ECON 340
Economic Research Methods

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Lecture 24
Differences-in-Differences & Event Study Designs

Answers to Causal Questions

- Lots of important questions in economics are of a causal nature.
- For example — what is the impact of immigration on labor markets? Or how do minimum wages impact employment?
- Experiments are the gold standard, but not always feasible.
- So we look for natural experiments.

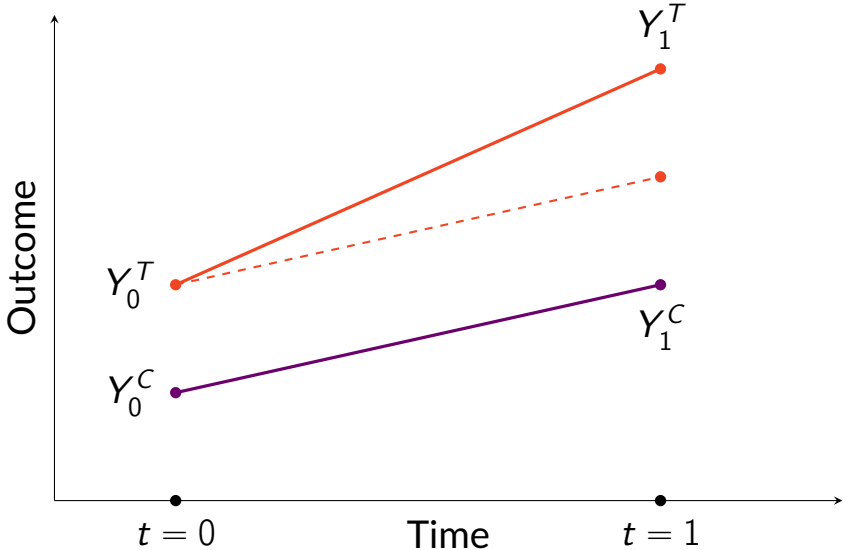
Differences-in-Differences Estimator

- Two groups: Treatment (T) and Control (C)
- Two time-periods: Pre ($t = 0$) and Post ($t = 1$)
- Differences-in-Differences (DID) estimator:

$$\begin{aligned}\beta_1^{DID} &= (\bar{Y}_1^T - \bar{Y}_0^T) - (\bar{Y}_1^C - \bar{Y}_0^C) \\ &= \Delta\bar{Y}^T - \Delta\bar{Y}^C\end{aligned}$$

where $\Delta\bar{Y}^T$ and $\Delta\bar{Y}^C$ is the average change in Y in the treatment and control group, respectively.

Differences-in-Differences

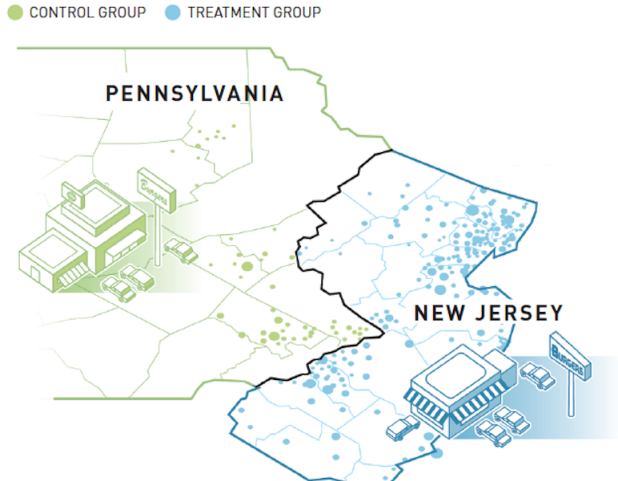


Mariel Boatlift

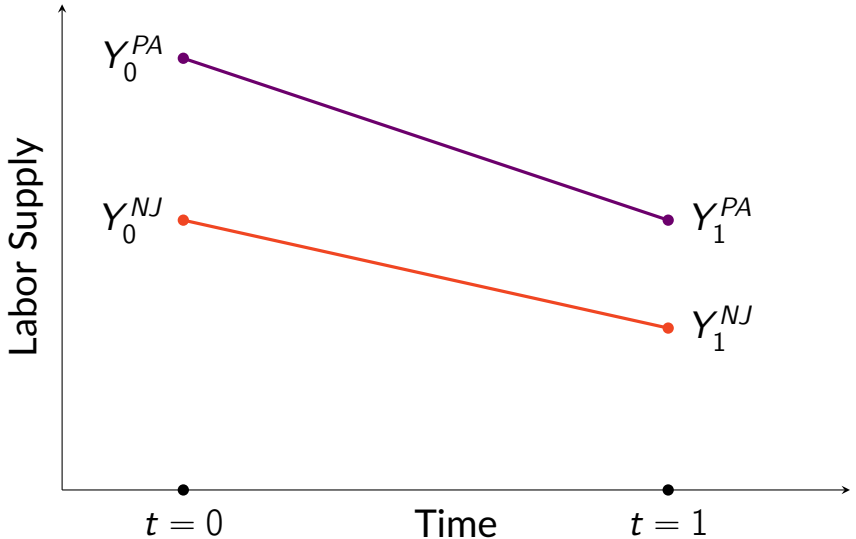
- In April 1980, Fidel Castro unexpectedly allowed all Cubans who wished to leave the country to do so from the port of Mariel.
- Around 50% of these immigrants settled in Miami.
- This led to a 7% increase in the labor force of Miami.
- Card (1990) studies the impact of the Boatlift on the Miami labor market by comparing wage and employment trends in Miami with those in four comparison cities.

