

Difference-in-Differences Lab

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1 Modern Difference-in-Difference with Covariates

Callaway and Sant’Anna (2021a) estimate the effects of US state-level minimum wage laws on employment of teenagers. Replication data are available in the `did` package via `data(mpdt)`. Further information on the data is available in Callaway and Sant’Anna (2021b).

Using teenage employment (`lemp`) as the outcome, estimate the average $ATT(g, t)$, using regression adjustment to account for county size in the outcome model. Compare this result to the unadjusted one, and interpret.

2 Doubly-Robust Modern Difference-in-Difference

Again using teenage employment (`lemp`) as the outcome, estimate the average $ATT(g, t)$. This time, include county population as a predictor in both the outcome regression and a model for the treatment assignment. Compare this result to the others, and interpret.

3 Modern Difference-in-Difference Placebo Testing

Perform a placebo test to validate our causal interpretation of the individual $ATT(g, t)$ ’s. Using `lpop` as the outcome, estimate all of the $ATT(g, t)$ values, compare them to those we found during the discussion, and interpret. Do the same with the average $ATT(g, t)$. Do not use covariates in a model. (Note that you will need to jitter the `lpop` “outcome” somewhat, since, as a pre-treatment measure, it does not vary by county-year in the data.)

4 Modern Difference-in-Difference Policy Implication

A policymaker wants to be able to make a statement of the form, “since the first state raised its minimum wage in 2004, Z teenagers have lost their jobs (or not been hired) due to these policy changes.”

Use the calculation you completed in Section 1 to provide an estimate for Z . You may make simplifying assumptions like “no population growth”.

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References

- Callaway, Brantly, and Pedro H. C. Sant'Anna. 2021a. "Did: Difference in Differences." <https://bcallaway11.github.io/did/>.
- . 2021b. "Difference-in-Differences with Multiple Time Periods." *Journal of Econometrics* 225 (2): 200–230.