

Quasi-Experiments II

POLSCI 4SS3

Winter 2023

Course surveys due April 12, 11:59 PM



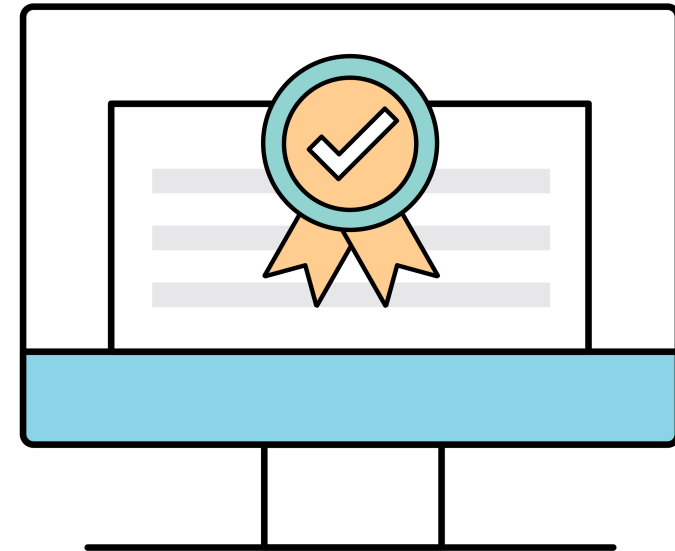
Now Open! Student Course Experience Surveys

It's time to share your feedback on your learning experience.

Here are a few quick tips to make the most impact with your comments.

- 🏅 Think constructively about your course(s).
- 🏅 Be respectful.
- 🏅 Be specific and provide a reasonable amount of information.
- 🏅 Consider what's working and what's not working.

Get started on your course surveys: mcmaster.bluera.com/mcmaster



Announcements

- Final projects due **April 21**
- Groups need to meet with instructor one more time before **April 19** (Otherwise your group meeting grade is F)
- Extra office hour times **April 13-19**
- Every group member needs to be in **at least one** group meeting to receive the group meeting grade

Last time

- **Quasi-experiments:** Observational answer strategies for causal inquiries

Inquiry	Data strategy	
	Observational	Experimental
Descriptive	Sample survey	List experiment
Causal	Quasi-experiment	Survey/field experiment

- RDD as an example of quasi-experiment
- **Today:** Difference-in-differences as another common example in public policy

What did you learn this semester?

Where to go from here?

Go back to foundations

- Probability and statistics
- Philosophy of science
- Research design
- R programming

Where to go from here?

Further learning

- Programming in Python, Julia
- Survey design
- Program evaluation
- Science of science

Where to go from here?

Careers & fields

- Data science, computer science, statistics
- Computational/quantitative social science
- Econometrics
- Evidence-informed policy
- Public administration
- Business, marketing

Difference-in- differences

Reminder

- Critiques to causal claims from observational data
 1. Reverse causation
 2. Omitted variable bias
 3. Selection bias
- Need creativity to rule these out

Difference-in-differences design

- *At least* two groups or conditions (treatment, control)
- *At least* two time periods (pre- and post-treatment)
- Once treated, units **stay on**
- We accept that selection bias is unavoidable
- But comparing before-after changes between groups allows us to calculate treatment effect

