Assignment 4 – Regression Discontinuity Design.

Causal Inference and Research Design.

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I.   Github repo and summary.

1. Github Repo

https://github.com/stefanyPena/RDD

2. Summary

This paper uses a data set from the author containing the administrative records of 512. 964 Washington State DWI stops, recorded between 1995 and 2011. Hansen proposes a regression discontinuity design to give consistent estimates, taking advantage of the thresholds determined by the BAC that impose two degrees of punishment on offenders (0. 08 and 0. 15 for the aggravating factor). The order of the approach is to test the possibility of classifying in the current variable, since individuals can manipulate their CBAs to not reach the threshold and avoid the penalties. Then covariate balance tests are performed to check the validity of the controls of the main test; and finally the effect of the punishment levels determined by the BAC courts on recidivism is estimated
The results obtained suggest that having a blood alcohol level above the DUI threshold (and therefore being punished) reduces recidivism by up to 2 percentage points, and crossing the aggravated limit of 0. 15 has a reduction in recidivism of an additional one percentage point. The mechanisms proposed by the author, show that the increase in the cost of the offense has a reduction in recidivism, consistent with the individual rational perspective.
Finally, it concluded that the additional penalties experienced by drunk drivers on the BAC thresholds are effective in reducing drink-driving
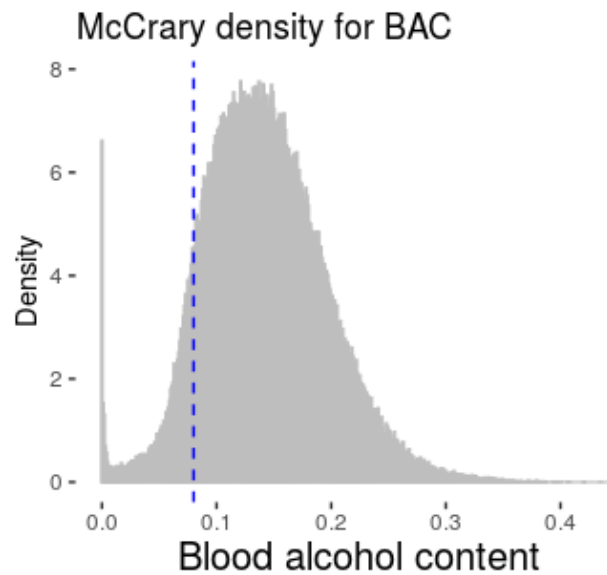
II.   Replication

3.

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   Statistic      N     Mean  St.   Dev. Min Pctl(25) Pctl(75) Max

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   TreatmentD  214,558 0.893  0.309    0     1        1        1

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Table 1. Treatment variable descriptive statistics

4.

McCrary density for BAC

The blue dotted line represents the relevant threshold of 0. 08 blood alcohol level. It is important to clarify that because the amount of data is so large (512964 observations), there may be some discontinuities that cannot be detected visually. Two tests have been conducted whose purpose is to calculate the density of observations just below and above the threshold so that if the data are not manipulated, the density of observations should not be significantly different, i. e., it means testing whether the suspects were able to adjust their BAC to just below the threshold and whether the state police systematically manipulated the observed to obtain fewer or more (approximately 0. 8)
violations.

5. Model

6. The results show the discontinuities in the 0. 08 cuts estimated with a linear and quadratic local adjustment model. On the other hand, from the quadratic adjustment perspective, all confidence intervals cross at the cutoff point, making the apparent imbalance of the linear estimate statistically zero, i. e. the equilibrium of the covariates. These results suggest that the converts are balanced at the cutoff point and therefore do not provide any evidence of a violation of the softness assumption.
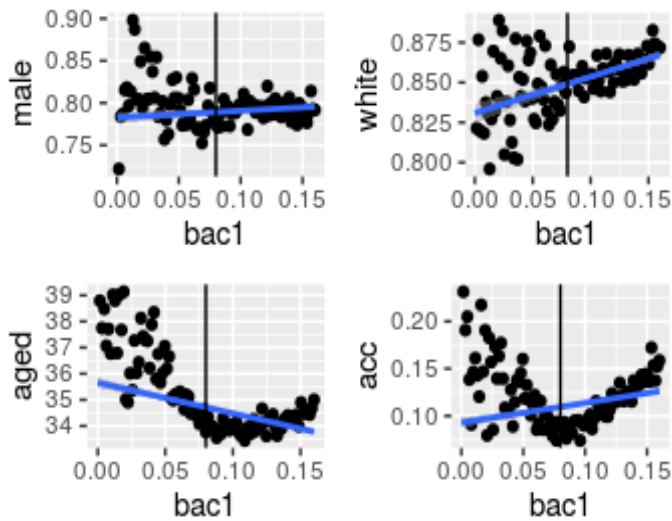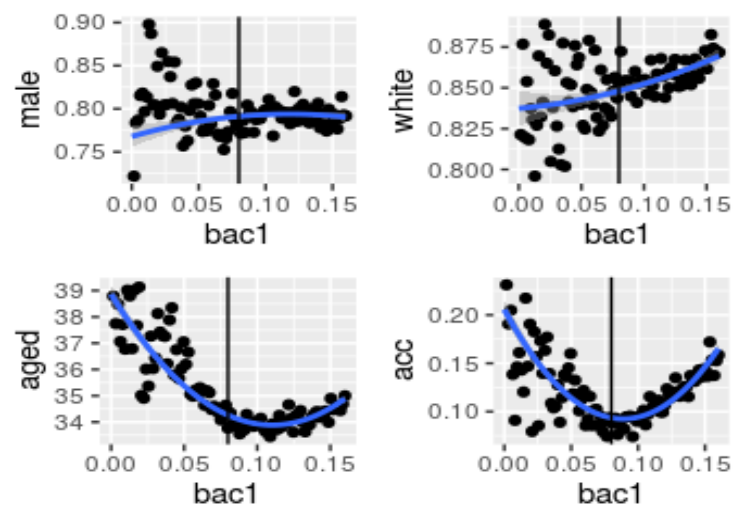

Figure 2. Linear fit

Figure 3. Quadratic fit.