

# Experiments and Causal Inference for Public Policy

Spring 2025

<b>Instructor</b>	Dr. Brett Bessen
<b>Time</b>	Tues & Fri, 3:10 pm – 4:50 pm
<b>Room</b>	Aulas 4, 419
<b>E-mail</b>	<a href="mailto:brettbessen@tec.mx">brettbessen@tec.mx</a>
<b>Office Hours</b>	Tues & Fri, 2:00 pm – 3:00 pm
<b>Office</b>	Aulas 2, 273

## Course Description

Critical questions in economics, public policy, and political science involve *causality*. For instance, does raising the minimum wage increase unemployment? Do get-out-the-vote programs work? Does economic growth *cause* democratization? This course will introduce you to the logic of causal inference and provide you with tools to investigate causal questions. The course is loosely broken up into three sections. We'll start with a review of statistical inference and regression. Next, we'll discuss randomized experiments and the analysis of experimental data. In the final section, we'll turn to methods for causal inference using observational data, covering methods such as matching, instrumental variables, and difference-in-differences. Each of these sections will stress the *assumptions* needed to make valid inferences and the *uncertainty* around our estimates.

## Learning Objectives

- Evaluate the validity of causal claims
- Develop research designs to study causal processes
- Analyze data and present analyses using R

## Using R

Social science data are often messy; learning to work with data takes time and patience. We will use R to clean and analyze data. While there are similar software programs—e.g., Stata or SPSS—R is free, widely used, and provides a good foundation for other programming languages. Throughout the course, I will provide scripts showing you how to implement the methods discussed in R. In addition to following these scripts, you are encouraged to try alternative code and consult online resources.

## Helpful Links

- [Download R](#)
- [Download R Studio](#)

## Assignments and Grades

**Short Assignments – 20%:** Short assignments call for you to implement and interpret the methods we discuss in class, typically using some example dataset. I encourage you to complete and submit your assignments in R Markdown. Short assignments will be due every 1 to 2 weeks.

**Midterm Exam – 20%:** You will have an in-class midterm exam covering the basics of statistical inference and regression on *March 14th*.

**Research Paper – 60%:** Your main assignment is a research paper requiring you to *design, conduct, and analyze a randomized experiment*. To help you succeed with your experiment the research paper grade is broken down as follows. These assignments are **due via Canvas at 3:00 pm on the day listed above**.

	<b>Contribution</b>	<b>Due</b>
<i>Research Design</i>	15%	Apr 19
<i>Paper Draft</i>	15%	May 30
<i>Final Paper</i>	30%	Jun 13

## Grade Scale

Letter grades will be based on the following scale. I will round up grades within 0.5 percentage points of the next letter grade. For instance, an 83.6 would be rounded up to an 84 and receive a B in the course.

A	95-100
A-	90-94
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
D+	67-69
D	64-66
D-	60-63
F	0-59

## Course Policies

**Class Norms:** We will engage in critical debate—sometimes about contentious topics—in this course. Students will engage in respectful dialogue and must not disparage their classmates. I encourage you to practice taking academic criticism as a way to develop your ideas rather than as an attack on your values.

**Attendance:** Regular attendance is critical for you to keep up with the material and complete the in-class labs. Please email me if you cannot attend a given class and I can help you get caught up.

**Late Work:** Late assignments will lose 10 percentage points per day. Assignments turned in more than 15 minutes past the deadline will be considered late; assignments not turned in after three days will receive a zero.

**Office Hours:** My office hours are *Tuesdays and Fridays from 2 - 3 pm in Aulas 2, Office 273*. I am happy to meet via Zoom during those hours as well. If you would like to meet with me but are unavailable during my office hours, please email me at least 24 hours in advance and we'll set up another time.

**Email Policy:** Feel free to email me with any questions or comments. I will typically respond within one business day. Please do not expect a response on weekends or after 5 pm. Please send me a follow-up in the unlikely case that I don't respond within three business days. My email is [brettbessen@tec.mx](mailto:brettbessen@tec.mx).

**Flexibility:** I am happy to work with you to help you succeed in this course. Let me know if extenuating circumstances make it difficult for you to attend class or keep up with the material.

**Academic Honesty:** Plagiarism or cheating will not be tolerated. All assignments must be original work done for this class. Plagiarism will result in a failing grade for the course and will be reported to the office of academic integrity.

## Texts

### Required

- Green, D. P. (2022). *Social Science Experiments*. Cambridge University Press.
- Huntington-Klein, N. (2021). *The effect: An Introduction to Research Design and Causality*. Chapman and Hall/CRC. [Free online](#).
- Kellstedt, P. M., & Whitten, G. D. (2018). *The Fundamentals of Political Science Research*. Cambridge University Press.

### Recommended

You do not need to buy these texts, but you may find them useful complements to the assigned readings:

- Angrist, J. D., & Pischke, J. S. (2014). *Mastering 'Metrics: The Path from Cause to Effect*. Princeton University Press.
- Cunningham, S. (2021). *Causal Inference: The Mixtape*. Yale University Press. [Free online](#).

