College Enrollment and Earnings:

Examining the Impact of Two Federal Drug Acts

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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.

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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
- Elimated 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

Basic event study model

$$y_{it} = \alpha_i + \gamma_t + q'_{it}\phi + \sum_{m=-G}^{M} \beta_m z_{i,t-m} + C_{it} + \epsilon_{it} \tag{1}$$

where α_i and γ_t are individual and time fixed effects,

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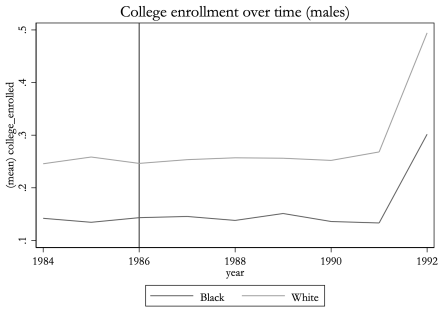
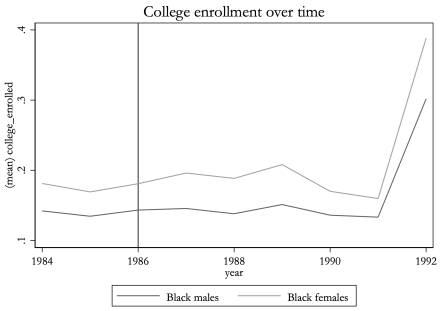
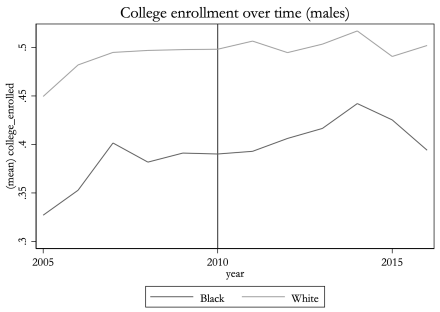
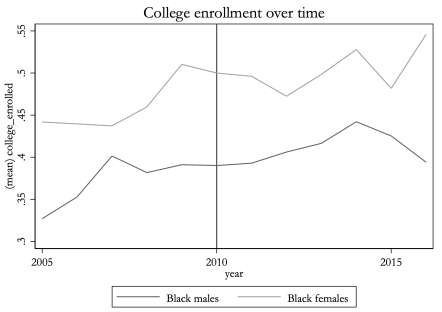
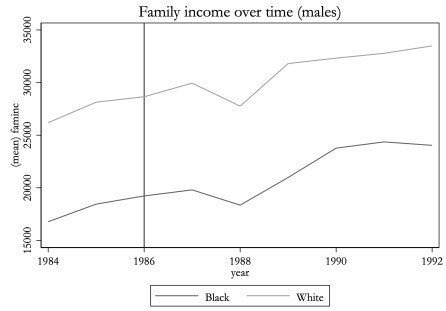
Note: all figures are limited to ages 18-24 inclusive.

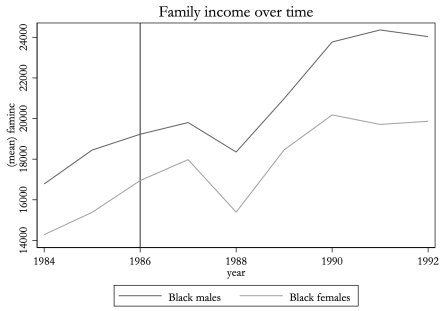


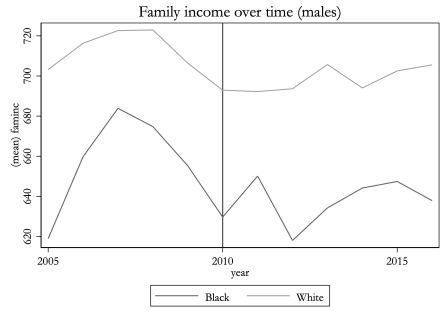







Family income over time (males)
(mean) faminc
15000
20000
25000
30000
35000
1984
1986
1988
1990
1992
year
Black
White


Family income over time
(mean) faminc
14000
16000
18000
20000
22000
24000
1984
1986
1988
1990
1992
year
Black males
Black females


Family income over time (males)
(mean) faminc
620
640
660
680
700
720
2005
2010
2015
year
Black
White