Diff-in-diffs estimator

Group	Timing	
	Before	After
Treatment	A	B
Control	C	D

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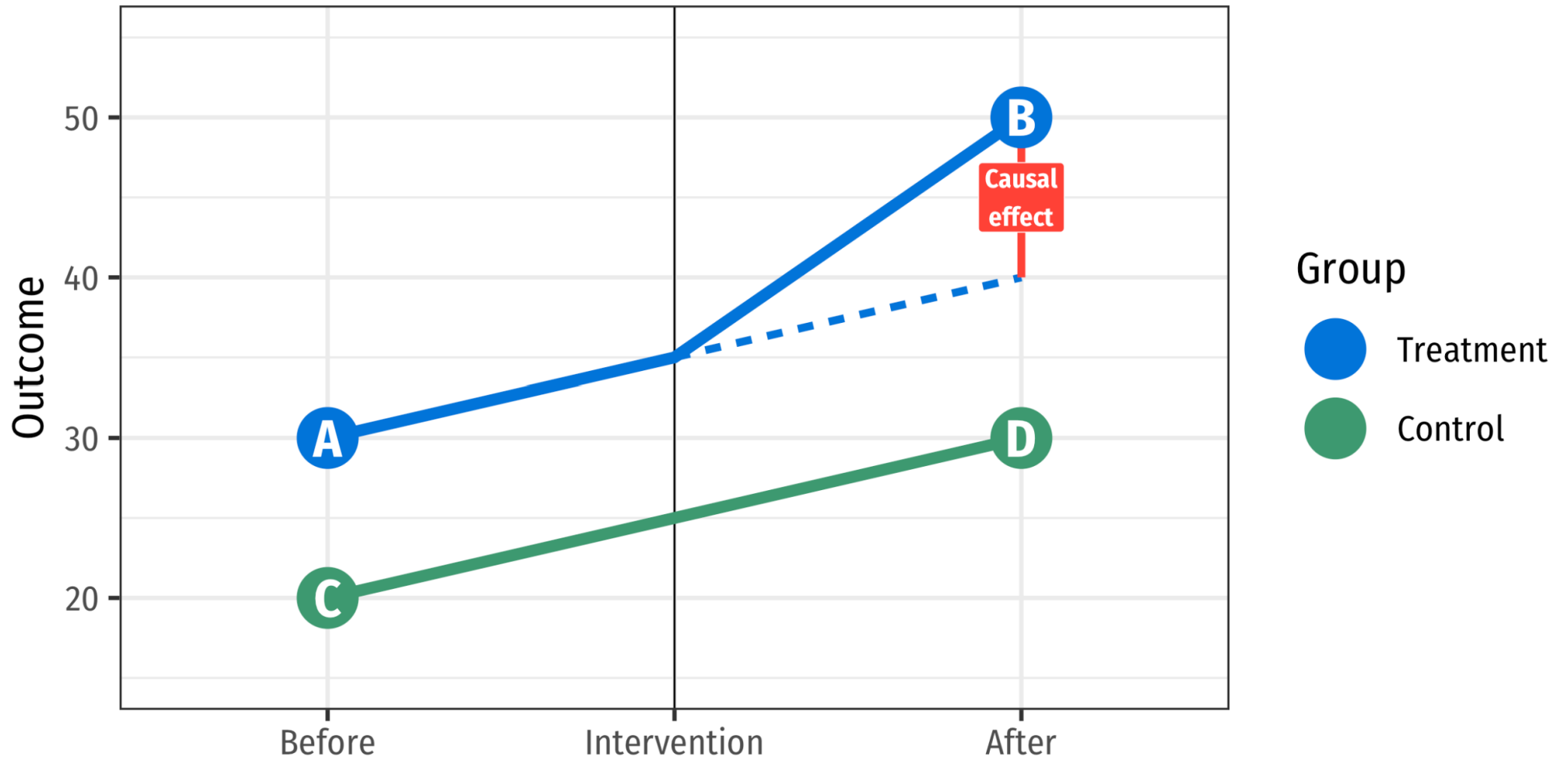
$$\widehat{ATE} = \underbrace{[\text{Mean}(B) - \text{Mean}(A)]}_{\text{Difference}}$$

Diff-in-diffs estimator

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$$\widehat{ATE} = \underbrace{[\text{Mean}(B) - \text{Mean}(A)]}_{\text{Difference}}$$

Difference



Assuming the treatment group follows the dotted line absent treatment, the difference in

