

College Enrollment and Earnings: Examining the Impact of Two Federal Drug Acts

Ray Huang^{*}

Brown University, Honors Thesis

March 11, 2023

Abstract

(aspirational abstract) I examine the impact of two federal drug acts on college enrollments and earnings among black males by using a variety of counterfactual groups. The Anti-Drug Act of 1986 transformed the formerly rehabilitation-focused justice system into a punitive one, imposed sentencing minimums and disparities. The Fair Sentencing Act of 2010 undid many of these policies. I construct estimates of the impact of these two acts on black males aged 18-24 using three unique counterfactual groups: 1) white males, 2) black females, and 3) black men aged 28-34. I also leverage the variation between high and low drug arrest states. I estimate that the Anti-Drug Act of 1986 resulted in a change in college enrollment rates between XX and XX and a change in earnings between XX and XX. For this subpopulation, this implies estimates of economic returns to education ranging from XX to XX.

^{*}Contact: ray_huang@brown.edu. I thank Peter Hull at Brown University for serving as my advisor and for providing me with fantastic feedback. I would also like to thank Alison Lodermeier and Francesco Ferlenga.

Introduction

Anti-Drug Act of 1986:

- Created minimum sentencing laws re possession of many drugs.
- Crack/powdered cocaine was particularly relevant (significantly harder rules on crack, which was cheaper and used by minorities much more, 100-1 ratio)
- The law led to an increase in the average time imprisoned for drug crimes from 22 months to 33 months (Shewan)

Fair Sentencing Act of 2010:

- Reduced the disparity between the amount of crack cocaine and powder cocaine needed to trigger certain federal criminal penalties from a 100:1 weight ratio to an 18:1 weight ratio
- Eliminated minimum sentencing for crack cocaine
- Congressional Budget Office has estimated that implementing the Fair Sentencing Act of 2010 will reduce the prison population by 1,550 person-years over the time period from 2011–2015, creating a monetary savings of \$42 million during that period

Existing literature:

- The Labor Market Consequences of Incarceration- Western, Kling, Weiman (2016)
- Juvenile Incarceration, Human Capital, and Future Crime: Evidence from Randomly Assigned Judges - Aizer, Doyle (2015)
- Evan Rose papers: The Impact of Incarceration on Employment and Earnings, etc

Data

- CPS October supplement
 - Dropped observations with missing family income data
- UCR from ICPSR (missing data problem, many counties failed to report arrest rates for the relevant crimes)
 - Arrest data normalized to state population data. State population data are based on U.S. Census Bureau midyear population estimates.
- ACS

Empirical/Econometric Methods, Hypotheses tested

Counterfactual groups

- Black males vs white males
 - Identifying assumption: absent of the Anti-Drug Abuse Act of 1986, black and white male educational outcomes would have trended similarly.

- Black males vs black females
- Black males aged 18-24 vs black males aged 28-34 at the time of the act
- High vs low drug use

Empirical tools:

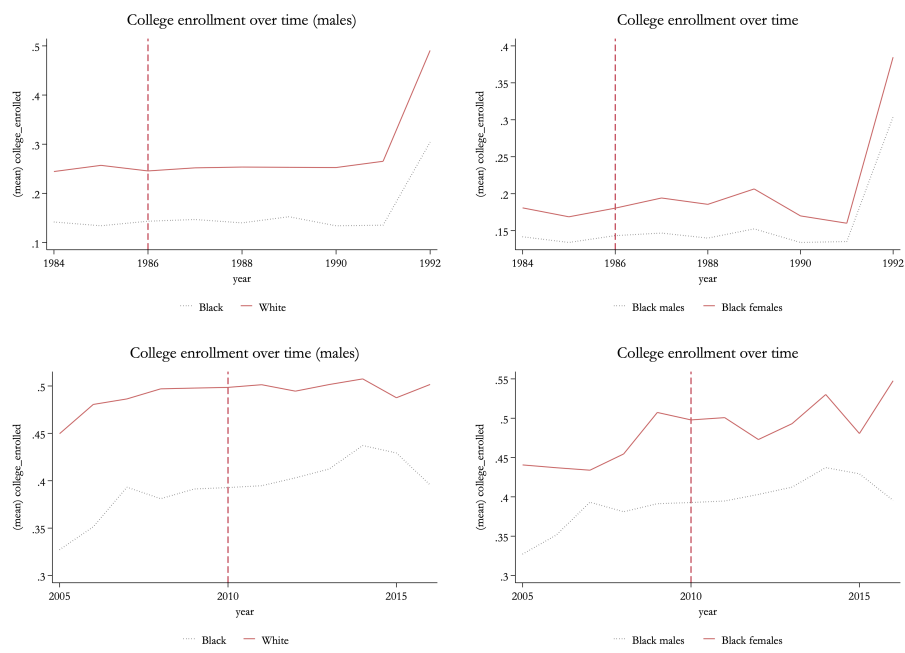
- DiD / DDD / Event study.
- – Using Roth's pretrend & honest did suggestions
- DDIV