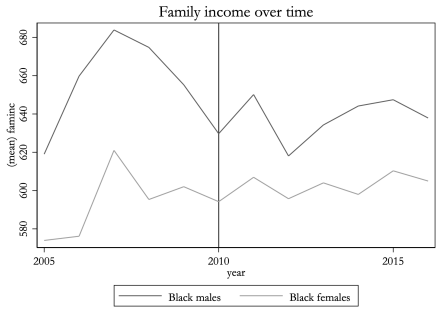
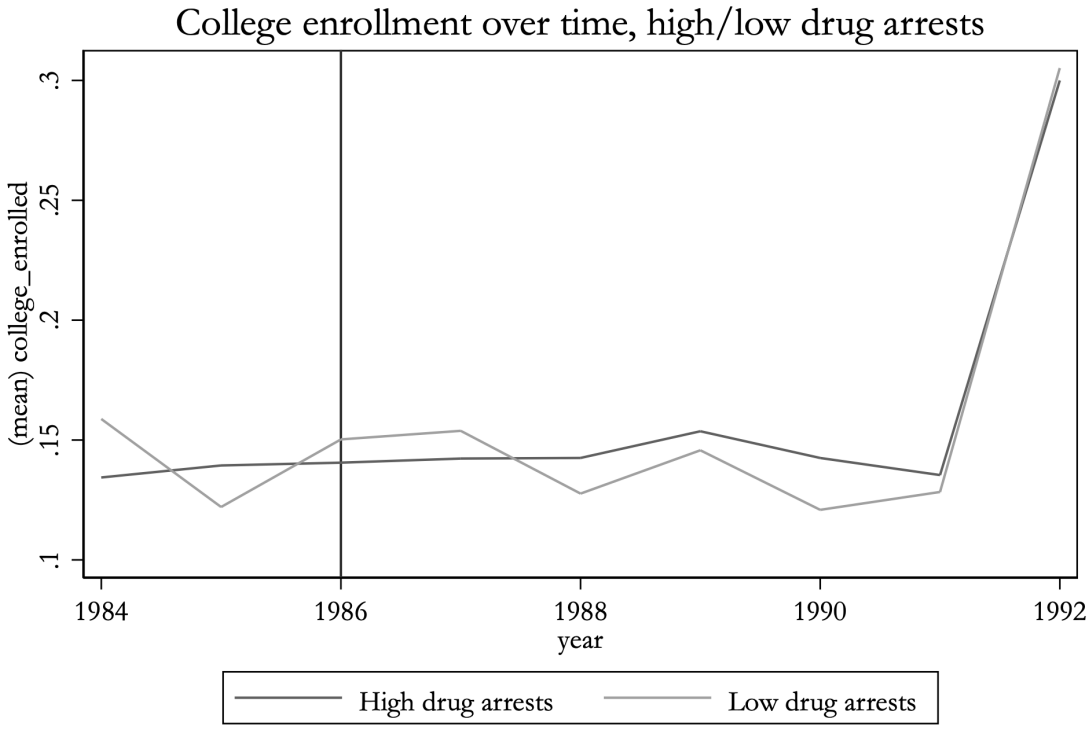
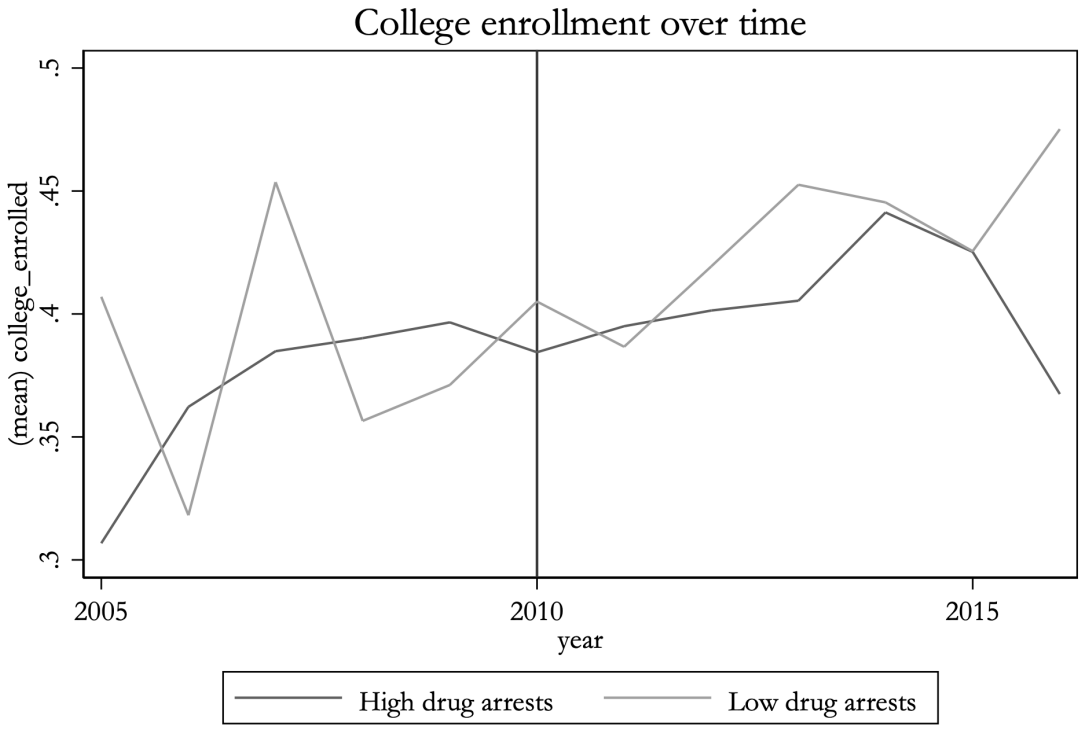