Card and Krueger (1994)

April 1, 1992: Hourly minimum wage in New Jersey increased from $4.25 to $5.05



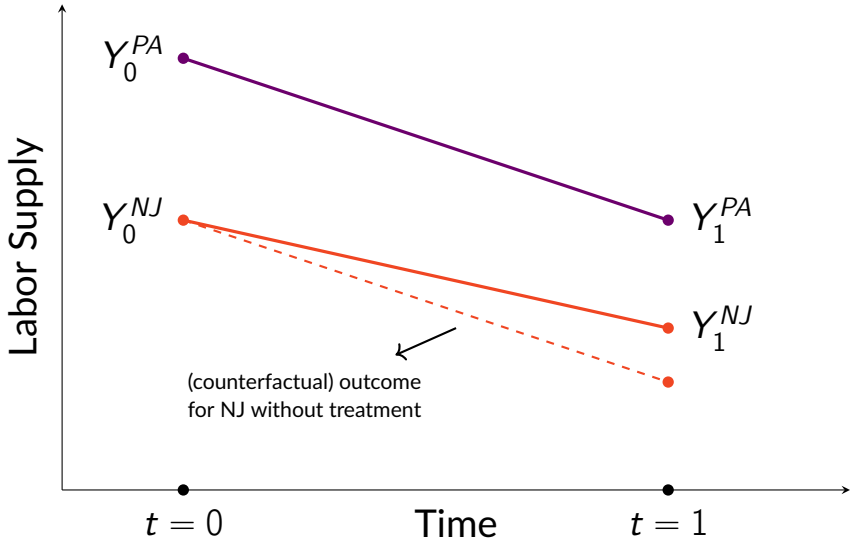
Observed Outcomes



Differences-in-Difference Design

- Say, labor supply declined in both states over this period due to seasonality or aggregate trends in the economy
- We might be tempted to attribute the decline in labor supply over this period in NJ to increased minimum wages (unintuitive!)
- Differences-in-Difference design: look at how labor supply evolved in NJ relative to the control group (PA)

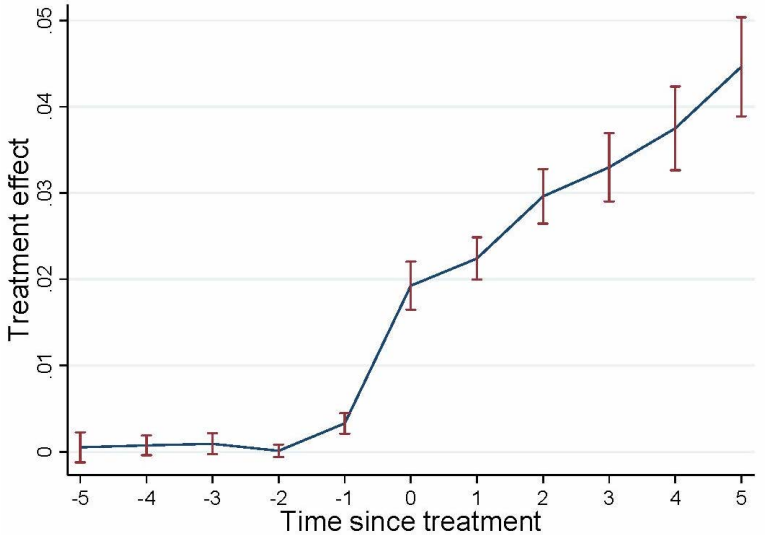
Differences-in-Difference Estimator



Differences-in-Difference Design

- Underlying assumption: parallel trends for treatment and control groups in the absence of treatment
- We are not saying outcomes are similar for NJ and PA, but just that they move similarly over time
- In practice, one can often test this assumption by looking at pre-trends
- Event-study designs: examine the difference in outcomes for two groups over a longer pre-period

