\*————————–begin RDD\_Replication\_Evelyn.do————————

# [RDD Replication](#rdd-replication)

**Github repo and summary**

1. <https://github.com/EvelynCheng-Github/RDD>
2. What is his research question? His research question is that the effect of harsher punishments and sanctions on driving under the influence.

What data does he use? He utilizes the administrative records of 512,964 drunk driving parking spots in Washington State. What’s more, blood alcohol content thresholds are important value to control drinking and driving.

What is his research design, or “identification strategy”? This article provides quasi-experimental evidence on the impact of severity of punishment on future crimes. In order to provide evidence for these alternative mechanisms, this article examines the degree of change in sanctions and punishments in terms of thresholds, multiple time windows for recidivism, and alcohol-related alternative crimes.

What are his conclusions? Conclusion is that the additional sanctions experienced by drunk drivers at BAC thresholds are effective in reducing repeat drunk driving.

**Reproducing somewhat Hansen’s results**

3. Create a dummy

4. Any evidence for manipulation



BAC histogram I draw presented that there are no obvious changes around 0.08. I didn’t see manipulations in these data. I find same results with Hansen and there are no evidence for sorting on the running variable.

5. Recreate Table 2 Panel A

. rdrobust white bac1, c(0.08) h(0.03 0.13) kernel(uniform)

Sharp RD estimates using local polynomial regression.

Cutoff c = .08 | Left of c Right of c Number of obs = 214558

-------------------+---------------------- BW type = Manual

Number of obs | 23010 191548 Kernel = Uniform

Eff. Number of obs | 16399 169805 VCE method = NN

Order est. (p) | 1 1

Order bias (q) | 2 2

BW est. (h) | 0.030 0.130

BW bias (b) | 0.030 0.130

rho (h/b) | 1.000 1.000

Outcome: white. Running variable: bac1.

--------------------------------------------------------------------------------

Method | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------------+------------------------------------------------------------

Conventional | .0018 .00501 0.3592 0.719 -.00802 .011619

Robust | - - -0.1135 0.910 -.014432 .012852

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. est store model1

. rdrobust aged bac1, c(0.08) h(0.03 0.13) kernel(uniform)

Sharp RD estimates using local polynomial regression.

Cutoff c = .08 | Left of c Right of c Number of obs = 214558

-------------------+---------------------- BW type = Manual

Number of obs | 23010 191548 Kernel = Uniform

Eff. Number of obs | 16399 169805 VCE method = NN

Order est. (p) | 1 1

Order bias (q) | 2 2

BW est. (h) | 0.030 0.130

BW bias (b) | 0.030 0.130

rho (h/b) | 1.000 1.000

Outcome: aged. Running variable: bac1.

--------------------------------------------------------------------------------

Method | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------------+------------------------------------------------------------

Conventional | -.60951 .164 -3.7165 0.000 -.930952 -.288077

Robust | - - -0.5166 0.605 -.562484 .327809

--------------------------------------------------------------------------------

. est store model2

. rdrobust acc bac1, c(0.08) h(0.03 0.13) kernel(uniform)

Sharp RD estimates using local polynomial regression.

Cutoff c = .08 | Left of c Right of c Number of obs = 214558

-------------------+---------------------- BW type = Manual

Number of obs | 23010 191548 Kernel = Uniform

Eff. Number of obs | 16399 169805 VCE method = NN

Order est. (p) | 1 1

Order bias (q) | 2 2

BW est. (h) | 0.030 0.130

BW bias (b) | 0.030 0.130

rho (h/b) | 1.000 1.000

Outcome: acc. Running variable: bac1.

--------------------------------------------------------------------------------

Method | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------------+------------------------------------------------------------

Conventional | -.01301 .00408 -3.1921 0.001 -.020996 -.005021

Robust | - - -1.4959 0.135 -.019453 .002612

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. est store model3

. esttab model1 model2 model3

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(1) (2) (3)

white aged acc

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RD\_Estimate 0.00180 -0.610\*\*\* -0.0130\*\*

(0.36) (-3.72) (-3.19)

------------------------------------------------------------

N 214558 214558 214558

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t statistics in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

When we consider white male as dependent variables, p-value is 0.719 which means we can’t reject null hypothsis. The covariates aren balanced at the cutoff. But if we take age and accident into account, p-value is near 0 which presents these two covariates aren’t balanced at the cutoff. Hansen’s result is that age and acc are exogenous. And balance test on table 2 shows that the results of age and acc isn’t statistically significant. There are no cutoff about all variables which is different than my results.