References

- Britton, Tolani. 2022. “Does locked up mean locked out? The effects of the anti-drug abuse act of 1986 on black male students’ college enrollment.” *Journal of Economics, Race, and Policy* 5 (1):54–71.
- Duflo, Esther. 2001. “Schooling and labor market consequences of school construction in Indonesia: Evidence from an unusual policy experiment.” *American economic review* 91 (4):795–813.
- Freyaldenhoven, Simon, Christian Hansen, Jorge Pérez Pérez, and Jesse M Shapiro. 2021. “Visualization, Identification, and Estimation in the Linear Panel Event-Study Design.” Working Paper 29170, National Bureau of Economic Research. URL <http://www.nber.org/papers/w29170>.

a

Note: all figures are limited to ages 18-24 inclusive.



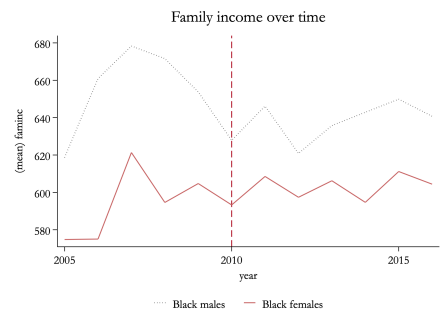
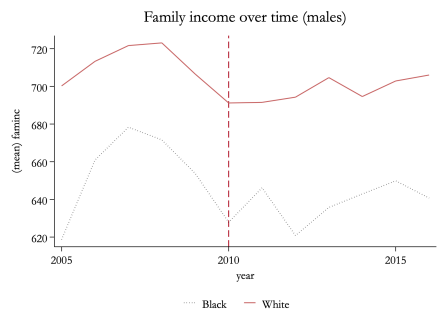
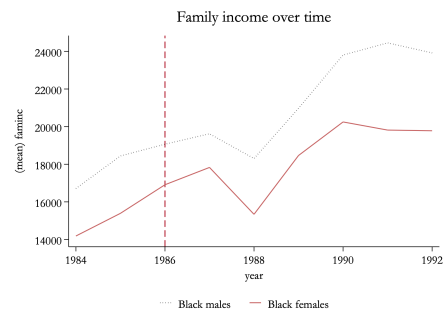
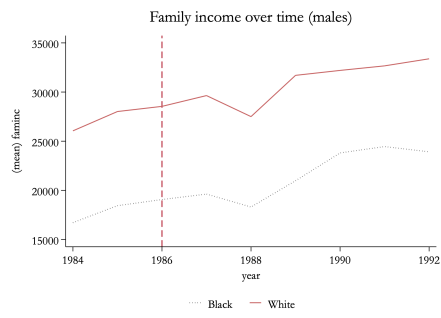


