

DXE_EMTR 2021

Third assignment (20% of total grade +3% Bonus)

Please submit the assignment by 28 Jan in the IS MUNI system. You are allowed and encouraged to work in groups of maximum size 3. No programming in R is needed for this assignment.

1 Regression Discontinuity Design (6%)

Suppose you would be interested in estimating the effect of alcohol consumption on mortality for young adults. The legal drinking age is 18 in Czechia and suppose that one can observe a discontinuous jump in mortality around the threshold 18 years. This suggests that Regression Discontinuity Design may be an appropriate approach to tackle this research question.

- Describe in detail how would an ideal dataset look like that would allow you to proceed.
- Write down the assumptions necessary for credible estimation of the desired causal effect.

The following article is helpful for this task: Carpenter, Christopher, and Carlos Dobkin. "The effect of alcohol consumption on mortality: regression discontinuity evidence from the minimum drinking age." *American Economic Journal: Applied Economics* 1.1 (2009): 164-82.

- The abstract of Carpenter and Dobkin (2009) says: "We estimate a 10 percent increase in the number of drinking days for young adults results in a 4.3 percent increase in mortality." Explain in detail how this number "4.3 percent" was calculated.

2 Difference-in-Differences (7%)

It is interesting to study a causal link between water safety and child mortality. In 1995 about 30% of municipalities in Argentina privatized their local water companies. Privatization may have translated into some variation in the service quality. A difference in child mortality between municipalities with privatized and non-privatized water companies was observed in subsequent years.

- Describe what assumptions are needed in order to credibly estimate the causal impact of the intervention (privatization) on child mortality via Difference-in-differences (Diff-in-diff) research design.
- Write down the two-way fixed effect model regression equation.
- Describe some ways of assessing the validity of the Diff-in-diff approach.
- Devise a few placebo specifications that would support the argument that the results are robust.

Galiani, Sebastian, Paul Gertler, and Ernesto Schargrodsky. "Water for life: The impact of the privatization of water services on child mortality." *Journal of political economy* 113.1 (2005): 83-120.

3 Synthetic Control Method (7%)

In 2009, Slovakia adopted euro. It is interesting to study what impact this may had on the economic performance, measured by the GDP per capita. Žúdel and Melioris (2016) looked at this problem and chose to make use of Synthetic Control Method (SCM) research design.

- Explain their identification strategy and describe their main findings.
- What are the benefits of using SCM in this particular setup?
- What kind of placebo specifications did authors use in order to support robustness of their findings?
- Explain the results presented in Figure 18 (Ratio of post-2006 RMSPE to pre-2006 RMSPE) in detail.

- The synthetic weights (Table 5) are compared with OLS weights (Regression weights). Discuss, why this is an argument for using SCM.
- The synthetic weights (Table 5) are not sparse, when using broader set of controls for construction of the synthetic control. Explain why.

Žúdel, Branislav, and Libor Melioris. "Five years in a balloon: Estimating the effects of euro adoption in Slovakia using the synthetic control method."(2016). OECD, ECONOMICS DEPARTMENT WORKING PAPERS No. 1317, ECO/WKP(2016)41

Bonus (+3%)

The chief economist of Google and an author of well-known microeconomics textbook Hal Varian wrote an essay in 2014 in which he predicted that machine learning techniques will become important within the economics profession.

Varian, Hal R. "Big data: New tricks for econometrics."Journal of Economic Perspectives 28.2 (2014): 3-28.

Write a short essay (<1000words) summarizing his arguments.