

# 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.

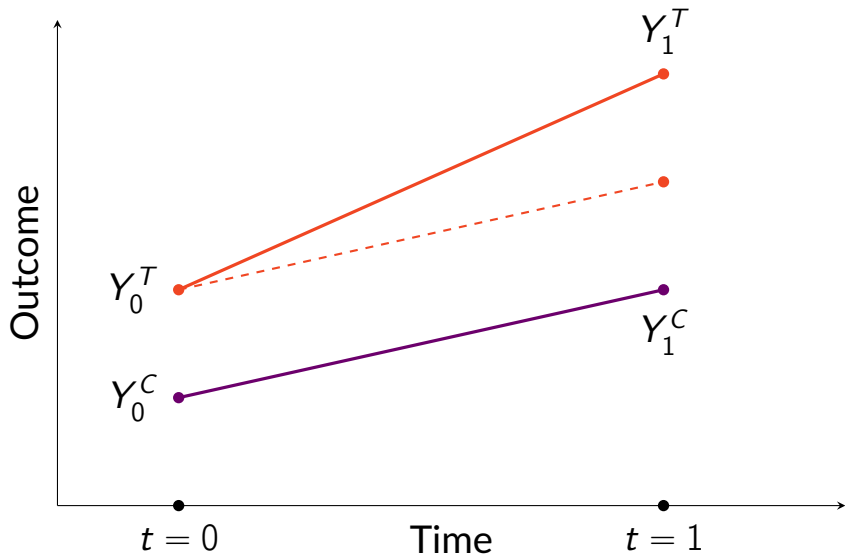
# Differences-in-Differences Estimator

- 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

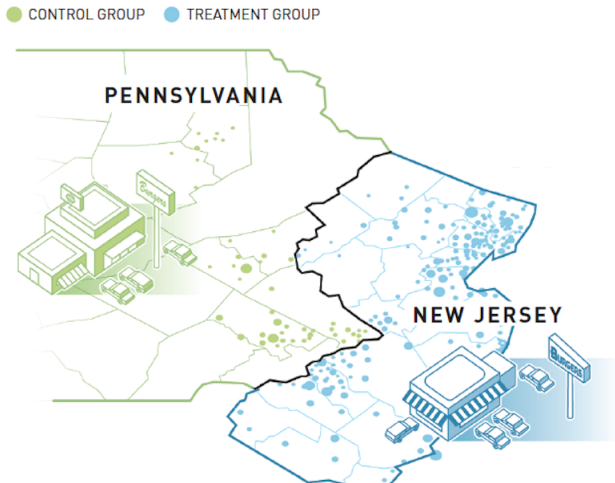


# Maríel Boatlift

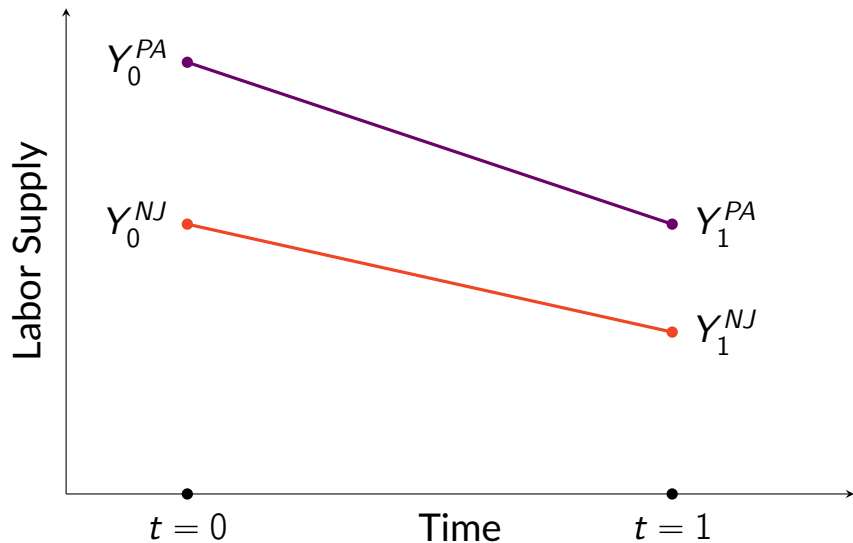
- In April 1980, Fidel Castro unexpectedly allowed all Cubans who wished to leave the country to do so from the port of Maríel.
- Around 50% of these immigrants settled in Miami.
- This led to a 7% increase in the labor force of Miami.
- Card (1990) studies the impact of the Boatlift on the Miami labor 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

