Problem: Minimum wages in the US (Card & Krueger)

In their famous study Card and Krueger (AER, 1994) investigated the effects of increasing the minimum wage on employment. Therefore, they used data from fast-food restaurants in New Jersey and Pennsylvania. The data consist of two waves of a survey, of which one was conducted prior to a minimum wage increase in New Jersey and the other afterwards. This paper has been one of the first in which a difference-in-difference model has been used to estimate a policy parameters (the effect of a minimum wage increase).

The first columns of the data describe the variables collected in the first wave of the survey, while the later columns describe the second survey (see also the file containing the description of the data). Each survey containing the number of full-time employees and the number of part-time employees. Construct a variable full-time equivalent for both waves, which is the number of full-time employees plus the number of part-time employees divided by two and also add the number of managers. I will simply refer to employees for this outcome variable. In this exercise we investigate the robustness of the results reported by Card and Krueger (1994).

(i) Compute separately for New Jersey and Pennsylvania the average number of employees in both waves, and compute the difference-in-difference estimate. Next repeat this, but only considering the restaurants that responded in both waves of the survey.

Next, we focus on the regression model:

$$E_{1i} - E_{0i} = \alpha + \delta \text{NJ}_i + U_i$$

where $E_{1i} - E_{0i}$ is the change in employment in restaurant i between the two waves, and NJ_i is a dummy variable indicating in restaurant i is located in New Jersey.

(ii) Estimate this model and next subsequently add characteristics of the restaurants observed in the first wave. But think carefully which characteristics can be included. How does the latter affect the estimate for the coefficient δ?

The validity of difference-in-difference estimation hinges on a common trend between the treatment and control group. Sometimes trends before the intervention can be used to justify this common trend assumption. This is not possible

in this setting since the data only contain information on one time period before the intervention. Therefore, we consider a different approach. From now only we only focus on those restaurants which have responded in both waves.

(iii) Provide a balancing table, i.e. show the sample mean of characteristics observed in the first survey separately for the restaurants in New Jersey and Pennsylvania. What is your opinion about the balancing table?

(iv) Check for the different characteristics if there is a common support for restaurants in New Jersey and Pennsylvania. And estimate a propensity score for being a restaurant in New Jersey.

(v) Use propensity score matching to estimate the average treatment effect on the treated for the employment before and after the minimum wage increase in New Jersey, so on E_{0i} and E_{1i} separately.

(vi) Now use propensity score mathing to estimate the average treatment effect on the treated on the change in employment in the restaurants, so $E_{1i} - E_{0i}$.

(vii) Now check the sensitivity of the propensity score matching estimate by also computing the weighting estimators for the average treatment effect on the treated.