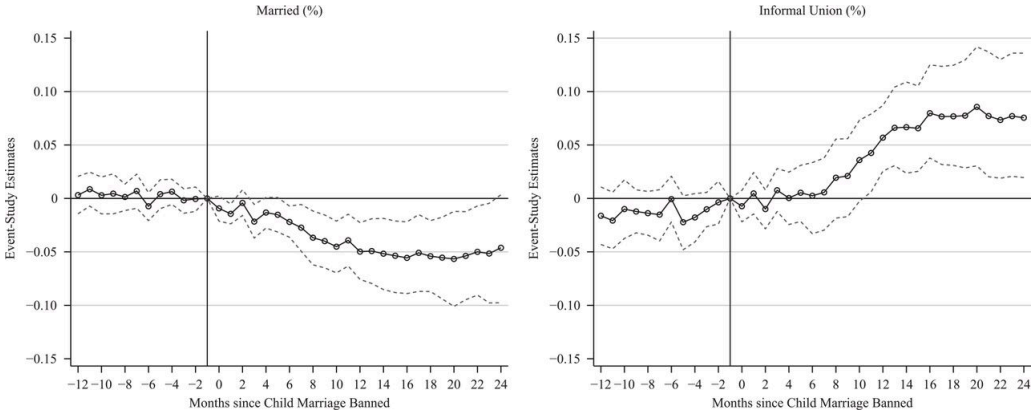
Event Study Design



Child Marriage in Mexico

- Belles-Obrero and Lombardi (2023) examine the impact of raising the minimum age of marriage to 18 in Mexico
- Take advantage of the staggered adoption of this reform across states
- Compare the outcomes of 16-17 year olds in states where child marriage is banned to those in states where it is not, during several months before and after the reform.
- Find no effect on school attendance or fertility rates, driven by a substitution of formal marriage for informal unions

Child Marriage in Mexico

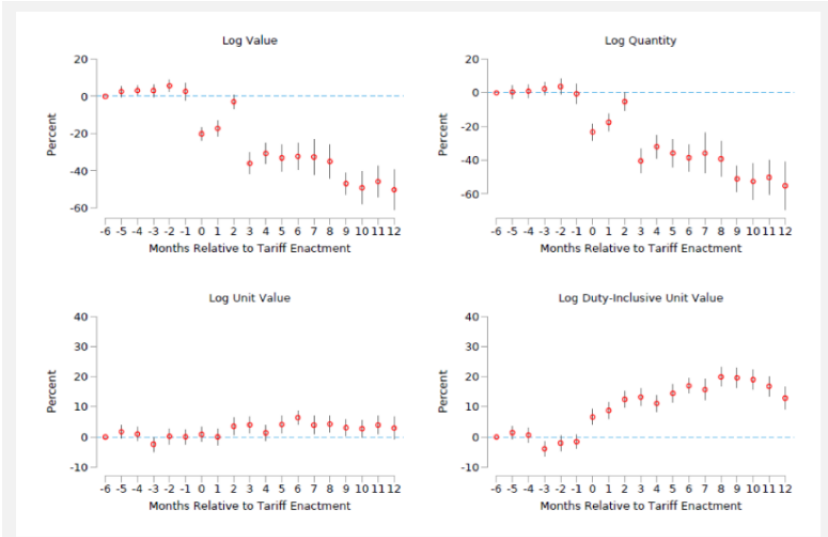


Source: Belles-Obrero and Lombardi (2023)

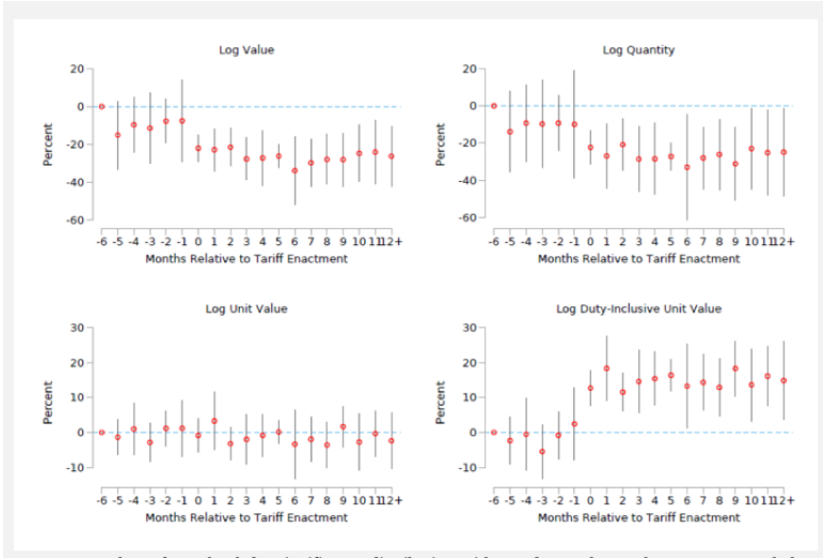
Trade War

- The United States enacted several waves of tariff increases on specific products and countries in 2018 and 2019
  - US implemented tariffs on 17.6% of 2017 imports, mainly from China (average increase from 3.7% to 25.8%)
  - Partners retaliated by targeting 8.7% of U.S. exports
- Fajgelbaum et al. (2020) use U.S. trade and tariff data to estimate the impact of the trade war
- Use an event-study framework that tracks monthly U.S. import data to assess the trajectory of targeted imported and exported varieties relative to non-targeted varieties

Trade War: Imports Event Study



Trade War: Exports Event Study



Taking Stock

- Trade War reading: https://microeconomicinsights.org/the-return-to-protectionism/
- Research paper due next week Tues
- Talk about Big Data & Machine Learning on Tues
- Review class for the midterm on Thurs
- Please fill the SOQs :)