6. Recreate Figure 2 panel A-D



In Hansen’s paper, demographic factors such as age, race, and gender are stable across the DUI punishment thresholds.

7. Replicate Table 3

. reg recidivism bac1 male white acc aged if bac1 > 0.03 & bac1 < 0.13

Source | SS df MS Number of obs = 89,967

-------------+---------------------------------- F(5, 89961) = 55.62

Model | 26.4808257 5 5.29616514 Prob > F = 0.0000

Residual | 8565.65702 89,961 .095215227 R-squared = 0.0031

-------------+---------------------------------- Adj R-squared = 0.0030

Total | 8592.13785 89,966 .095504278 Root MSE = .30857

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recidivism | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

bac1 | -.0754879 .047039 -1.60 0.109 -.1676838 .016708

male | .0331526 .0025364 13.07 0.000 .0281813 .0381239

white | .0161118 .0029094 5.54 0.000 .0104093 .0218142

acc | .0047692 .0034149 1.40 0.163 -.0019241 .0114624

aged | -.0008381 .0000891 -9.41 0.000 -.0010127 -.0006635

\_cons | .1025354 .0064622 15.87 0.000 .0898696 .1152012

------------------------------------------------------------------------------

. est store model4

. rdrobust recidivism bac1, c(0.08) h(0.03 0.13) kernel(uniform) covs(male white acc aged)

Covariate-adjusted sharp RD estimates using local polynomial regression.

Cutoff c = .08 | Left of c Right of c Number of obs = 214558

-------------------+---------------------- BW type = Manual

Number of obs | 23010 191548 Kernel = Uniform

Eff. Number of obs | 16399 169805 VCE method = NN

Order est. (p) | 1 1

Order bias (q) | 2 2

BW est. (h) | 0.030 0.130

BW bias (b) | 0.030 0.130

rho (h/b) | 1.000 1.000

Outcome: recidivism. Running variable: bac1.

--------------------------------------------------------------------------------

Method | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------------+------------------------------------------------------------

Conventional | -.02015 .00444 -4.5420 0.000 -.028852 -.011458

Robust | - - -2.9039 0.004 -.029956 -.005814

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Covariate-adjusted estimates. Additional covariates included: 4

. est store model5

. rdrobust recidivism bac1, c(0.08) h(0.03 0.13) kernel(uniform) p(2) covs(male white acc aged)

Covariate-adjusted sharp RD estimates using local polynomial regression.

Cutoff c = .08 | Left of c Right of c Number of obs = 214558

-------------------+---------------------- BW type = Manual

Number of obs | 23010 191548 Kernel = Uniform

Eff. Number of obs | 16399 169805 VCE method = NN

Order est. (p) | 2 2

Order bias (q) | 3 3

BW est. (h) | 0.030 0.130

BW bias (b) | 0.030 0.130

rho (h/b) | 1.000 1.000

Outcome: recidivism. Running variable: bac1.

--------------------------------------------------------------------------------

Method | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------------+------------------------------------------------------------

Conventional | -.01788 .00616 -2.9039 0.004 -.029956 -.005814

Robust | - - -2.6092 0.009 -.035159 -.004996

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Covariate-adjusted estimates. Additional covariates included: 4

. est store model6

. esttab model4 model5 model6

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(1) (2) (3)

recidivism recidivism recidivism

------------------------------------------------------------

bac1 -0.0755

(-1.60)

male 0.0332\*\*\*

(13.07)

white 0.0161\*\*\*

(5.54)

acc 0.00477

(1.40)

aged -0.000838\*\*\*

(-9.41)

RD\_Estimate -0.0202\*\*\* -0.0179\*\*

(-4.54) (-2.90)

\_cons 0.103\*\*\*

(15.87)