Figure 1: College enrollment overtime 1986

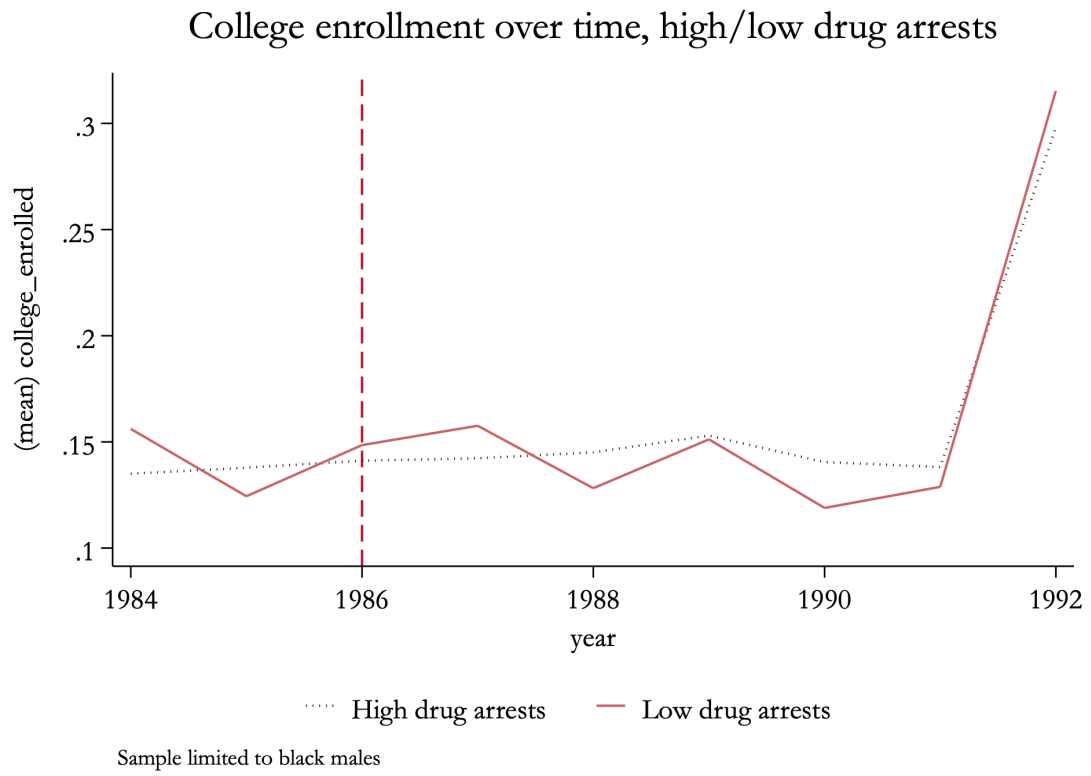


Figure 2: College