

Modern Regression Discontinuity Designs: Ideas and Applications

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Outline

RDD: Why Do I Care?

- 1. Empirical Example**
- 2. Sharp versus Fuzzy RDDs**
- 3. Visualization**
- 4. Briefly: Continuity versus Local Randomization**
- 5. Estimation, Validation, Falsification**

Go to <https://tinyurl.com/ynyr35v2> and download all files

RDDs

What?

- ▶ A simple, often powerful causal inference method
- ▶ Old method - designed by psychologists Thistlewaite and Campbell: First RD paper published in 1960
- ▶ (At this time, psychology and sociology were much closer as fields - Campbell's work often sociological)
- ▶ Actually, a little misunderstood - economists thought it was an IV.
- ▶ Least “inflated” causal inference method among non-experimental methods
- ▶ Go to <https://tinyurl.com/ynyr35v2> and download all files

Brodeur, Cook, and Heyes (2020) “Methods Matter: p-Hacking and Publication Bias in Causal Analysis in Economics”

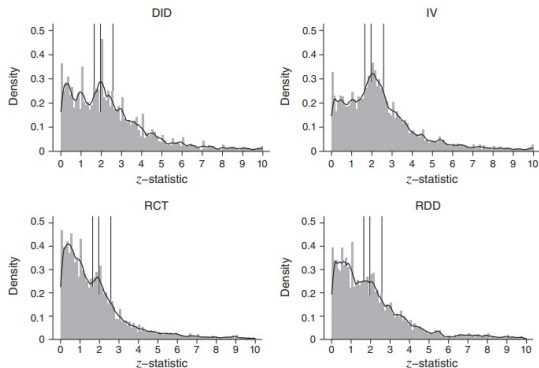


FIGURE 2. z-STATISTICS BY METHOD

Notes: This figure displays histograms of test statistics for $z \in [0, 10]$ by method: difference-in-differences (DID), instrumental variables (IV), randomized control trial (RCT), and regression discontinuity design (RDD). Histogram bins are 0.1 wide. Reference lines are displayed at conventional two-tailed significance levels. We have also superimposed an Epanechnikov kernel. We do not weight articles.

Sharp RDDs

Modern RDDs Have Three Parts: Score, Cutoff, Treatment

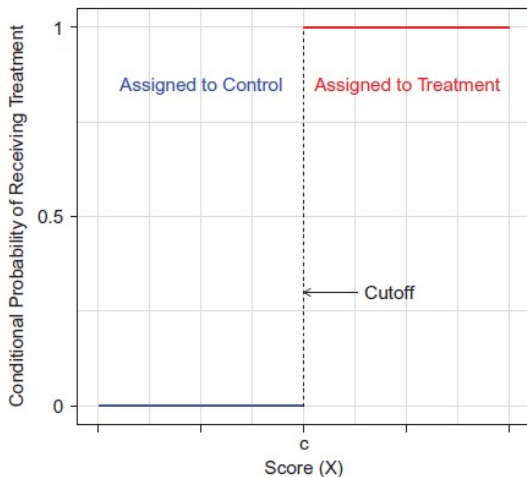


Figure 1 Conditional Probability of Receiving Treatment in the Sharp RD Design

Understanding the Local Continuity Assumption:

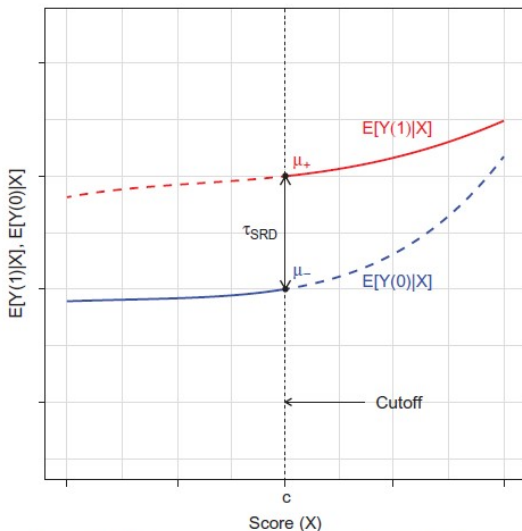


Figure 2 RD Treatment Effect in the Sharp RD Design

RDDs Are Informative About Treatment Effects At (and Often It is Argued Around) Cutoff

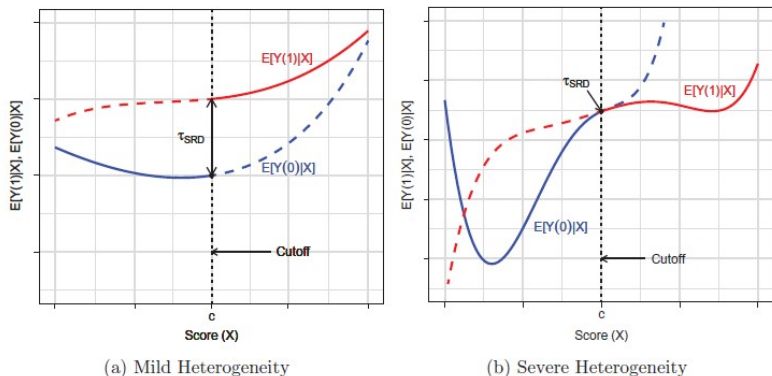


Figure 4 Local Nature of the RD Effect

Visualization

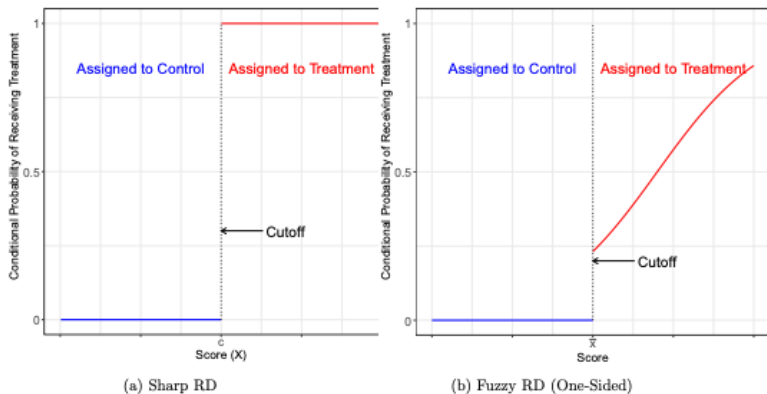
RD Plots

Continuity-Based Approach to RD

Final Remarks: Fuzzy RDD

Sharp v. Fuzzy RDD

Figure 4.1: Conditional Probability of Receiving Treatment in Sharp vs. Fuzzy RD Designs



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