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EDS 241
Assignment 2

Due on 2/4/22 at 17:00

Turn in your Markdown pdf on Gauchospace in the "Assignment Turn in Area"

The goal of this assignment is to provide a simple test of whether the effects of air quality regulations are the same across locations with different racial mix. To this end you will test if the NOx Budget Program, a cap-and-trade market for nitrogen oxides (NOx) emissions from power plants lead to similar effects in counties that are predominantly white versus counties that are predominantly African American. The data are a subset of data sample I used in the following paper: https://olivierdeschenes.weebly.com/uploads/1/3/5/0/135068654/defensive-investments-and-the-demans-for-air-quality.pdf. You can also get more information on the NOx Budget Program, here: https://www.epa.gov/airmarkets/nox-budget-trading-program

The data included in the file **NBP.xls**, which is available on Gauchospace, are: **fips** (fips code identifying each county), **NBP** (indicator =1 if the county was regulated under the NOx Budget Program), **PctBlack** (fraction of the county population that is African American), and **Dnox_masstons** (change in annual NOx emissions from all power plants in a county between 2000 and 2008 (in tons)). Note that the NBP market was in effect in 212 of the 485 counties in the sample from 2003 to 2008, so the 2008-2000 change give us a sense of the program's effect on emissions. If emissions of NOx from power plants declined in a county, then **Dnox_masstons** should be negative.

Finally, it may be useful to review the **RegressionSpecification.pdf** notes on Gauchospace before doing the assignment.

(a) Make a histogram depicting the distribution of Dnox_masstons.

(b) Create an indicator =1 if the county has PctBlack above the sample median, and =0 otherwise (in the rest of the assignment, I refer to this variable as 'D'). What is the average of PctBlack for counties above the median, i.e. counties for which D=1?

(c) Estimate a regression of Dnox_masstons on NBP. Interpret the estimated intercept and the coefficient on NBP.

(d) Create an interaction between the variables NBP and D. Estimate a regression of Dnox_masstons on NBP, D, and this interaction. Interpret each estimated regression coefficient, including the intercept.

(e) What is the predicted Dnox_masstons in a county that was not regulated under NBP and where PctBlack is above the sample median (i.e., where D=1)? Report the 95% confidence interval for this prediction. Make sure to use "heteroskedasticity-robust" standard errors.