Family income over time
(mean) faminc
580
600
620
640
660
680
2005
2010
2015
year
Black males
Black females

Figure 1: College enrollment overtime 1986



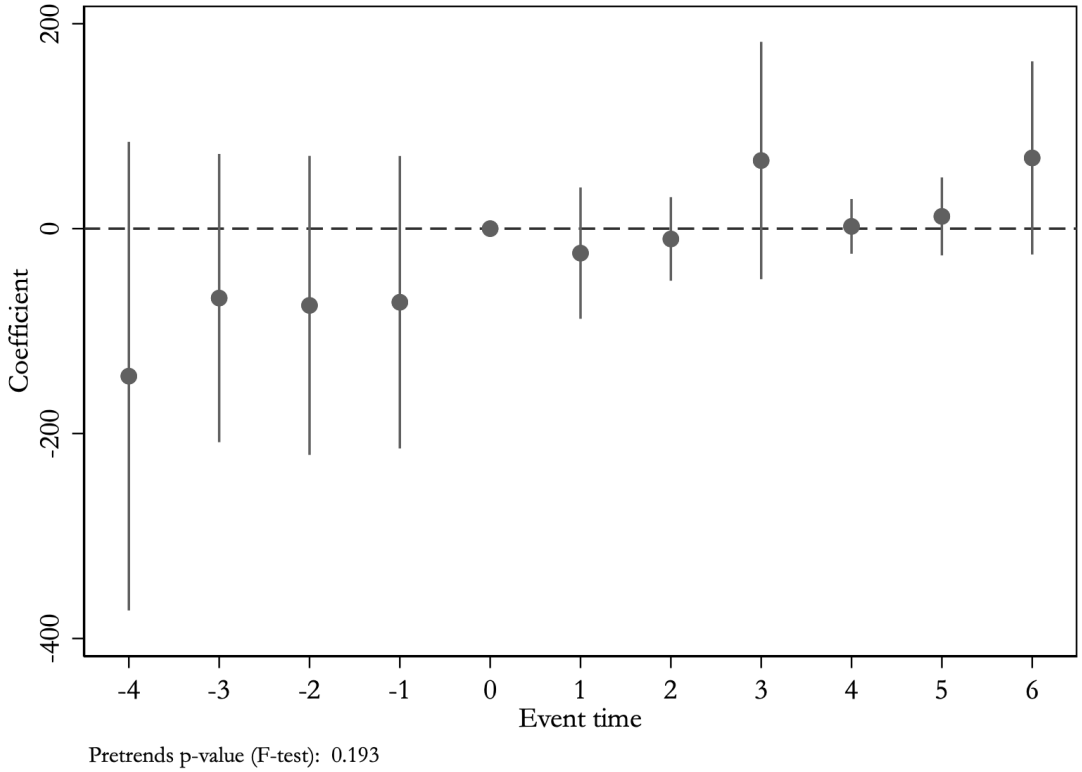
Sample limited to black males

Figure 2: College enrollment overtime 2010



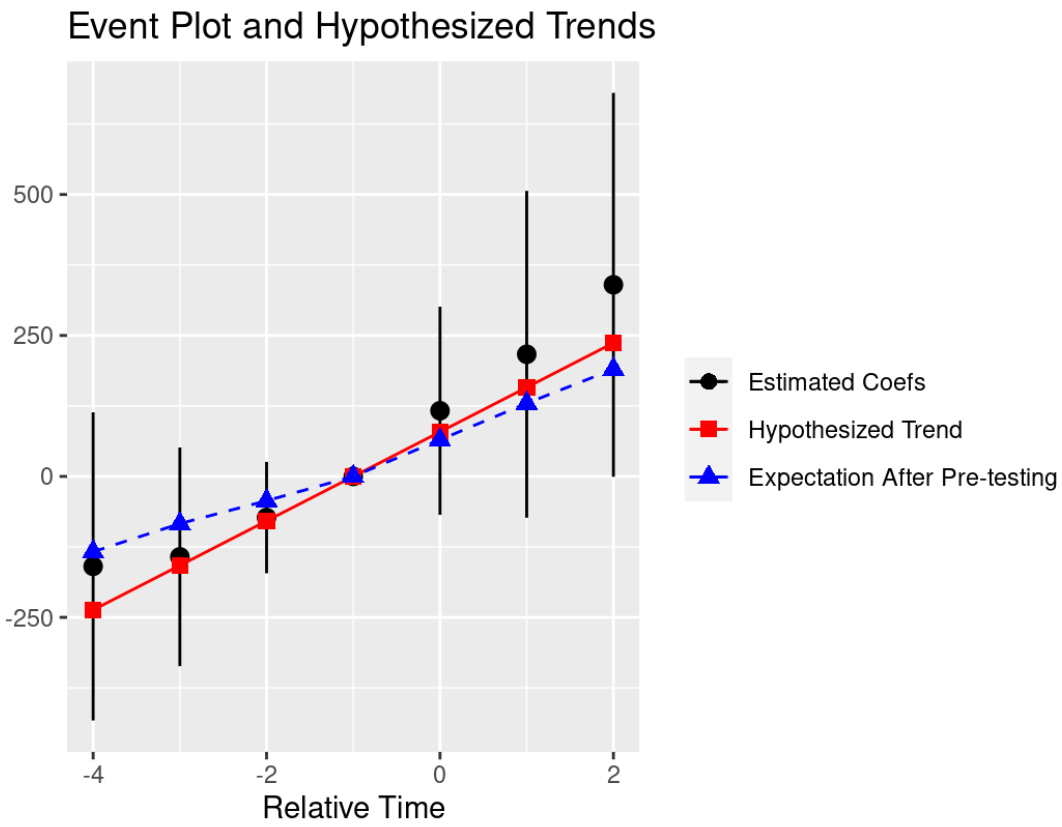
Sample limited to black males

Figure 3: Effect of Anti-Drug Abuse Act on Drug-related Arrest Rate of Black Men



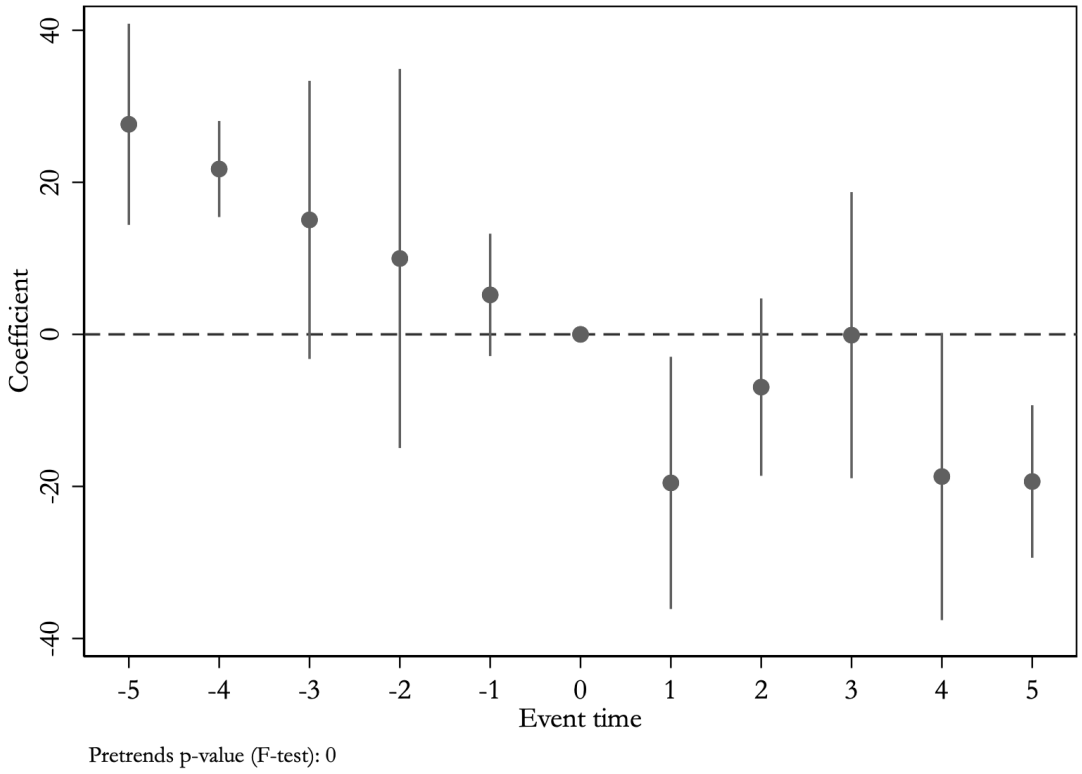
Note: This figure reports coefficients from the estimation of equation 1 evaluating the impact of the Anti-Drug Abuse Act of 1986 on arrest rates per 100,000 related to drug violations using CPS and UCR data from 1982-1992. Event time 0 := 1986. The coefficients represent the change in outcomes for high-drug arrest states relative to non-high-drug arrest states, where high-drug arrest states are defined to be those above the 75th percentile in 1984. The sample is defined as black males aged 18-24 in 1986 who are not currently incarcerated. Control variables include population and unemployment rates at the state-year level.

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



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

Figure 5: Effect of Fair Sentencing Act on Drug-related Arrest Rate of Black Men



Note: This figure reports coefficients from the estimation of equation 1 evaluating the impact of the Fair Sentencing act of 2010 on arrest rates per 100,000 related to drug violations using CPS and UCR data from 2005-2015. Event time 0 := 2010. The coefficients represent the change in outcomes for high-drug arrest states relative to non-high-drug arrest states, where high-drug arrest states are defined to be those above the 75th percentile in 2008. The sample is defined as black males aged 18-24 in 2010 who are not currently incarcerated. Control variables include population and unemployment rates at the state-year level.