enrollment overtime 2010

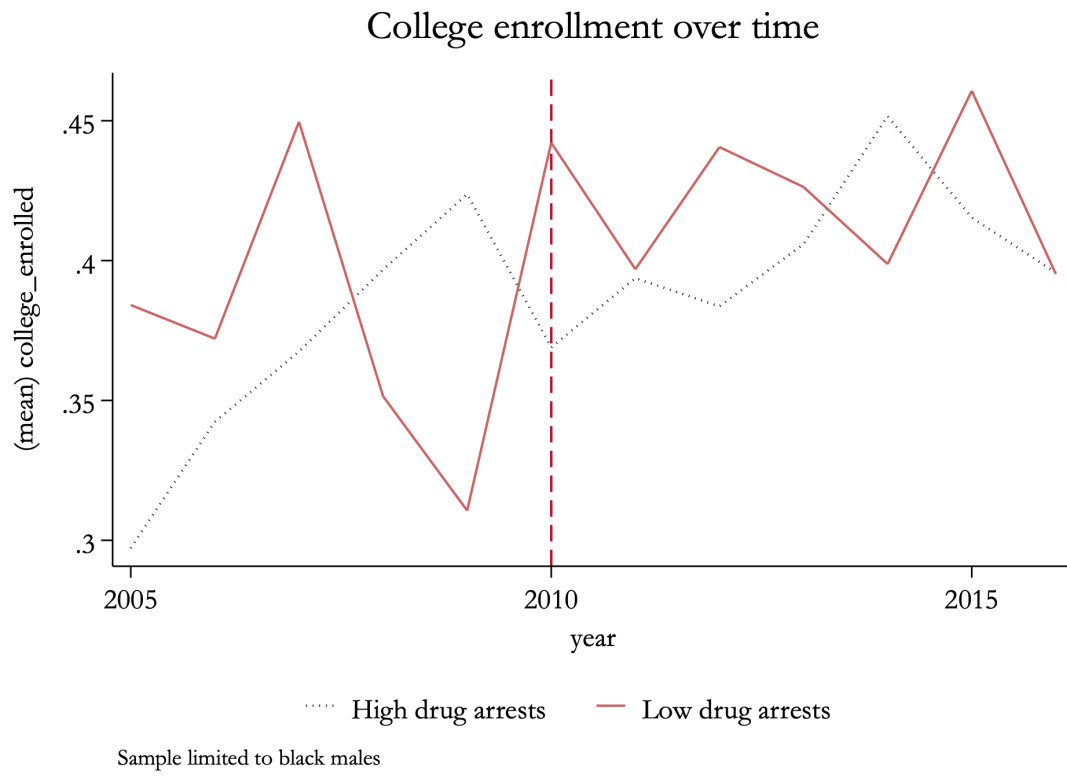
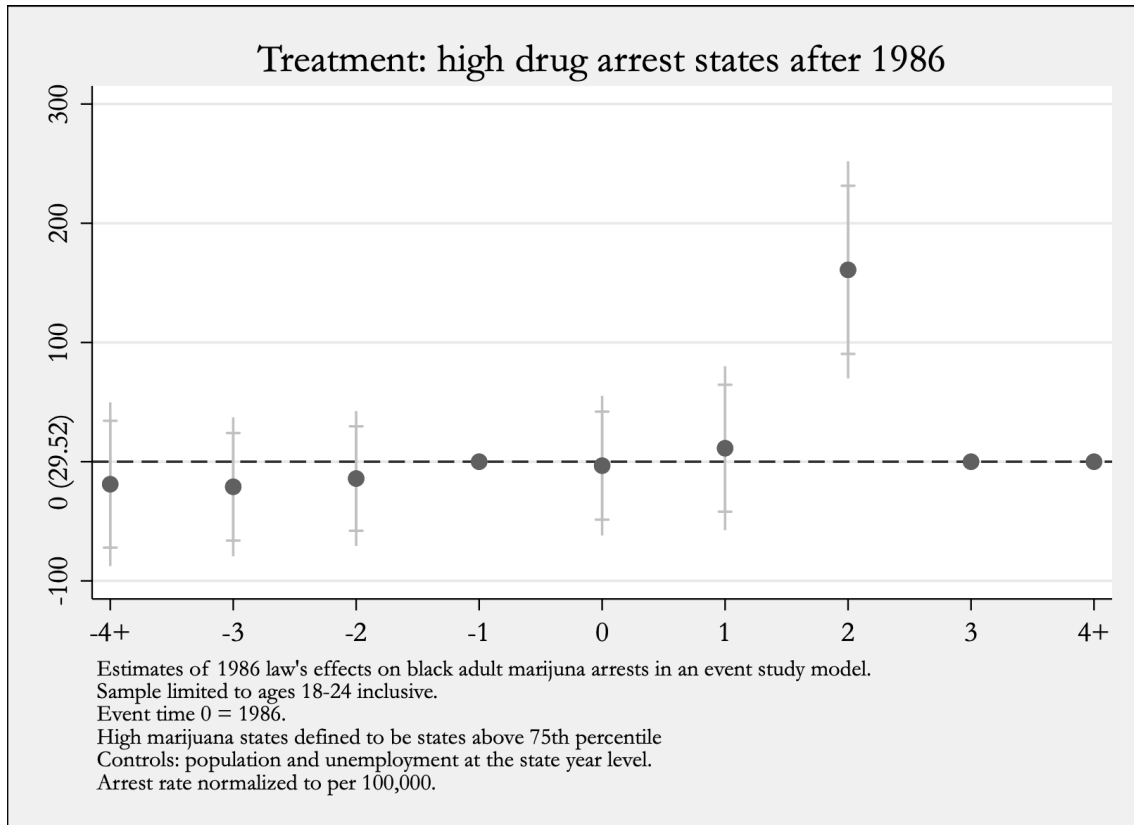


