PS9591B: Regression and Causal Inference (Methods 2)

Department of Political Science – Western University, Winter 2023
Tuesday 9:30-11:30am and Wednesday 9:30-10:30am, SSC 7251

Instructor: Dr. Mathieu Turgeon (mturgeo4@uwo.ca)
Office hours: Monday 12-2pm or by appointment (SSC 7223)
Teaching assistant: John Santos (jsanto27@uwo.ca)
Office hours: Thursday 2-3pm (SSC 7328)

Course description

This course introduces students to basic statistical techniques used to estimating and testing causal relationships. Evaluating causal claims is best done using an experimental design like randomized controlled trials, but most of the data available to political scientists, however, is observational in nature. Drawing causal inferences from observational data is a hard task but not an impossible one, given careful treatment of the data. A series of methodological tools are available to scholars to evaluate causal arguments and hypotheses using observational data and this course introduces the most commonly used ones for cross-sectional data structures—observations of subjects (like individuals, polities or countries) at one point or period of time. At the end of this course, students should be able to interpret most of the empirical analyses reported in political science journals and monographs and produce their own empirical analyses to estimate and test causal relationships of interest.

Course objectives

• learn how to use data to answer cause-and-effect questions;

• understand the conditions under which we can identify causal relationships by making comparisons;

• learn how to use methodological tools like randomized trials, regression analysis, regression discontinuity designs and difference-in-differences to evaluate causal relationships;

• learn how to interpret empirical analyses reported in political science journals and monographs;

• learn how to produce empirical analyses to estimate and test causal relationships.

Course texts

The required texts for this course are:


Additional readings will be posted on OWL.
Course assessment

Students will be assessed as follows:

- **Class participation (10%)**: students will be randomly asked to solve problems in the classroom at least three times during the semester. Be ready when you come to class!

- **Homework (50%)**: There will be five assignments, each worth 10 points of the final grade.

- **Final take-home exam (40%)**: Students will be given a replication exercise. More details will be provided in class.

Topics and readings

**Week #1 (January 10–11): Course Introduction**

Review of syllabus, class organization, and installation of datasets for in-class exercises and assignments.

**Week #2 (January 17–18): Introduction to causal inference**

1. Wooldridge: Chapter 1;
2. Angrist and Pischke: Introduction;

**Week #3 (January 24–25): Core concepts of experimental designs**

2. Angrist and Pischke: Chapter 1;

**Week #4 (January 31–February 1): The simple regression model (SRM)**


**Week #5 (February 7–8): The multiple regression model (MRM): estimation, Part 1**

1. Wooldridge: Chapter 3.

**Week #6 (February 14–15): The multiple regression model (MRM): estimation, Part 2**

1. Wooldridge: Chapter 3.
***(February 21-22): Spring reading week. Enjoy the break!***

Week #7 (February 28–March 1): The multiple regression model (MRM): inference, Part 1
   1. Wooldridge: Chapter 4.

Week #8 (March 7–8): The multiple regression model (MRM): inference, Part 2
   1. Wooldridge: Chapter 4.

Week #9 (March 14–15): The multiple regression model (MRM): further issues
   1. Wooldridge: Chapters 6 and 8.

Week #10 (March 21–22): The multiple regression model (MRM) with qualitative information: binary (or dummy) variables

Week #11 (March 28–29): The regression discontinuity design (RDD)
   1. Angrist and Pischke: Chapter 4;

Week #12 (April 4–5): Difference-in-differences (DiD)
   1. Angrist and Pischke: Chapter 5;