Government Transfer and Poverty Reduction in Brazil

This exercise is based on Litschig, Stephan, and Kevin M Morrison. 2013. "The Impact of Intergovernmental Transfers on Education Outcomes and Poverty Reduction." *American Economic Journal: Applied Economics* 5(4): 206–40.

In this exercise, we estimate the effects of increased government spending on educational attainment, literacy, and poverty rates.

Some scholars argue that government spending accomplishes very little in environments of high corruption and inequality. Others suggest that in such environments, accountability pressures and the large demand for public goods will drive elites to respond. To address this debate, we exploit the fact that until 1991, the formula for government transfers to individual Brazilian municipalities was determined in part by the municipality's population. This meant that municipalities with populations below the official cutoff did not receive additional revenue, while states above the cutoff did. The data set `transfer.csv` contains the variables:

Name	Description
`pop82`	Population in 1982
`poverty80`	Poverty rate of state in 1980
`poverty91`	Poverty rate of state in 1991
`educ80`	Average years education of state in 1980
`educ91`	Average years education of state in 1991
`literate91`	Literacy rate of state in 1991
`state`	State
`region`	Region
`id`	Municipal ID
`year`	Year of measurement

Question 1

We will apply the regression discontinuity design to this application. State the required assumption for this design and interpret it in the context of this specific application. What would be a scenario in which this assumption is violated? What are the advantages and disadvantages of this design for this specific application?

Question 2

Begin by creating a variable that determines how close each municipality was to the cutoff that determined whether states received a transfer or not. Transfers occurred at three separate population cutoffs: 10,188, 13,584, and 16,980. Using these cutoffs, create a single variable that characterizes the difference from the closest population cutoff. Following the original analysis, standardize this measure by dividing the difference with the corresponding cutoff and multiply it by 100. This will yield a normalized percent score for the difference between the population of each state and the cutoff relative to the cutoff value.

Question 3

Begin by subsetting the data to include only those municipalities within 3 points of the funding cutoff on either side. Using regressions, estimate the average causal effect of government transfer on each of the

three outcome variables of interest: educational attainment, literacy, and poverty. Give a brief substantive interpretation of the results.

Question 4

Visualize the analysis done in the previous question by plotting data points, fitted regression lines, and the population threshold. Briefly comment on the plot.

Question 5

Instead of fitting linear regression models, we compute the difference in means of the outcome variables between the groups of observations above the threshold and below it. How do the estimates differ from what you obtained in the earlier Question? Is the assumption invoked here identical to the one required for the analysis conducted there? Which estimates are more appropriate? Discuss.

Question 6

Repeat the analysis conducted in the original question but vary the width of analysis window from 1 to 5 percentage points below and above the threshold. Obtain the estimate for every percentage point. Briefly comment on the results.

Question 7

Conduct the same analysis as in the earlier Question but this time using measures of the poverty rate and educational attainment taken in 1980, before the population-based government transfers began. What do the results suggest about the validity of analysis presented in the earlier Question?