Regression designs and their applications

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Time: 15:30–17:00, Place: A5, 6 Buidling C, Room 108

Course Description

Does incumbent performance affect chances of re-election? Do get-out-the-vote election campaigns actually increase turnout? Do citizen information programs increase political participation? And if so, by how much? These and related questions in political science might seem straightforward, but answering them properly is harder than you might think. In this course we will encounter a framework for thinking about questions like these from the perspective of causal inference. This means thinking about how we can best estimate the effects of causes (such as peace keeping missions) on outcomes. In a perfect world we could conduct experiments, but often we are left with using limited and noisy pre-existing data. We will discuss a number of regression models, which will provide us with a toolbox for tackling these kinds of causal questions. The course will consist of both theoretical and practical sessions.

Course Outline

Week 1 (Feb. 16): Introduction

- Introductions, course structure, assignments
- Goals and methods of scientific inference

Week 2 (Feb. 23): What can we know? Identification Problems in the Social Sciences

- What is model identification?
- More data (no matter how "big") does not solve our problems
- The trouble with endogeneity

Week 3 (March 1): The Potential Outcomes Framework

- "What could have been" – Counterfactual states as building blocks of a statistical theory of causal inference
- The fundamental problem of causal inference
- Understanding assignment mechanisms

Week 4 (March 8): Regression models I

- Regression as description / Regression as inference
- Understanding model results
- Quantities of interests

Week 5 (March 15): Regression models II

- Are things causes if they are "significant"?
- What can we learn about causal relationships?
- Some cautionary remarks

Week 6 (April 5): Practical session I / Assignment I

Week 7 (April 12): Assignment I Philly

Week 8 (April 19): Matching

- Finding comparable cases
- Models for causal inference from matched data
- Propensity scores

Week 9 (April 26): Instrumental variables I

- (Quasi-)random assignments: nature, wars, and lotteries...

- Models for causal inferences with instrumental variables instruments

Week 10 (May 3): Instrumental variables II

- Instruments and propensity scores
- "What if the cure is worse than the disease?": violated exclusions and weak instruments

Week 11 (May 10): Regression Discontinuity Designs

- Discontinuities as (quasi-)random assignment
- Models for causal inference at discontinuous jumps
- Sensitivity to model specifications & more cautionary remarks

Week 12 (May 17): Practical session II

Week 13 (May 24): Assignment II

Week 14 (May 31): Assignment II