

Please hand in your solutions on Thursday, May 21, before the tutorial.

Exercise 1: DiD - paper discussion

In the lecture you discussed the theoretical framework of the difference-in-differences (DiD) approach and the underlying assumptions. With this in mind, read the following paper:

Dobkin, C., Nicosia, N., Weinberg, M. (2014). Are supply-side drug control efforts effective? Evaluating OTC regulations targeting methamphetamine precursors. Journal of Public Economics, 120, 48-61.

Please consider the following components of the paper and discuss them critically:

- research question
- contribution
- aim of the analyzed policy
- methodology
- identifying variation
- key identifying assumption
- data
- results / findings
- interpretation of the results / implications / policy relevance
- limitations of the paper

Exercise 2: DiD - practical application

The file `otc_regulation.dta` includes data of the Dobkin et al. (2014) paper that you are now familiar with. The file covers records for all 50 states and the District of Columbia for each month Jan 2000 to March 2008 and includes the following variables:

- `state_ab`: state postal code
- `any_law`: date law regulating OTC medicines that can be used to make methamphetamine went into effect
- `pop_all_fitted`: state population
- `event_date`: month the record pertains to

- `cov_food_st_person`: people on food stamps
- `cov_unemp_rate`: percent unemployed
- `cap_under_2_oz`: labs with a through put of less 2 oz
- `cap_2_8_oz`: labs with a through put of 2 to 8 oz per production run
- `tot_labs`: number of total labs

(a) Similar to Fig. 2. of the paper make a graph showing the time series of the proportion of the population living in states with an OTC restriction in place (OTC law coverage) and the time series of the total number of labs for each of the three sizes (lab capacity under 2oz, 2-8oz, 9oz or greater). For the enactment month of the law you have to weight a state's population by the proportion of days with the regulation in effect because the laws were usually not enacted at the beginning of a month (see chapter 4 of the paper). What does the figure reveal?

(b) Make a graph that shows the average number of the three different types of labs discovered in event time. Center the figure at time 0 (when the law went into effect in the state).

(c) Estimate a standard FE model to determine the effect of the law on the number of discovered labs of the three different sizes. Equation (1) of the paper serves as your reference point. Be sure to code the OTC_{st} indicator as defined in the paper. Use the appropriate standard errors and justify your choice. Do your coefficients coincide with what you see in your graphs and with the regression estimates of the paper?

(d) Under what assumptions does equation (1) of the paper reveal consistent estimates? Do you think that these assumptions are met?

(e) What does equation (1) assume about the temporal evolution of the treatment effect? How does the regression equation (2) of the paper improve on this?

(f) Similar to equation (2) of the paper, run a regression of the number of labs discovered on state FE, time dummies and event time dummies. Plot the estimates of the event time dummies and their confidence intervals. Interpret the figure and compare it with your previous findings. Did the laws reduce the number of labs? Does the effect look persistent?