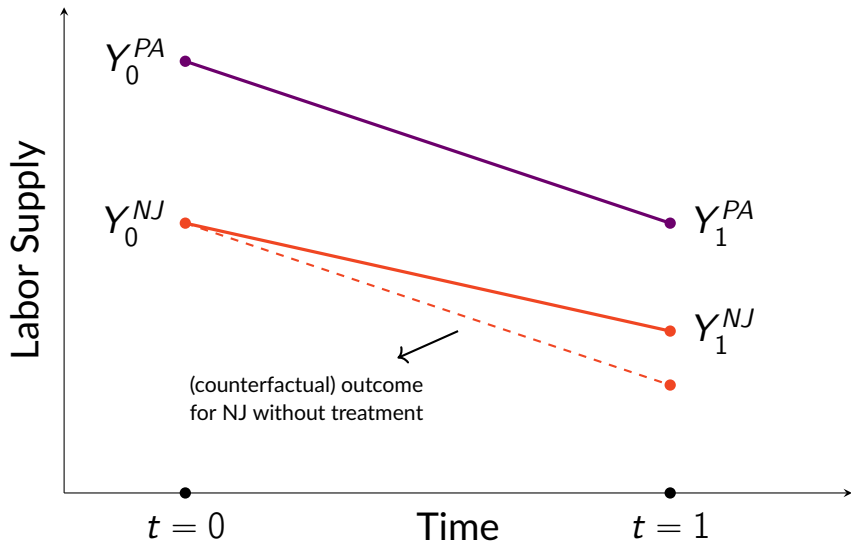


# Differences-in-Difference Design

- 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)



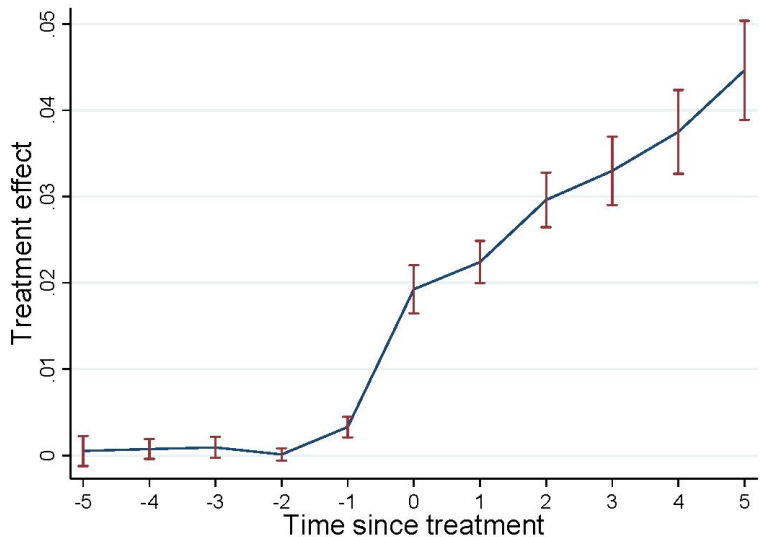
# Differences-in-Difference Estimator



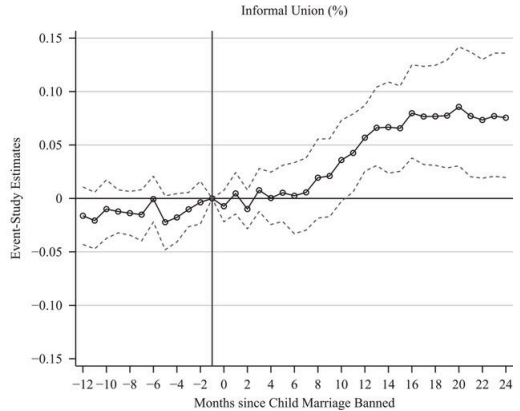
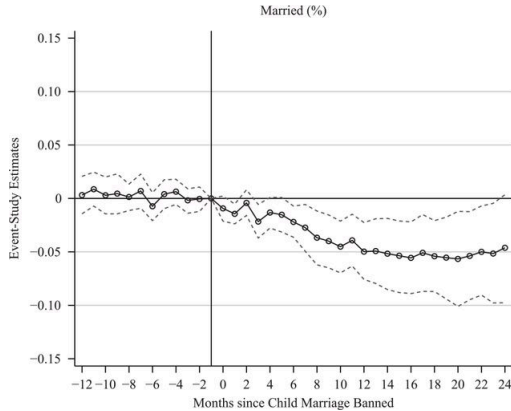
# Differences-in-Difference Design