Assumption

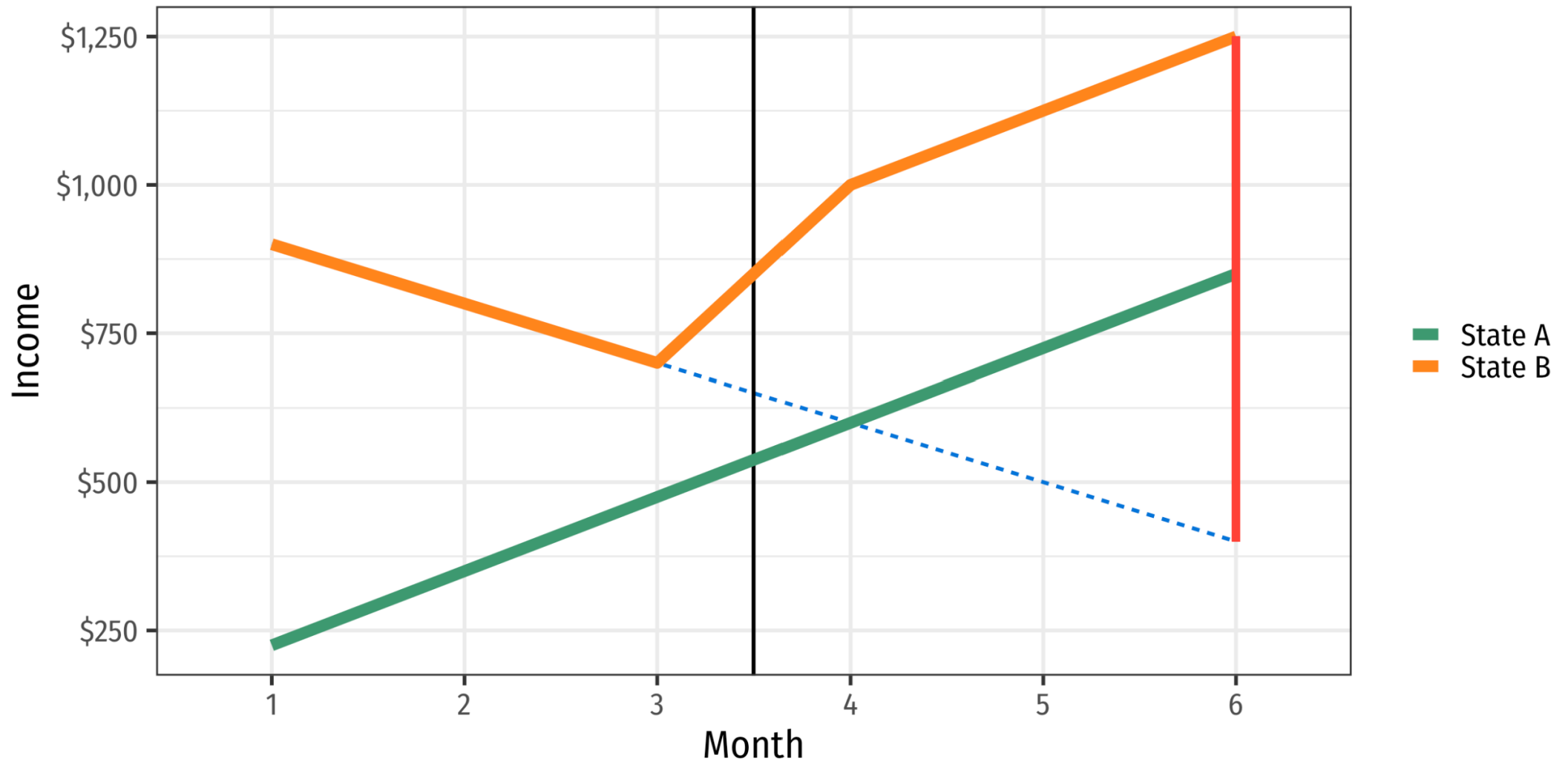
Parallel trends

- Treatment and control may have different values before treatment
 - Absent treatment, the treatment group would have changed like the control group
-
- This is equivalent to claiming that treatment and control, while different, follow a similar trajectory
 - Ideally, you justify by observing the outcome over many pre-treatment periods

What happens if we break parallel trends?

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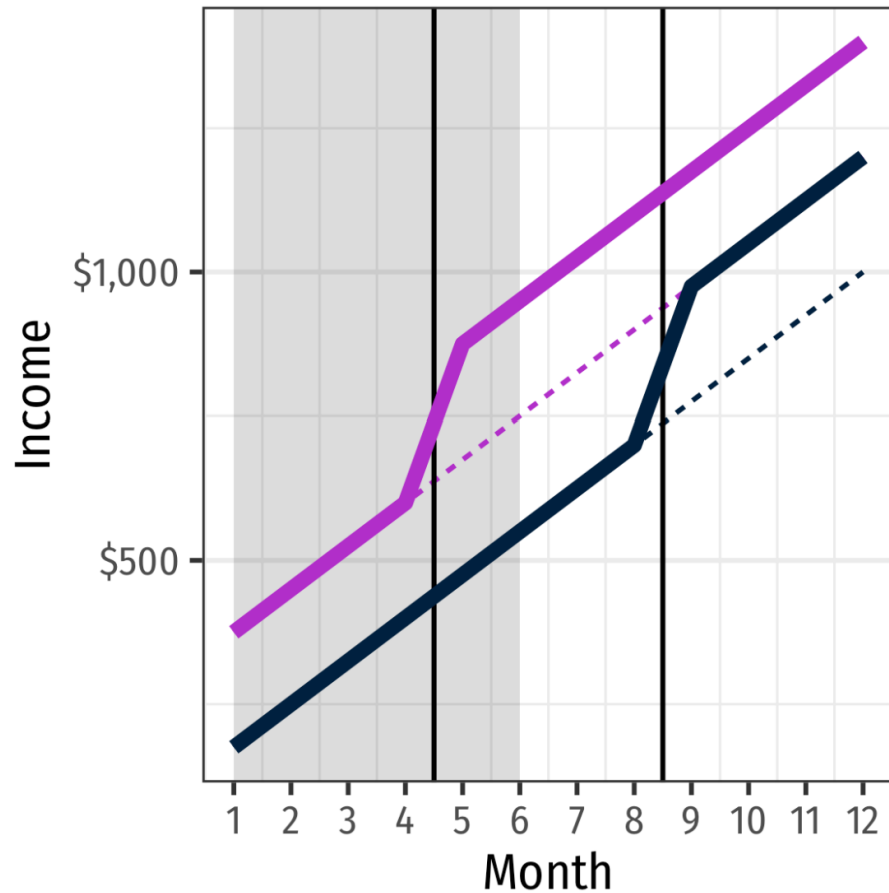


