

# Regression Discontinuity and Other Methods

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# Random Effects and Fixed Effects Estimator

## ▶ **Random Effects:**

- ▶ Assumes differences across entities are random.
- ▶ Pros: More efficient if no entity-specific confounders.
- ▶ Cons: Biased if entity-specific confounders are correlated with predictors.

## ▶ **Fixed Effects:**

- ▶ Controls for time-invariant differences between entities.
- ▶ Pros: Unbiased if entity-specific attributes are constant over time.
- ▶ Cons: Cannot estimate effects of time-invariant predictors.

# Hausman Test

- ▶ Test the difference in coefficients obtained by estimating with fixed effects vs. random effects.
- ▶ **Null Hypothesis ( $H_0$ ):** Difference in coefficients is not systematic.
- ▶ Idea: If  $H_0$  is rejected, use fixed effects; if not, random effects might be preferable.

# Regression Discontinuity Design (RDD)

- ▶ Exploits situations in which rules or laws create sharp thresholds in the implementation of policies and programs.
- ▶ Example: Below the threshold people are not eligible but above the threshold they are eligible.
- ▶ Arbitrary rules provide natural experiments.
- ▶ Compares entities just affected by the rule with those just not affected.
- ▶ Lacks the element of random assignment - quasi-experimental.

# Summary: Performance & Competitive Effects of School Autonomy

- ▶ Focus: How should public schools be managed? Autonomy vs. Tight control.
- ▶ 1988 Education Act: Schools could opt for 'grant-maintained' (GM) with more autonomy and resources.
- ▶ GM Status: Decided by parent vote. 51% affirmative leads to GM status.
  - ▶ *The Threshold - The Discontinuity Point*
- ▶ Study uses the voting system and results as a basis for RDD.

# Key Considerations for RDD Validity

- ▶ **Stable Covariates:** Covariates shouldn't change discontinuously around the cutoff.
  - ▶ Test: Graph each covariate and check for insignificant treatment effects on them.
- ▶ **No Manipulation:** The cutoff shouldn't be manipulated.
  - ▶ Test: Perform a McCrary test and observe the density of the assignment variable.
- ▶ **No Extraneous Jumps:** There shouldn't be jumps in the outcome outside of the threshold.