Figure 3: Event study 1986, AB arrest rate 18F



Power: 0.499. Bayes.Factor: 0.550. Likelihood.Ratio: 2.024

Figure 4: Pretrends for Event study 1986, AB arrest rate 18F

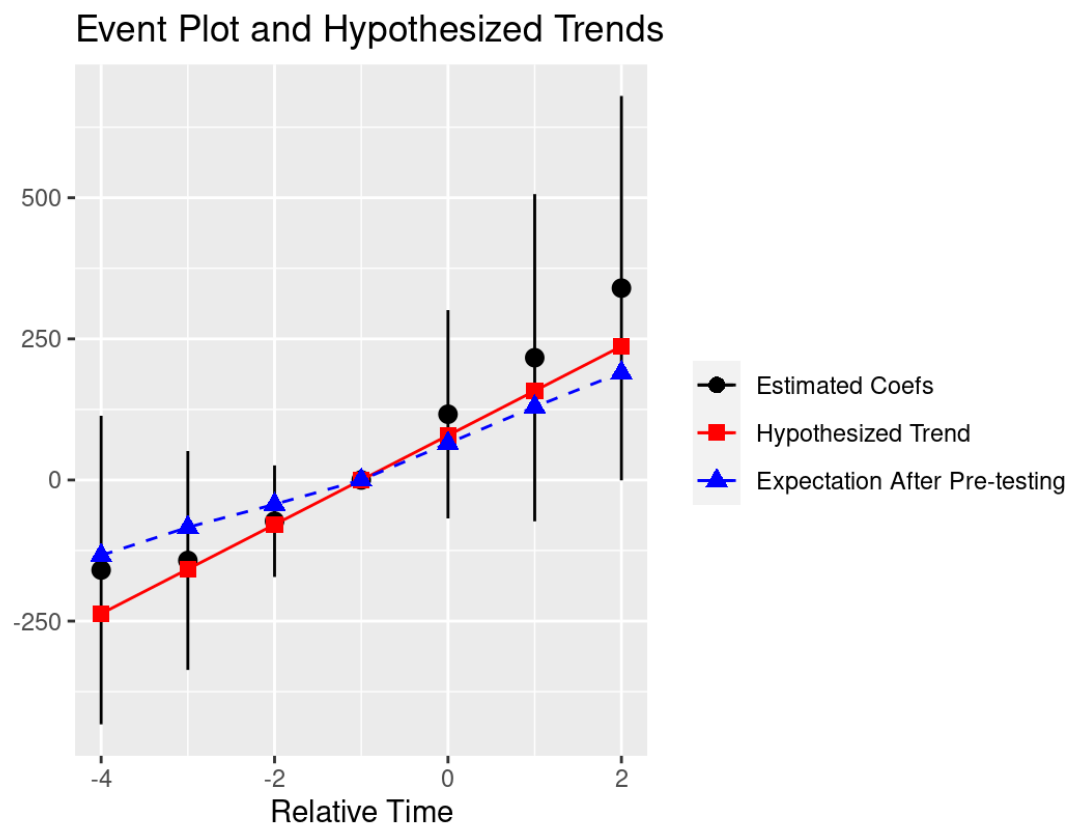


Figure 5: Event study 2010, AB arrest rate 18F

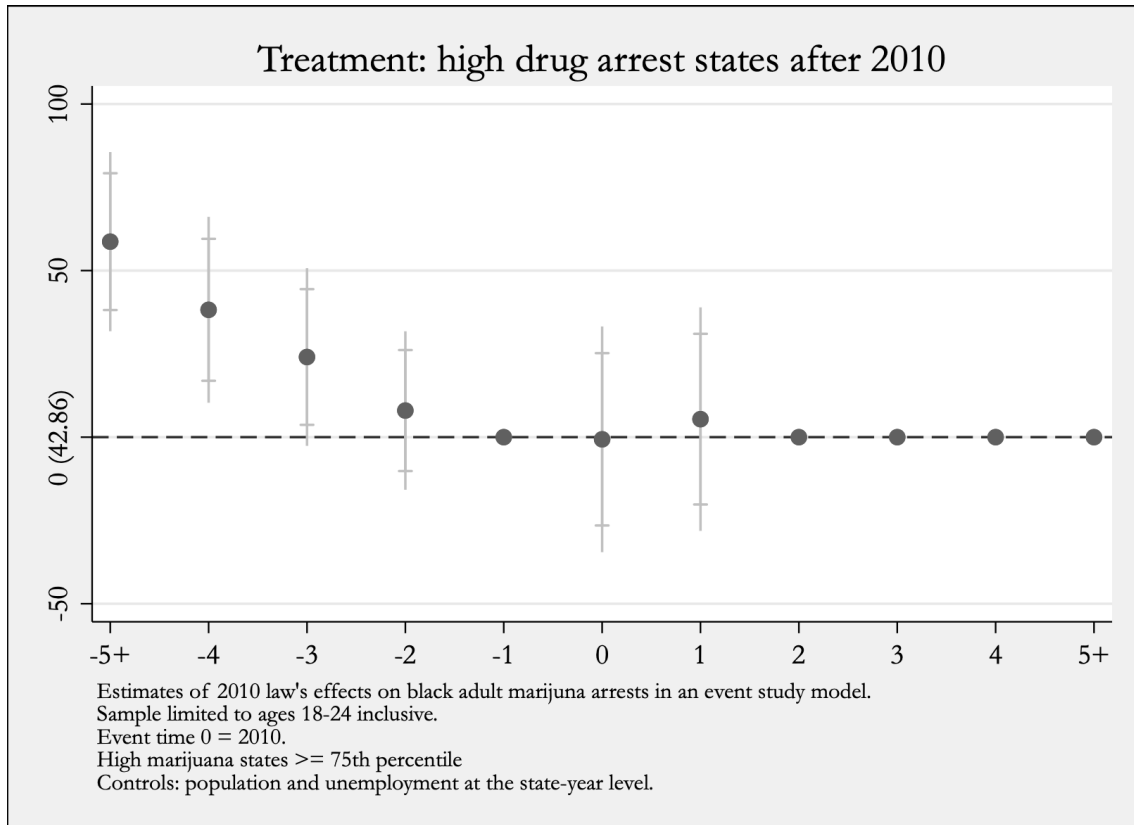


Table 1: Summary Statistics CPS

| | (1) | (2) | (3) | (4) |
|---------------------------------------|-----------------|-----------------|-----------------|-----------------|
| | 1984-86 | 1987-92 | 2000-09 | 2010-16 |
| Male | 0.49 (0.500) | 0.49 (0.500) | 0.50 (0.500) | 0.50 (0.500) |
| Black | 0.13 (0.341) | 0.14 (0.342) | 0.13 (0.341) | 0.15 (0.356) |
| HS Graduate | 0.82 (0.384) | 0.81 (0.389) | 0.83 (0.377) | 0.86 (0.344) |
| Enrolled in college | 0.24 (0.428) | 0.29 (0.453) | 0.50 (0.500) | 0.55 (0.498) |
| Enrolled in college (Black males) | 0.02 (0.146) | 0.03 (0.160) | 0.06 (0.229) | 0.07 (0.254) |
| Enrolled in college (Non-Black males) | 0.22 (0.414) | 0.26 (0.440) | 0.45 (0.497) | 0.48 (0.500) |
| Enrolled in 2-year coll. | 0.07 (0.258) | 0.09 (0.280) | 0.10 (0.303) | 0.12 (0.320) |
| Enrolled in 4-year coll. | 0.20 (0.400) | 0.23 (0.421) | 0.28 (0.448) | 0.29 (0.455) |
| Observations | 44408 | 73623 | 96326 | 72859 |

SD in (). Sample limited to ages 18-24 inclusive. Observations with missing education data were dropped. CPS October supplement weights included. Using code 18.

Table 2: UCR 1986 black adult arrests related to marijuana

| | (1) AB |
|----|-----------|
| 1 | 10.92 |
| 2 | 5.30 |
| 3 | 10.67 |
| 4 | 17.53 |
| 5 | 8.53 |
| 6 | 18.97 |
| 7 | 16.32 |
| 8 | 151.89 |
| 10 | 19.36 |
| 11 | 3.58 |
| 12 | 58.17 |
| 13 | 5.91 |