## Additional Resources

- [Modern Dive](#): Free guide to statistical inference with R
- [R for Data Science](#): Text on tidying, visualizing, and manipulating data in R
- [R para Ciencia de Datos](#): Spanish translation of R for Data Science
- [Google Scholar](#): Access scientific literature online
- [Biblioteca](#): Find and download articles

## Course Schedule

### Week 1: Feb 11 & 14. Causality and Research Design

- Fundamentals of Political Science Research, Ch. 2 - 4
- [Modern Dive, Ch. 1](#)
- [Impatient R](#)
- recommended: Gertler, P. J., Martinez, S., Premand, P., Rawlings, L. B., & Vermeersch, C. M. (2016) [Impact evaluation in practice](#). World Bank Publications. Ch. 1 & 2

### Week 2: Feb 18 (Zoom) & 21. Descriptive Statistics and Data Visualization.

- Fundamentals of Political Science Research, Ch. 5 & 6
- [Modern Dive, Ch. 2 & 3](#)

### Week 3: Feb 25 & 28. Statistical Inference

- Fundamentals of Political Science Research, Ch. 7 & 8
- [Modern Dive, Ch 7](#).

### Week 4: Mar 4 & 7. Regression

- Fundamentals of Political Science Research, Ch 9 - 10
- [Modern Dive, Ch 5](#)
- Cinelli, C., Forney, A., & Pearl, J. (2021). A crash course in good and bad controls.
- recommended: [The Effect, Ch 13](#).

### Week 5: Mar 11 & 14. Regression Assumptions & Midterm

- Fundamentals of Political Science Research, Ch 11

**MIDTERM EXAM** — In class on Mar 14

**No Class, Mar 18 & 21, Semana Tec**

**Week 6: Mar 25 & 28. The Logic of Experiments**

- Green, Social Science Experiments, Ch. 1 & 2
- Angrist, J. D., & Pischke, J. S. (2009). Mostly Harmless Econometrics: An Empiricist's Companion. Ch 2
- Balcells, L., Palanza, V., & Voytas, E. (2022). Do transitional justice museums persuade visitors? Evidence from a field experiment.

**Week 7: Apr 1 & 4 (Zoom). Designing Experiments**

- Green, Social Science Experiments, Ch 4 & 5
- Mutz, D. C. (2011). Population-based survey experiments. Ch 2 - 4
- Landgrave, M. (2022). Do citizens demand transparency from co-partisans? Evidence from a pre-registered experiment in Mexico.

**Week 8: Apr 8 & 11. Analyzing Experiments**

- Green, Social Science Experiments, Ch 6 & 7
- [Modern Dive, Ch 9](#)
- [Gerber et al, Recommended Reporting Standards for Experiments](#)

**RESEARCH DESIGN** – Due Apr by 11 by 3 pm

**No Class, April 15 & 18, Semana Santa**

**Week 9: Apr 22 & 25. Moderation and Mediation**

- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations.
- Bessen, B.R. and Connell, B.J., 2022. Another Day, Another Currency: Self-interest, Experience, and Attitudes Toward Dollarization in Ecuador.
- Imai, K., Keele, L., Tingley, D., & Yamamoto, T. (2011). Unpacking the black box of causality: Learning about causal mechanisms from experimental and observational studies.

**Week 10: Apr 29 & May 2. Natural Experiments**

- Dunning, T. (2015). Natural experiments in the social sciences: a design-based approach. Ch 1
- Choose one:
  - Posner, D. N. (2004). The political salience of cultural difference: Why Chewas and Tumbukas are allies in Zambia and adversaries in Malawi.
  - De La O, A. L. (2013). Do conditional cash transfers affect electoral behavior? Evidence from a randomized experiment in Mexico.

**No Class, May 6 & 9, Semana Tec**

**Week 11: May 13 & 16. Instrumental Variables.**

- [The Effect, Ch 19](#)
- Gerber, Alan S., and Donald P. Green. (1999) Does canvassing increase voter turnout? A field experiment.
- Choose one:
  - Hidalgo, F. D., Naidu, S., Nichter, S., & Richardson, N. (2010). Occupational choices: economic determinants of land invasions.
  - Acemoglu, Daron, Simon Johnson, and James A. Robinson. (2001) The colonial origins of comparative development: An empirical investigation.

**Week 12: May 20 & 23. Regression Discontinuity**

- [The Effect, Ch 20](#)
- Manacorda, M., Miguel, E., & Vigorito, A. (2011). Government transfers and political support.

**Week 13: May 27 & 30. Time Series and Event Studies**

- [The Effect, Ch 17](#)
- Fundamentals of Political Science Research, pgs 282 - 296
- Berniell, I., Berniell, L., de la Mata, D., & Edo, M. (2023). Motherhood and flexible jobs: Evidence from Latin American countries. World Development.

**RESEARCH PAPER DRAFT** – Due May 30 by 3 pm

**Week 14: Jun 3 & 6. Difference-in-Differences**

- [The Effect, Ch 18](#)
- Goodman-Bacon, A., & Marcus, J. (2020). Using Difference-in-Differences to Identify Causal Effects of COVID-19 Policies.
- Choose one:
  - Motolinia, L. (2021). Electoral accountability and particularistic legislation: evidence from an electoral reform in Mexico.
  - Duan, K. et al (2018). Implementation and clinical effectiveness of a community-based non-communicable disease treatment programme in rural Mexico: a difference-in-differences analysis.

**Week 15: Jun 10 & 13. Matching and Other Strategies**

- [The Effect, Ch 14](#)
- Brookman, D. E. (2013). Black politicians are more intrinsically motivated to advance blacks' interests: A field experiment manipulating political incentives.

**FINAL RESEARCH PAPER** - Jun 13 by 5 pm