Approach. Cengage Learning. Chapters 2, 3 and 4.

Week 3: Potential Outcome Framework

- Rosenbaum, P. R. (2017). Observation and Experiment: An Introduction to Causal Inference. Harvard University Press. Chapter 1 and 2.
- Gerber, A. S., and Green, D. P. (2012). Field experiments: Design, analysis, and interpretation. WW Norton. Chapter 2.
- Holland, PW. (1986), Statistics and Causal Inference." Journal of the American Statistical Association, 81, 945-970.

Week 4: Randomized Experiments

- Rosenbaum, P. R. (2017). Observation and Experiment: An Introduction to Causal Inference. Harvard University Press. Chapter 3 and 4.
- Gerber, A. S., and Green, D. P. (2012). Field experiments: Design, analysis, and interpretation. WW Norton. Chapter 3 and 4.
- McClendon, G. H. (2014). Social esteem and participation in contentious politics: A field experiment at an LGBT pride rally. American Journal of Political Science, 58(2), 279-290.
- Humphreys, M., and Weinstein, J. M. (2009). Field experiments and the political economy of development. Annual Review of Political Science, 12, 367-378.

Week 5: Survey Experiments

- Blair, G., and Imai, K. (2012). Statistical analysis of list experiments. Political Analysis, 20(1), 47-77.
- Hainmueller, J., Hopkins, D. J., and Yamamoto, T. (2013). Causal inference in conjoint analysis: Understanding multidimensional choices via stated preference experiments. Political Analysis, 22(1), 1-30.
- Gingerich, D. W., Oliveros, V., Corbacho, A., and Ruiz-Vega, M. (2015). When to protect? Using the crosswise model to integrate protected and direct responses in surveys of sensitive behavior. Political Analysis, 24(2), 132-156.
- Samuels, D., and Zucco, C. (2014). The power of partisanship in Brazil: Evidence from survey experiments. American Journal of Political Science, 58(1), 212-225.

Week 6: Natural Experiments

- Dunning, T. (2012). Natural experiments in the social sciences: a design-based approach. Cambridge University Press. Chapter 1, 2 and 3.
- Sekhon, J. S., and Titiunik, R. (2012). When natural experiments are neither natural nor experiments. American Political Science Review, 106(1), 35-57.
- Keele, L., and Titiunik, R. (2016). Natural experiments based on geography. Political Science Research and Methods, 4(1), 65-95.
- Stokes, L. C. (2016). Electoral backlash against climate policy: a natural experiment on retrospective voting and local resistance to public policy. American Journal of Political Science, 60(4), 958-974.

Week 7: Instrumental Variables

- Gerber, A. S., and Green, D. P. (2012). Field experiments: Design, analysis, and interpretation. WW Norton. Chapter 5.
- Angrist, J. D., Imbens, G. W., and Rubin, D. B. (1996). Identification of causal effects using instrumental variables. Journal of the American statistical Association, 91(434), 444-455.
- Sovey, A. J., and Green, D. P. (2011). Instrumental variables estimation in political science: A readers' guide. American Journal of Political Science, 55(1), 188-200.
- Marshall, J. (2016). Coarsening Bias: How Coarse Treatment Measurement Upwardly Biases Instrumental Variable Estimates. Political Analysis, 24(2), 157-171.
- Acemoglu, D., Cantoni, D., Johnson, S., and Robinson, J. A. (2009). The consequences of radical reform: The French Revolution (No. w14831). National Bureau of Economic Research.

Week 8: Regression Discontinuity Designs

- Cattaneo, M. D., Idrobo, N., and Titiunik, R. (2018). A Practical Introduction to Regression Discontinuity Designs: Volume I and II.
- Calonico, S., Cattaneo, M. D., and Titiunik, R. (2014). Robust nonparametric confidence intervals for regression-discontinuity designs. Econometrica, 82(6), 2295-2326.
- Erikson, R., and Titiunik, R. (2015). Using regression discontinuity to uncover the personal incumbency advantage. Quarterly Journal of Political Science, 10(1), 101-119.
- Caughey, D., and Sekhon, J. S. (2011). Elections and the regression discontinuity design: Lessons from close US house races, 1942–2008. Political Analysis, 19(4), 385-408.

Week 9: Midterm

Week 10: Spring Break

Week 11: Difference-in-Differences

- Angrist, J. D. and Pischke, J. S. (2009). Mostly harmless econometrics: An empiricist's companion. Princeton University Press. Chapter 5.
- Bertrand, M., Duflo, E., and Mullainathan, S. (2004). How much should we trust differences-in-differences estimates?.The Quarterly journal of economics, 119(1), 249-275.
- O'Neill, S., Kreif, N., Grieve, R., Sutton, M., and Sekhon, J. S. (2016). Estimating causal effects: considering three alternatives to difference-in-differences estimation. Health Services and Outcomes Research Methodology, 16(1-2), 1-21.
- Lü, X. (2014). Social policy and regime legitimacy: The effects of education reform in China. American Political Science Review, 108(2), 423-437.

Week 12: Synthetic Control Methods

- Abadie, A., Diamond, A., and Hainmueller, J. (2010). Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program. Journal of the American statistical Association, 105(490), 493-505.
- Abadie, A., Diamond, A., and Hainmueller, J. (2015). Comparative politics and the synthetic control method. American Journal of Political Science, 59(2), 495-510.
- Abadie, A., and Gardeazabal, J. (2003). The economic costs of conflict: A case study of the Basque Country. The American Economic Review, 93(1), 113-132.
- Acemoglu, D., Hassan, T. A., and Tahoun, A. (2014). The power of the street: Evidence from Egypt's Arab Spring (No. w20665). National Bureau of Economic Research.

Week 13: Design of Observational Studies

- Rosenbaum, P. R. (2017). Observation and Experiment: An Introduction to Causal Inference. Harvard University Press. Chapter 9 and 10.
- Rosenbaum, P. R. (2015). How to see more in observational studies: Some new quasi-experimental devices. Annual Review of Statistics and Its Application, 2, 21-48.
- Keele, L. (2015). The statistics of causal inference: A view from political methodology. Political Analysis, 23(3), 313-335.
- Rubin, D. B. (2008). For objective causal inference, design trumps analysis. The Annals of Applied Statistics, 808-840.
- Visconti, G. (2017). Economic Perceptions and Electoral Choices: A Design-Based Approach. Political Science Research and Methods, 1-19.

Week 14: Matching Methods and Sensitivity Analysis

- Rosenbaum, P. R. (2017). Observation and Experiment: An Introduction to Causal Inference. Harvard University Press. Chapter 11.
- Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward. Statistical science: a review journal of the Institute of Mathematical Statistics, 25(1), 1.
- Sekhon, J. S. (2009). Opiates for the matches: Matching methods for causal inference. Annual Review of Political Science, 12, 487-508.
- Visconti, G. and Zubizarreta, J. (2018). Handling Limited Overlap in Observational Studies with Cardinality Matching. Observational Studies 4, 217-249.

Week 15: Presentations Research Proposals

Week 16: Final exam (in class)