| 15 | 7.44 |
| 16 | 9.67 |
| 17 | 13.72 |
| 18 | 3.13 |
| 19 | 20.92 |
| 20 | 14.44 |
| 21 | 18.48 |
| 22 | 6.50 |
| 23 | 17.94 |

Table 3: Britton T2, DiD Impact of 1986 Act using white males

| | (1) | (2) | (3) |
|----------------------|------------------------|------------------------|------------------------|
| after1986 | .0369*** (.007408) | .01522** (.005981) | 0 (.) |
| Black | -.09715*** (.01181) | -.05948*** (.01025) | -.05466*** (.01083) |
| interaction | -.02207* (.01175) | -.02106* (.01143) | -.01981* (.0113) |
| Constant | .2928*** (.008707) | -3.183*** (.3267) | -3.175*** (.3309) |
| Observations | 56931 | 56931 | 56931 |
| Adjusted R^2 | 0.008 | 0.102 | 0.106 |
| State_yr_FE | N | N | Y |
| Demographic_controls | N | Y | Y |

Estimates weighted using CPS October supplement weights. Robust standard errors clustered at state level. Controls: age, age-squared, Latino ethnicity, yearly state average unemployment rates, and (binned) family income.

Table 4: Britton T2, control experiment: males 35-50

| | (1) | (2) | (3) |
|----------------------|-------------------------|------------------------|------------------------|
| after1986 | .005445*** (.001345) | .004669*** (.00146) | 0 (.) |
| Black | .006481 (.00452) | .006954 (.004607) | .008635* (.004556) |
| interaction | -.01158** (.004744) | -.01186** (.004872) | -.01127** (.004781) |
| Constant | .02076*** (.001323) | .1965*** (.0353) | .1988*** (.03587) |
| Observations | 116850 | 116850 | 116850 |
| Adjusted R^2 | 0.000 | 0.004 | 0.005 |
| State_yr_FE | N | N | Y |
| Demographic_controls | N | Y | Y |

Standard errors in parentheses

Estimates weighted using CPS October supplement weights.