Variants of the design

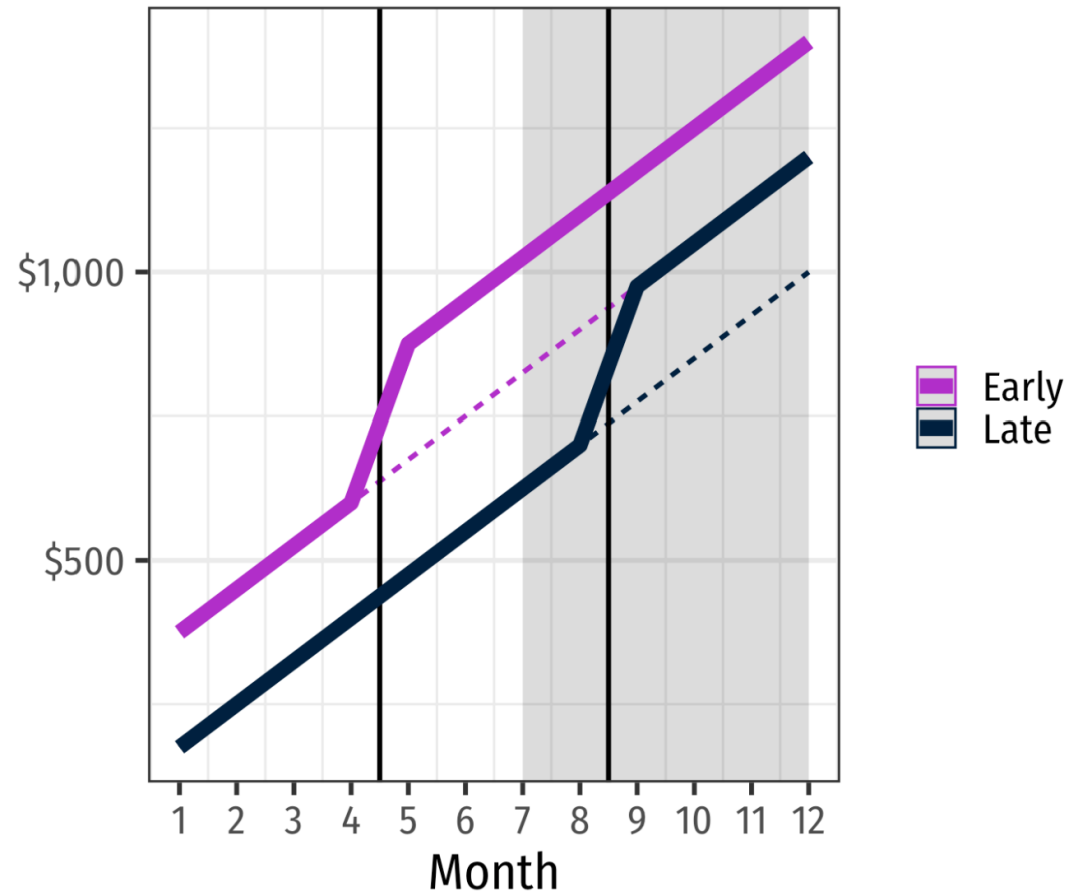
- Many groups, treatments, time periods
- **Increasingly common:** Units become treated at different time periods
- **Example:** Policy adopted by cities over a time period
- This makes similar to a **staggered adoption** design
- But things get very complicated *without randomization*

Multiple treatment periods

Positive effect for early group



Negative effect for early group!