Table 1: Summary Statistics CPS

	(1) 1984-86	(2) 1987-92	(3) 2000-09	(4) 2010-16
Male	0.49	0.49	0.50	0.50
	(0.500)	(0.500)	(0.500)	(0.500)
Black	0.13	0.14	0.13	0.15
	(0.341)	(0.342)	(0.341)	(0.356)
HS Graduate	0.82	0.81	0.83	0.86
	(0.384)	(0.389)	(0.377)	(0.344)
Enrolled in college	0.24	0.29	0.50	0.55
	(0.428)	(0.453)	(0.500)	(0.498)
Enrolled in college (Black males)	0.02	0.03	0.06	0.07
	(0.146)	(0.160)	(0.229)	(0.254)
Enrolled in college (Non-Black males)	0.22	0.26	0.45	0.48
	(0.414)	(0.440)	(0.497)	(0.500)
Enrolled in 2-year coll.	0.07	0.09	0.10	0.12
	(0.258)	(0.280)	(0.303)	(0.320)
Enrolled in 4-year coll.	0.20	0.23	0.28	0.29
	(0.400)	(0.421)	(0.448)	(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***	.01522**	0
	(.007408)	(.005981)	(.)
Black	-.09715***	-.05948***	-.05466***
	(.01181)	(.01025)	(.01083)
interaction	-.02207*	-.02106*	-.01981*
	(.01175)	(.01143)	(.0113)
Constant	.2928***	-3.183***	-3.175***
	(.008707)	(.3267)	(.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***	.004669***	0
	(.001345)	(.00146)	(.)
Black	.006481	.006954	.008635*
	(.00452)	(.004607)	(.004556)
interaction	-.01158**	-.01186**	-.01127**
	(.004744)	(.004872)	(.004781)
Constant	.02076***	.1965***	.1988***
	(.001323)	(.0353)	(.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***	.02439**	0
	(.01195)	(.01121)	(.)
male	-.01533	-.03048***	-.03176***
	(.01063)	(.01096)	(.011)
sex_interaction	-.02593**	-.0309**	-.03036**
	(.01097)	(.01198)	(.01235)
Constant	.2109***	-2.023***	-1.863***
	(.01161)	(.4754)	(.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	.0006	0
	(.003698)	(.003747)	(.)
male	-.004283	-.007077	-.007701
	(.005809)	(.005981)	(.005947)
sex_interaction	-.01114	-.01064	-.01
	(.006694)	(.006906)	(.006873)
Constant	.03153***	.1313	.1421
	(.004166)	(.1403)	(.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***	.02706***	0
	(.007166)	(.006856)	(.)
Black	-.1157***	-.1046***	-.1074***
	(.01562)	(.01288)	(.01497)
interaction	.03255**	.02337*	.02309*
	(.01346)	(.01291)	(.01241)
Constant	.4821***	-9.869***	-9.756***
	(.00888)	(.2646)	(.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***	.03063***	0
	(.006454)	(.006456)	(.)