Robust standard errors clustered at state level.

Controls: age, age-squared, Latino ethnicity, yearly state average unemployment rates, and (binned) family income.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Britton T3, DiD Impact of 1986 Act using black females

| | (1) | (2) | (3) |
|----------------------|-----------------------|------------------------|-----------------------|
| after1986 | .04076*** (.01195) | .02439** (.01121) | 0 (.) |
| male | -.01533 (.01063) | -.03048*** (.01096) | -.03176*** (.011) |
| sex_interaction | -.02593** (.01097) | -.0309** (.01198) | -.03036** (.01235) |
| Constant | .2109*** (.01161) | -2.023*** (.4754) | -1.863*** (.4963) |
| Observations | 13463 | 13463 | 13463 |
| Adjusted R^2 | 0.003 | 0.065 | 0.072 |
| State_yr_FE | N | N | Y |
| Demographic_controls | N | Y | Y |

Standard errors in parentheses

Estimates weighted using CPS October supplement weights.

Robust standard errors clustered at state level.

Controls: age, age-squared, Latino ethnicity,

yearly state average unemployment rates, and (binned) family income.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Britton T3, control experiment: black females ages 35-50

| | (1) | (2) | (3) |
|----------------------|------------------------|-----------------------|-----------------------|
| after1986 | .00501 (.003698) | .0006 (.003747) | 0 (.) |
| male | -.004283 (.005809) | -.007077 (.005981) | -.007701 (.005947) |
| sex_interaction | -.01114 (.006694) | -.01064 (.006906) | -.01 (.006873) |
| Constant | .03153*** (.004166) | .1313 (.1403) | .1421 (.1458) |
| Observations | 22510 | 22510 | 22509 |
| Adjusted R^2 | 0.001 | 0.008 | 0.012 |
| State_yr_FE | N | N | Y |
| Demographic_controls | N | Y | Y |

Standard errors in parentheses

Estimates weighted using CPS October supplement weights.

Robust standard errors clustered at state level.

Controls: age, age-squared, Latino ethnicity,

yearly state average unemployment rates, and (binned) family income.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: DiD: Fair Sentencing Act, blacks vs whites

| | (1) | (2) | (3) |
|----------------------|------------------------|------------------------|-----------------------|
| after2010 | .03193*** (.007166) | .02706*** (.006856) | 0 (.) |
| Black | -.1157*** (.01562) | -.1046*** (.01288) | -.1074*** (.01497) |
| interaction | .03255** (.01346) | .02337* (.01291) | .02309* (.01241) |
| Constant | .4821*** (.00888) | -9.869*** (.2646) | -9.756*** (.2759) |
| Observations | 84252 | 84252 | 84252 |
| Adjusted R^2 | 0.006 | 0.086 | 0.094 |
| State_yr_FE | N | N | Y |
| Demographic_controls | N | Y | Y |

Standard errors in parentheses

Weights used. Males only. SEs clustered at state level. Still missing some demographic controls.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: DiD: Fair Sentencing Act, blacks vs whites, control experiment

| | (1) | (2) | (3) |
|----------------------|------------------------|------------------------|------------------------|
| after2010 | .02531*** (.006454) | .03063*** (.006456) | 0 (.) |
| Black | -.08438*** (.01596) | -.04168*** (.01237) | -.03653*** (.01222) |
| interaction | .013 (.008524) | .00668 (.008129) | .007254 (.007676) |
| Constant | .5667*** (.008649) | .2126 (.1277) | .2356* (.1292) |
| Observations | 212279 | 212279 | 212279 |
| Adjusted R^2 | 0.003 | 0.087 | 0.096 |
| State_yr_FE | N | N | Y |
| Demographic_controls | N | Y | Y |

Standard errors in parentheses

Weights used. Males only. SEs clustered at state level. AGES 35-50

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: DiD Fair Sentencing Act, black males vs females

| | (1) | (2) | (3) |
|----------------------|------------------------|-----------------------|-----------------------|
| after2010 | .04733*** (.01311) | .03127** (.01319) | 0 (.) |
| male | -.09605*** (.01095) | -.1066*** (.01104) | -.1086*** (.01067) |
| sex_interaction | .01715 (.01197) | .01744 (.01394) | .01724 (.0136) |
| Constant | .4624*** (.01328) | -7.511*** (.5776) | -7.421*** (.5828) |
| Observations | 18587 | 18587 | 18587 |
| Adjusted R^2 | 0.011 | 0.102 | 0.107 |
| State_yr_FE | N | N | Y |
| Demographic_controls | N | Y | Y |