Effects are positive first, negative later. The average of the two cancels out, but the policy

Example

Leininger et al (2023)

Temporary disenfranchisement in Germany

- Discrepancies of minimum voting age across elections (municipal, state, national)
- 16-17 year olds in Schleswig-Holstein can vote in local but not national elections
- **Temporary disenfranchisement** may push voters away from democracy

Research design

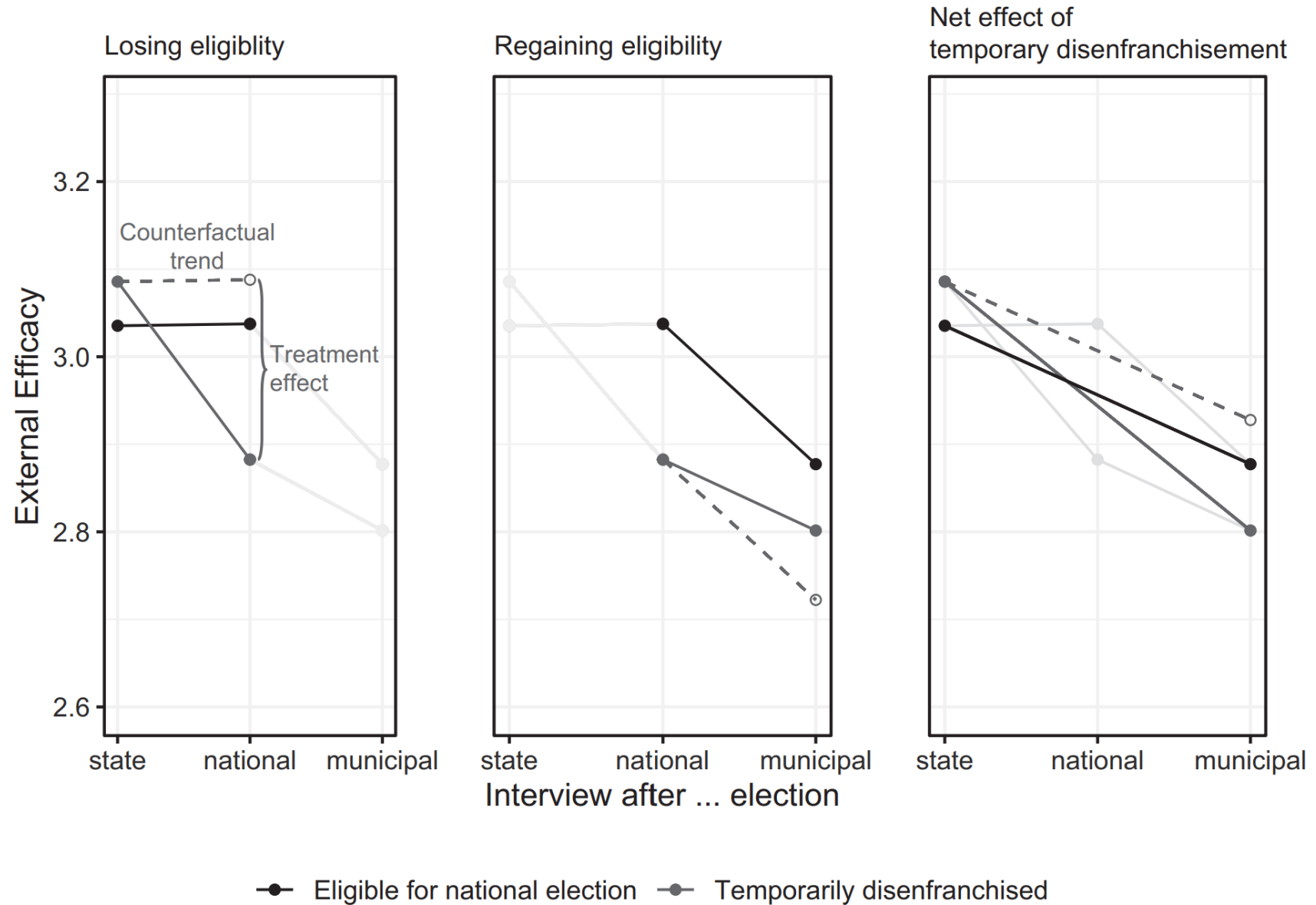
TABLE 1. Study Design

Group	Age	State election May 7, 2017	National election September 24, 2017	Municipal elections May 6, 2018	<i>N</i>
1 Control	18	Eligible	Eligible	Eligible	581
2 Treatment	16–17	Eligible	<i>Ineligible</i>	Eligible	916