------------------------------------------------------------

N 89967 214558 214558

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t statistics in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

. reg recidivism bac1 male white acc aged if bac1 > 0.055 & bac1 < 0.105

Source | SS df MS Number of obs = 46,957

-------------+---------------------------------- F(5, 46951) = 34.24

Model | 16.0618538 5 3.21237077 Prob > F = 0.0000

Residual | 4405.02672 46,951 .093821787 R-squared = 0.0036

-------------+---------------------------------- Adj R-squared = 0.0035

Total | 4421.08857 46,956 .094153858 Root MSE = .3063

------------------------------------------------------------------------------

recidivism | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

bac1 | -.4758923 .1091708 -4.36 0.000 -.6898687 -.2619159

male | .0357643 .0034757 10.29 0.000 .0289519 .0425767

white | .0174948 .0039742 4.40 0.000 .0097052 .0252843

acc | .0043439 .0049114 0.88 0.376 -.0052825 .0139703

aged | -.0007526 .0001216 -6.19 0.000 -.0009909 -.0005142

\_cons | .1284739 .0112569 11.41 0.000 .1064103 .1505375

------------------------------------------------------------------------------

. est store model7

. rdrobust recidivism bac1, c(0.08) h(0.055 0.105) kernel(uniform) covs(male white acc aged)

Covariate-adjusted sharp RD estimates using local polynomial regression.

Cutoff c = .08 | Left of c Right of c Number of obs = 214558

-------------------+---------------------- BW type = Manual

Number of obs | 23010 191548 Kernel = Uniform

Eff. Number of obs | 19435 148004 VCE method = NN

Order est. (p) | 1 1

Order bias (q) | 2 2

BW est. (h) | 0.055 0.105

BW bias (b) | 0.055 0.105

rho (h/b) | 1.000 1.000

Outcome: recidivism. Running variable: bac1.

--------------------------------------------------------------------------------

Method | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------------+------------------------------------------------------------

Conventional | -.02046 .00388 -5.2784 0.000 -.028053 -.012861

Robust | - - -3.7153 0.000 -.030628 -.009473

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Covariate-adjusted estimates. Additional covariates included: 4

. est store model8

. rdrobust recidivism bac1, c(0.08) h(0.055 0.105) kernel(uniform) p(2) covs(male white acc aged)

Covariate-adjusted sharp RD estimates using local polynomial regression.

Cutoff c = .08 | Left of c Right of c Number of obs = 214558

-------------------+---------------------- BW type = Manual

Number of obs | 23010 191548 Kernel = Uniform

Eff. Number of obs | 19435 148004 VCE method = NN

Order est. (p) | 2 2

Order bias (q) | 3 3

BW est. (h) | 0.055 0.105

BW bias (b) | 0.055 0.105

rho (h/b) | 1.000 1.000

Outcome: recidivism. Running variable: bac1.

--------------------------------------------------------------------------------

Method | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------------+------------------------------------------------------------

Conventional | -.02005 .0054 -3.7153 0.000 -.030628 -.009473

Robust | - - -2.7437 0.006 -.032208 -.005367

--------------------------------------------------------------------------------

Covariate-adjusted estimates. Additional covariates included: 4

. est store model9

. esttab model7 model8 model9

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(1) (2) (3)

recidivism recidivism recidivism

------------------------------------------------------------

bac1 -0.476\*\*\*

(-4.36)

male 0.0358\*\*\*

(10.29)

white 0.0175\*\*\*

(4.40)

acc 0.00434

(0.88)

aged -0.000753\*\*\*

(-6.19)

RD\_Estimate -0.0205\*\*\* -0.0201\*\*\*

(-5.28) (-3.72)

\_cons 0.128\*\*\*

(11.41)

------------------------------------------------------------

N 46957 214558 214558

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t statistics in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

8. Recreate the top panel of Figure 3



1. The hypothesis I tested is that raw data hasn’t be manipulated. And I find that there are no evidence for manipulations. Then, we check for covariate balance which I discover different results with author about age and acc. But the white variable is smooth around 0.08 that author and I get the same result. What’s more, I tested regression discontinuity of having BAC above the threshold.