Standard errors in parentheses

Weights used. SEs clustered at state level. Still missing some demographic controls.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: DiD Fair Sentencing Act, black males vs females, control experiment

| | (1) | (2) | (3) |
|----------------------|-------------------------|------------------------|-------------------------|
| after2010 | .07047*** (.01208) | .06141*** (.01159) | 0 (.) |
| male | -.06115*** (.006214) | -.0847*** (.006658) | -.08569*** (.006556) |
| sex_interaction | -.03216*** (.01178) | -.02729** (.01222) | -.0272** (.01212) |
| Constant | .5434*** (.01219) | -.2652 (.2397) | -.163 (.2573) |
| Observations | 42026 | 42026 | 42026 |
| Adjusted R^2 | 0.009 | 0.096 | 0.104 |
| State_yr_FE | N | N | Y |
| Demographic_controls | N | Y | Y |

Standard errors in parentheses

Weights used. SEs clustered at state level. AGES 35-50

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: DiD 1986, high vs low drug arrest states

| | (1) | (2) | (3) |
|----------------------|---------------------------|----------------------------|----------------------------|
| after1986 | .06438*** (.01186) | .05172*** (.01218) | 0 (.) |
| norm_ab_100000 | .001427*** (.0002203) | .0008127*** (.0002208) | .0008335*** (.0002848) |
| ab_post_interact | -.001246*** (.0001884) | -.0006916*** (.0002222) | -.0007952*** (.0002913) |
| Constant | .2186*** (.008384) | -8.506*** (.5324) | -8.378*** (.5158) |
| Observations | 27930 | 27930 | 27930 |
| Adjusted R^2 | 0.004 | 0.144 | 0.166 |
| State_yr_FE | N | N | Y |
| Demographic_controls | N | Y | Y |

Standard errors in parentheses

Weights used. SEs clustered at state and year level. Dropped obs between 25 and 75th percentile

Controls: age, age squared hispanic, family income, state unemployment.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: DDD 1986

| | (1) | (2) | (3) |
|--------------------------|-----------------------|-----------------------|-----------------------|
| after1986 | .05422*** (.01058) | .0574*** (.01131) | 0 (.) |
| Black | -.04368** (.02076) | -.007107 (.01931) | -.008681 (.01624) |
| high_drug50 | .08945*** (.02166) | .05799*** (.01306) | 0 (.) |
| post_black_interact | -.05222 (.03341) | -.04618 (.02773) | -.04357* (.02448) |
| high_drug_black_interact | -.1441*** (.0401) | -.1178*** (.02711) | -.1236*** (.02677) |
| high_drug_post_interact | -.05093* (.02715) | -.04527** (.02073) | -.04036* (.02035) |
| triple_interact | .1067** (.05011) | .09719*** (.03462) | .09079** (.03531) |
| Constant | .228*** (.007117) | -8.468*** (.5211) | -8.291*** (.5081) |
| Observations | 27930 | 27930 | 27930 |
| Adjusted R^2 | 0.013 | 0.147 | 0.169 |
| State_yr_FE | N | N | Y |
| Demographic_controls | N | Y | Y |

Standard errors in parentheses

Weights used. SEs clustered at state level. Highdrug50

Controls: age, age squared hispanic, family income, state unemployment.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Imitation of Panel A in Table 3 of Duflo (2001)

| | College enrollment | | | Fam inc | | |
|------------------------------|-----------------------|-----------------|-----------------|-----------------------|-----------------------|----------------------|
| | Level of drug arrests | | | Level of drug arrests | | |
| | High | Low | Diff. | High | Low | Diff. |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Aged 18-24 in 1986 and black | -0.93 (0.10) | -0.93 (0.10) | 0.00 (0.03) | 62144.02 (4519.83) | 53493.93 (5181.76) | 8650.09 (1359.73) |
| Aged 28-34 in 1986 | -0.82 (0.10) | -0.89 (0.10) | 0.06 (0.01) | 70312.94 (4861.23) | 63625.58 (5214.90) | 6687.36 (715.54) |
| Difference | -0.11 (0.01) | -0.04 (0.02) | -0.06 (0.02) | -8168.92 (866.90) | -1.0e+04 (677.34) | 1962.73 (1036.55) |

Clustered (state-year) robust standard errors in parentheses

CPS education supplement weights used. Males only