- 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

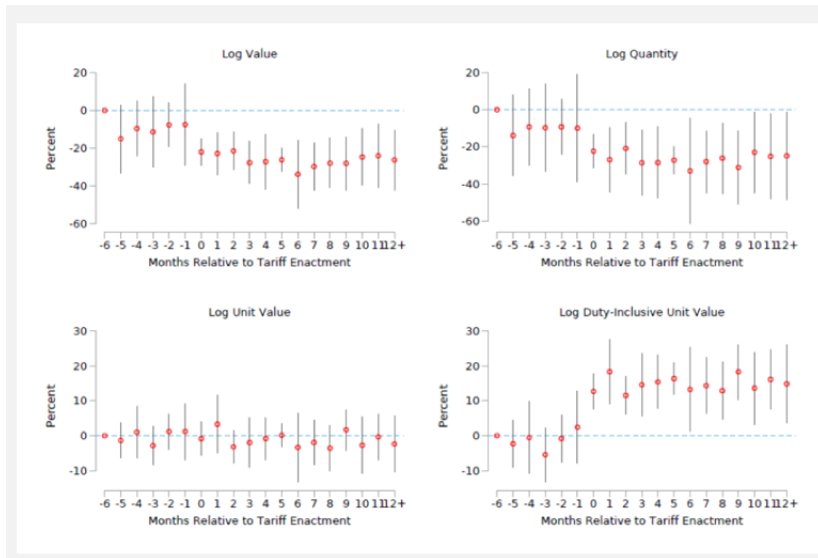


# Child Marriage in Mexico

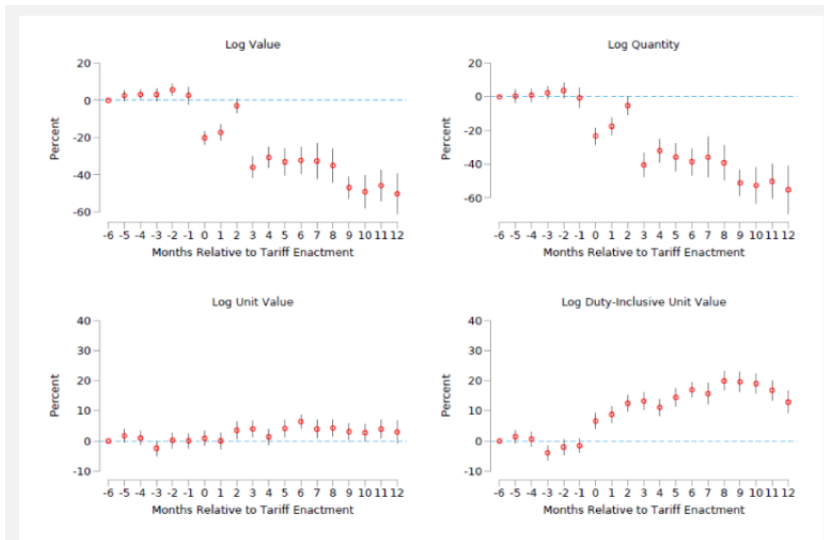


Source: Belles-Obrero and Lombardi (2023)

# Trade War



# Trade War



# Taking Stock

- Link for reading: <https://microeconomicinsights.org/the-return-to-protectionism/>
- Research paper due next week Tues (12/05)
- Talk about Big Data & Machine Learning on Tues
- Review class for the midterm on Thurs
- I won't be here to proctor your exam, but will be available to clarify in case something comes up
- Please fill the SOQs :)