Black	-.08438***	-.04168***	-.03653***
	(.01596)	(.01237)	(.01222)
interaction	.013	.00668	.007254
	(.008524)	(.008129)	(.007676)
Constant	.5667***	.2126	.2356*
	(.008649)	(.1277)	(.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***	.03127**	0
	(.01311)	(.01319)	(.)
male	-.09605***	-.1066***	-.1086***
	(.01095)	(.01104)	(.01067)
sex_interaction	.01715	.01744	.01724
	(.01197)	(.01394)	(.0136)
Constant	.4624***	-7.511***	-7.421***
	(.01328)	(.5776)	(.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***	.06141***	0
	(.01208)	(.01159)	(.)
male	-.06115***	-.0847***	-.08569***
	(.006214)	(.006658)	(.006556)
sex_interaction	-.03216***	-.02729**	-.0272**
	(.01178)	(.01222)	(.01212)
Constant	.5434***	-.2652	-.163
	(.01219)	(.2397)	(.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	.06232***	.04725***	0
	(.01152)	(.0118)	(.)
norm_ab_100000	.001401***	.000484	.0006727**
	(.0002268)	(.0002886)	(.0002949)
ab_post_interact	-.001222***	-.0003907	-.0006835**
	(.0001872)	(.0002587)	(.0002956)
Constant	.2206***	-8.473***	-8.382***
	(.008908)	(.6112)	(.5961)
Observations	26923	26923	26923
Adjusted R^2	0.004	0.145	0.167
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***	.0574***	0
	(.01058)	(.01131)	(.)
Black	-.04368**	-.007107	-.008681
	(.02076)	(.01931)	(.01624)
high_drug50	.08945***	.05799***	0
	(.02166)	(.01306)	(.)
post_black_interact	-.05222	-.04618	-.04357*
	(.03341)	(.02773)	(.02448)
high_drug_black_interact	-.1441***	-.1178***	-.1236***
	(.0401)	(.02711)	(.02677)
high_drug_post_interact	-.05093*	-.04527**	-.04036*
	(.02715)	(.02073)	(.02035)
triple_interact	.1067**	.09719***	.09079**
	(.05011)	(.03462)	(.03531)
Constant	.228***	-8.468***	-8.291***
	(.007117)	(.5211)	(.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	-0.93	0.00	62144.02	53493.93	8650.09
	(0.10)	(0.10)	(0.03)	(4519.83)	(5181.76)	(1359.73)
Aged 28-34 in 1986	-0.82	-0.89	0.06	70312.94	63625.58	6687.36
	(0.10)	(0.10)	(0.01)	(4861.23)	(5214.90)	(715.54)
Difference	-0.11	-0.04	-0.06	-8168.92	-1.0e+04	1962.73
	(0.01)	(0.02)	(0.02)	(866.90)	(677.34)	(1036.55)

Clustered (state-year) robust standard errors in parentheses

CPS education supplement weights used. Males only