Lecture 21

11-08-2021

What we did last time

Last week we introduced Natural Experiments

We focused on the similarities and differences between natural experiments and RCTs

We introduced several types of natural experiments common in applied research today

What we are covering this week

Regression Discontinuity Designs

Reminder CP, WP, and PS4 are due on Friday

Makeups for PS3 and all outstanding incompletes are due by next Monday

What's noticeable about this graph?

RDD the basics

Notation: $Y_i = D_i Y_i(1) + (1 - D_i) Y_i(0)$

We have a running variable Z_i that is normalized to 0 where the cutoff of treatment is affected

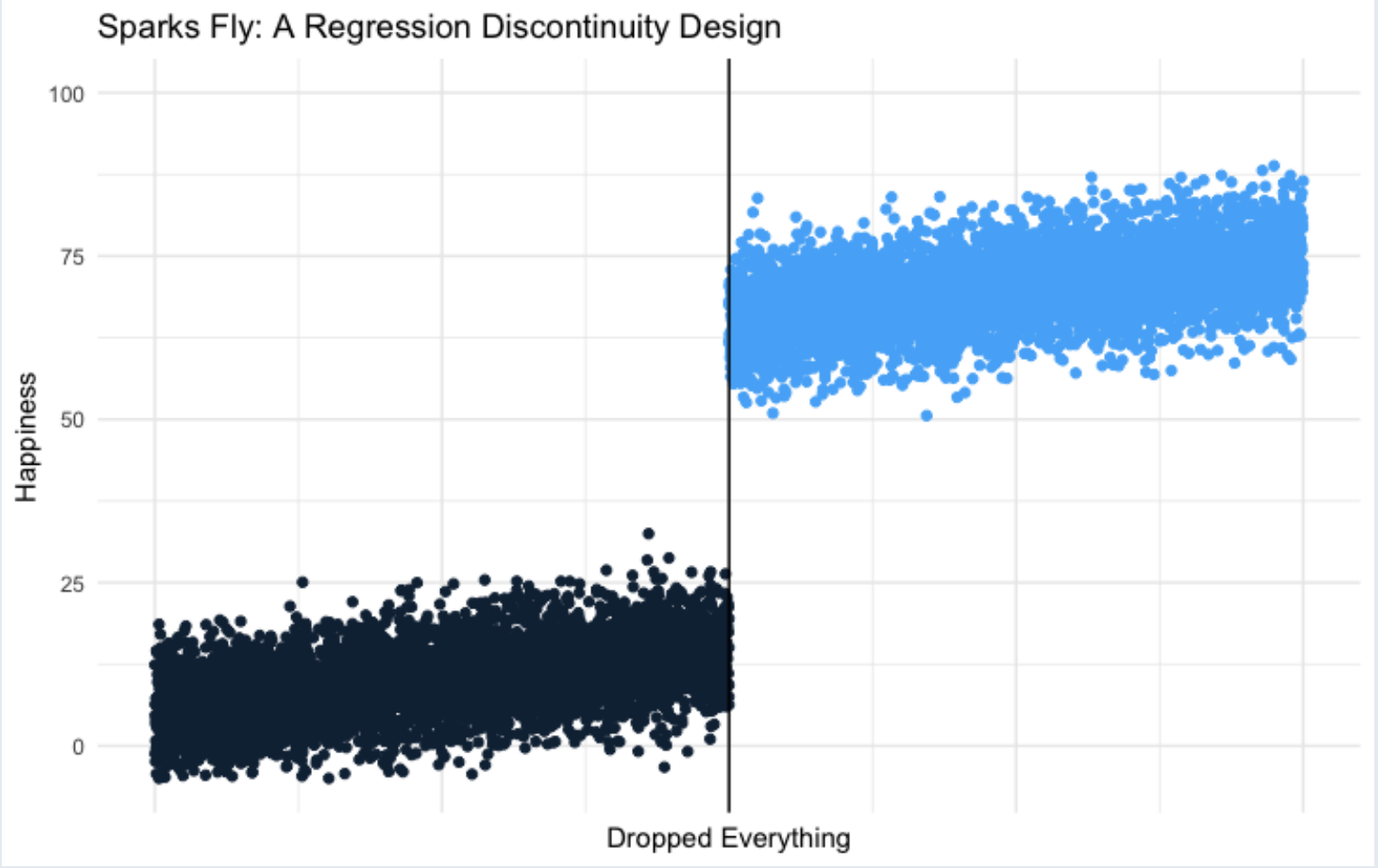
Key parameter is the conditional expectation $E[Y_i | Z_i = z]$

RDD the basics

The estimand of interest is a CACE:

$$E[Y_i(1) - Y_i(0)|Z_i = 0] = \lim_{-z} E[Y_i|Z_i = z) - \lim_{+z} E(Y_i|Z_i = z)$$

An RDD graph


Sparks Fly: A Regression Discontinuity Design
100
75
50
25
0
Happiness
Dropped Everything

