

Problem Set 4
Difference-in-Differences
Due February 3, 2023

We want to assess the impact of “Right-to-Work” (RTW) laws on unionization. Our research question is the following: do RTW laws reduce the unionization? Looking at aggregate data, we are unable to assess individual movements in and out of unionization. We will use individual 1-year panels from the NBER CPS MORG (cps_morg_2009_2016.dta) to assess the research question. This file can be found on [ELMS](#). The NBER CPS MORG data dictionary is slightly different than the Census CPS data and can be found on [NBER’s website](#).

RTW laws eliminate union security agreements or the requirement to pay union dues or agency fees to the union that has a collective bargaining agreement with a firm. In February 2012 Indiana adopted a RTW law, while Michigan implemented a similar law in late 2013 and Wisconsin in March 2015. You need to assess the Average Treatment on the Treated (ATT) for the adoption of RTW laws on unionization.

Your outcome of interest is union membership, which is binary 0 or 1. You need to set up a canonical 2- by-2 Difference-in-Differences to assess the ATT of RTW on union status.

$$Y_{its} = \alpha + \gamma Post_t + \beta Treat_s + (Post \times Treat)_{ts} + \psi X_{its} + \varepsilon.$$

You will be utilizing a linear probability model (LPM), since the outcome is binary. Your treatment variables will be the following for each individual 2-by-2 DD: INTREAT, MITREAT, and WITREAT. Your post variable will be the following: INPOST, MIPOST, and WIPOST. These variables are 0 for the first observation (before the law) and 1 in the second observation (after the law) is passed or implemented.

You will need two qualifiers for each 2-by-2 DD regression. First, each state has a set of comparison states. For example, you can see Indiana’s comparison states by tabulating “in_borderstate” and stfips. Second, you will need to observe the time period of interest. These have been set up for you. For example, Indiana’s observations before and after its law for the same individual can be found with “inob1”. As a final note, these data have 1-year panels for each individual with “ID” being the unit variable and “year” as the time variable. Use do not need xtreg, but you will need areg and absorb(ID) to account for individual fixed effects that will take care of the taste hypothesis. Please answer the following questions:

Question 1: Access the ATT in a simple 2x2 Difference-in-Difference

1a: What is the estimated ATT for Indiana’s law? Use inob1==1 as the time period and in_borderstate==1 and cluster standard errors at the state level. [12 points]

1b: What is the estimated ATT for Michigan’s law? Use miob1==1 as the time period and mi_borderstate==1 and cluster standard errors at the state level. [12 points]

1c: What is the estimated ATT for Wisconsin’s law? Use wiob1==1 as the time period and wi_borderstate==1 and cluster standard errors at the state level. [12 points]

Question 2: Specification Tests for 2x2 Difference-in-Differences

2a: Do a specification test for each of the 3 2x2 DD by adding covariates for each one your separate 2x2 DD. Use a Mincer equation, such as exp, exp2, education, sex, race. What are the 3 estimated ATT? [9 points]

2b: Do a specification test for each of the 3 2x2 DD by adding individual fixed effects. Use `areg <your model>, absorb(ID)`. What are the 3 estimated ATT? [9 points]

3c: Are the results relatively robust when adding covariates and/or individual fixed effects? Or, do the estimated ATTs radically differ? [9 points]

Question 3: Triple DDD and placebo tests

3a: Estimate a Triple DDD and use “management” variable for individuals in managerial occupations as a within-treatment subgroup placebo comparison. A RTW law should not impact managerial employees (use `i.management` in your triple DDD) [8 points]

3b: What is the parameter of interest for the DDD for each of the 3 DDD estimated? (Remember in class we looked at “NJ#Post#Lowwage” as the DDD and low wage workers got treatment, and here we are `STTreat#STPost#Management` and management should not be impacted by the treatment.) Are DDD estimates on management workers statistically significant? Are the `STTREAT#STPOST` statistically significant? Does it provide corroborate or invalidate our original DD estimates? [8 points]

Question 4: Placebo/Falsification Tests

4a: Rerun the 2x2 DD for each state, but use a false time adoption of January 2010. These are `inob2==1` for Indiana, `miob2==1` for Michigan, and `wiob2==1` for Wisconsin. [8 points]

4b: Do you find any statistically significant results? Does this corroborate or invalidate the original estimates? [8 points]

Question 5: Standard Errors

5a: Even if we cluster our standard errors at the “group” level (e.g.: state), what is a potential problem with our standard errors? [5 points]