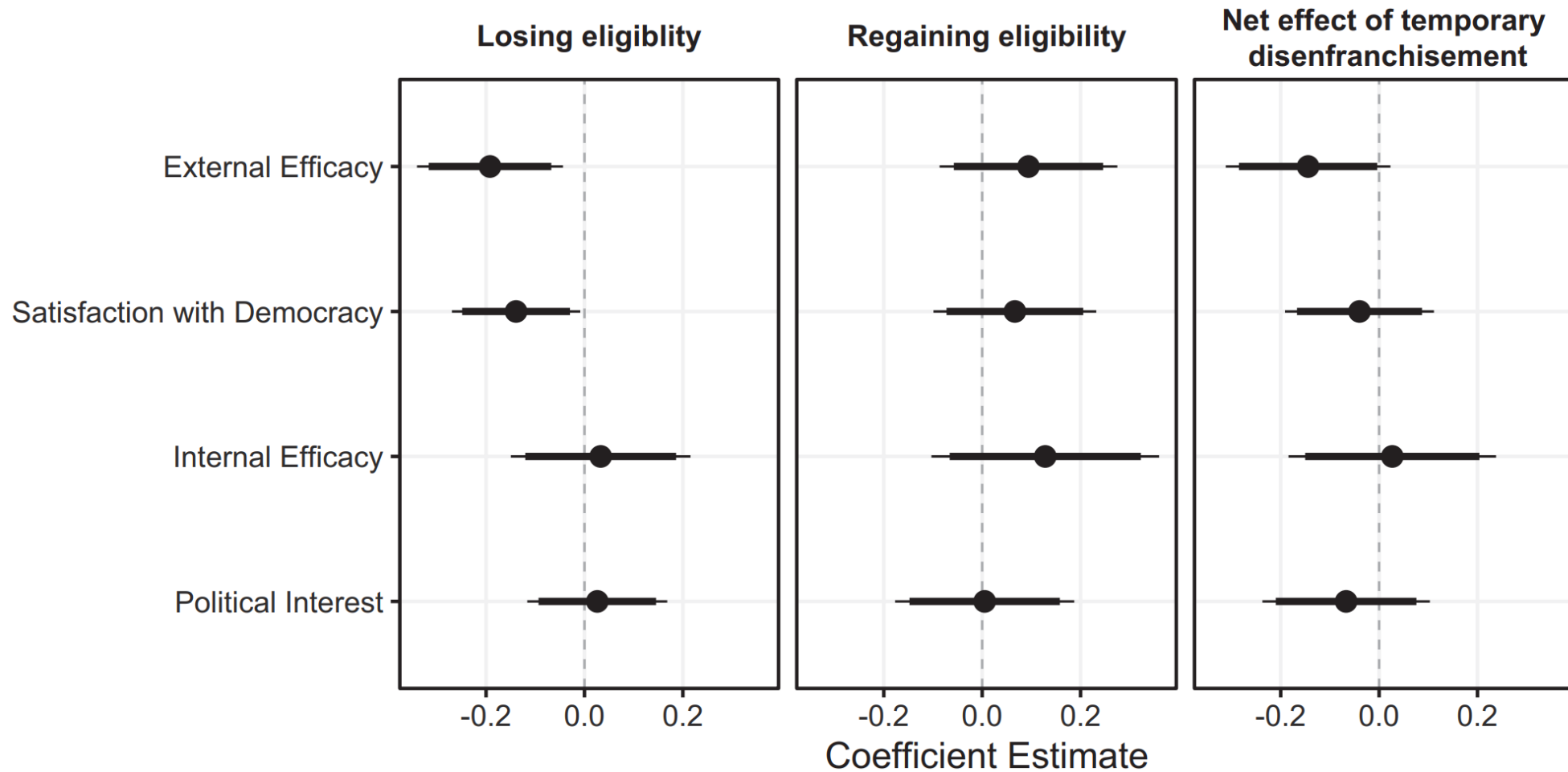
Note: The control group (1) comprises persons entitled to vote in the national election and all following elections because they were 18 on the day of the national election, and the treatment group (2) comprises persons entitled to vote in the state and municipal elections only because they were aged 16 or 17 on the day of the national election. *N* = respondents who participated in both waves 1 and 2.

- **Outcomes:** Survey questions about internal/external efficacy, satisfaction with democracy, political interest

Parallel trends



Results



Thank you!

Break time!