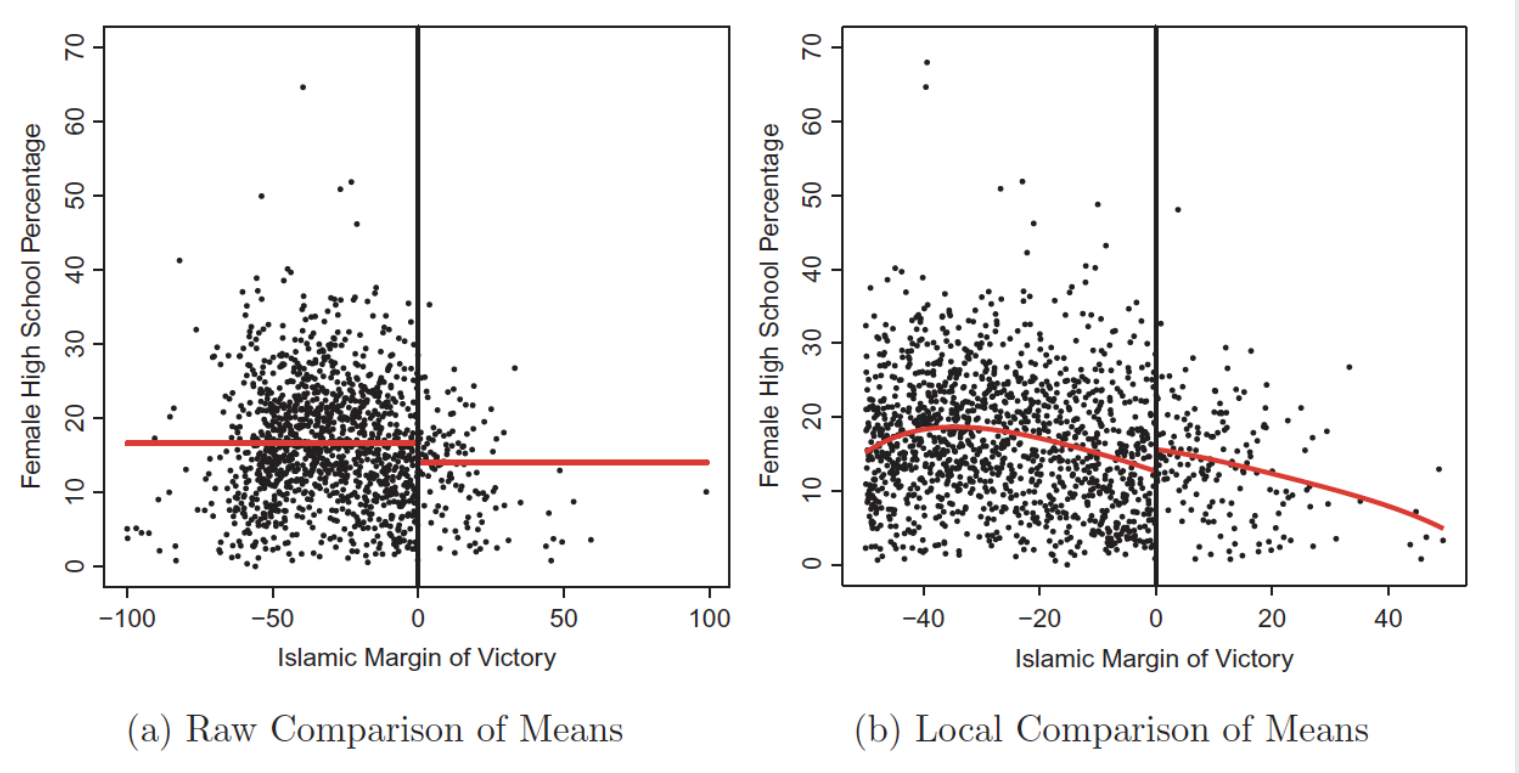
RDD: Example Meyersson (2014)

Meyersson is interested in the effect of Islamic parties' control of local governments on women's rights.

This is operationalized as the effect of educational attainment of young women

Problem: Islamic parties are not randomly assigned!

RDD: Example Meyersson (2014)



(a) Raw Comparison of Means

(b) Local Comparison of Means

RDD: Example Meyersson (2014)

Can we do better? Meyersson argues that we can consider a "close elections" design

Focuses entirely on the 1994 election in Turkey

The treatment group are municipalities that elect a mayor from an Islamic party in 1994. The control group are municipalities that do not.

The outcome is the education attainment of women who were in high school from 1994-2000

The causal effect is local

Again, a Sharp RD is calculated at a single point on the support of a continuous random variable (our score)

RD treatment effects tend to have limited external validity

RD effects are the average effect of treatment local to the cutoff ($Z_i = c$)

The importance of continuity

Continuity: The score function must be smooth.

Absent the treatment, the expected potential outcomes wouldn’t have jumped

Continuity explicitly rules out omitted variable bias at the cutoff

Continuity can serve as a placebo test (sort of)

When is an RDD not an RDD?

The key assumption is that the only thing that causes a change to the outcome at the cutoff is the treatment. This is violated if:

1. The assignment rule is known in advance
2. Agents have the ability to choose what side of the cutoff to be on
3. The cutoff is endogenous to factors that independently lead to a shift in potential outcomes

RDD Examples

We just went over an example of a regression discontinuity design

Here are some others:

- Electronic voting in Brazil (Hidalgo 2016)
- Representation under term limits (Klasnja and Titiunik 2018)
- Discrimination and performance among legislatures (Anzia and Berry 2011)