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Supplementary Materials for

Barred from employment: More than half of unemployed men in their 30s had a criminal history of arrest

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The PDF file includes:

Other Supplementary Material for this manuscript includes the following:

Supplemental Materials and Methods

Description of NLSY Dataset

The NLSY97 contains detailed data on criminal justice involvement. Monthly data on arrests and incarcerations are available (specifically, the number of times an individual was arrested in a given month or if the individual was incarcerated at any point in that month) in addition to annual data on convictions or guilty pleas (the outcome conditional on being arrested and charged with a crime).

The NLSY97 also provides employment variables that are derived from questions on employment dates and gaps in employment. Available at the weekly level for each respondent, the employment history variable identifies employment status over time as one of the following: unemployed, employed, not in the labor force, or armed forces. We note that there are categories in the weekly data that capture cases where an employment status cannot be cleanly derived due to insufficient data on job gaps, failure to ask respondent about job search activity (in the case of unemployed vs. not in the labor force), or because the respondent is too young and is therefore classified as working a freelance job (only relevant through survey round 5). See NLSY's documentation for definitions of employment states (*47*). We also note that due to some inconsistencies in how active service members responded to employment questions, we account for involvement in the armed forces by using the military employment flag (which is an annual variable). If an individual has a military employment code for a given year, all weekly observations for that year are adjusted to reflect membership in the armed forces (see point 9 under "Important Information About Using Employer & Job Variables" (*48*)). Additionally, weekly data on hours worked and annual data on job search activity are available from the survey.

Description of Derived Variables

Using the raw NLSY data described above, we derive a set of annual criminal history and employment variables, described in detail in this section. These derived annual variables are utilized in the primary analyses presented throughout the main text.

Derived criminal history variables: We constructed three cumulative measures of criminal history, defined for each individual in each year: (i) cumulative arrest history, (ii) cumulative convictions/guilty plea history, and (iii) cumulative incarceration history. All three of these measures reflect adult criminal history, and therefore only consider criminal history since turning 18 years old. To construct these measures, we first generated binary indicators for each individual that indicate whether he/she has at least one arrest, at least one conviction/guilty plea, or at least one incarceration in a given year. Using these annual indicators, we then generate cumulative criminal history variables, where a value of one indicates at least one arrest, conviction/guilty plea, or incarceration in any year up to and including the current year. Table S2 describes the various definitions of annual criminal history that we use throughout our analysis.

Derived employment variables: We constructed three primary annual employment statuses, defined for each individual in each year: (i) not in the labor force (NILF), (ii) unemployed, and (iii) employed. An individual is defined as NILF if he/she experiences 0 weeks of unemployment and 0 weeks of employment in a given year OR experiences a non-employment spell of at least 39 consecutive weeks OR is enrolled in school at any point in a calendar year. An individual is

defined as unemployed if he/she experiences an unemployment spell of at least four consecutive weeks and does not meet the criteria for NILF. Finally, an individual is defined as employed if he/she is classified as neither unemployed nor NILF and has a positive number of employed weeks.

In addition to these three primary employment categorizations, we also define two additional subcategorizations: (i) discouraged and (ii) part-time for economic reason. Discouraged workers are a subset of the NILF population. If a respondent is not in the labor force, the NLSY97 asks why he/she is not searching for work. Individuals that responded to this question with "Believed no work available" or "Could not find work" are labeled discouraged workers. Here, again, we are combining weekly employment data with an annual variable. The BLS's full definition of discouraged workers includes additional reasons that are not asked of individuals in the NLSY97. As such, our definition may not ultimately capture the full universe of discouraged, though the difference is likely trivial. Discouraged workers also include individuals experiencing a non-employment (either unemployed or NILF) spell of at least 39 weeks, but has actively searched/worked in the past year. A worker is labeled part-time for economic reasons if he/she has worked part-time for more than half of the weeks worked in a year and has actively searched for a new job while employed. Because we do not know if the individual is looking for full-time work or a different part-time job, we implicitly assume that the respondent is looking for full-time work. Furthermore, we note that in this case we are combining weekly employment data with annual job search data. Ideally, we would like to know the respondent's job search activity at the weekly level, but this level of detail is not available in the NLSY97. We therefore assume that the annual job search data applies to all weeks in the same calendar year. A week of part-time work is defined as working fewer than 35 hours (the BLS's cutoff for part-time employment). Because the weekly data on hours worked does not always allow us to cleanly identify full- vs part-time employment, we assume all weeks that an individual is employed but lack sufficient data on hours worked are full-time weeks worked, conditional on an individual working at least one week full-time in the year. Workers who are part-time for economic reasons comprise a subset of the employed population.

Table S3 details each of the derived employment variables described above. Table S3 also describes the distinction between the NLSY-derived variables used in the present study and the corresponding Bureau of Labor Statistics (BLS) variables, which are the standard. The largest difference between the NLSY-derived employment variables and their BLS counterparts are that the NLSY-derived variables are annual-level employment measures, whereas BLS measures are defined with respect to a reference week.

Table S4 presents the most important derived measures that we report throughout this work along with the short-hand labels that we refer to. Each of these variables are binary indicators defined for each year and each individual.

Estimation of $P(Criminal\ History \mid Unemployment,\ Age)$

Throughout this report, we present age-based estimates of the probability of criminal history (R) given unemployment (U) at a particular age (A). This calculation is complicated by the fact that different individuals turn age a in different survey waves, since the initial cohort contains individuals from a range of ages. We perform the following procedure to compute $P(R = 1|U =$

$1, A = a$):

1. Denote C_a to be the collection of individuals who are surveyed at age a in any survey wave.
2. Assign weight w_i^a to each observation in C_a corresponding to the weight assigned to individual i in the survey wave he/she was observed at age a.
3. Point estimates of $P(R = 1|U = 1, A = a)$ are computed as follows:

$$P(R = 1|U = 1, A = a) = \frac{\sum_{i \in C_a} w_i^a \, I(R_i = 1, U_i = 1, A_i = a)}{\sum_{i \in C_a} w_i^a \, I(U_i = 1, A_i = a)}$$

Here, $I(R_i = 1, U_i = 1, A_i = a)$ is an indicator function that equals 1 if individual i has a record and is unemployed at age a (the function $I(U_i = 1, A_i = a)$ is defined analogously). This proportion reflects the population of individuals who are born between 1980-1984 and turn age a during the observed time frame 1997-2018. In accordance with NLSY recommendations (49), standard errors are computed using the svy:proportion command from Stata, which appropriately corrects for the survey weights and design effects.

Missing data

There are varying degrees of missingness in the raw NLSY data, which results in missingness in our derived measures of annual employment and criminal history. We distinguish between two types of missing data: (i) unit missingness and (ii) item missingness. Unit missingness refers to data that are missing because an individual within the NLSY cohort failed to respond to the survey in a particular wave (e.g., due to survey attrition). Item missingness refers to data that are missing because individual items of the survey were not completed (whether intentionally or accidentally) by a survey respondent. Both types of missingness can result in bias if unaccounted for. In this section, we summarize the observed data missingness and describe the various measures we took to avoid introducing bias into our results due to data missingness.

Figure S1 summarizes the degree of unit missingness experienced in the NLSY survey, broken down by race and gender demographics. We see that there is a substantial degree of unit missingness, especially in the later survey waves due to attrition (the figure combines both cross-sectional and oversample cohorts). Overall, approximately 25 percent of the initial cohort failed to respond to the survey in the final included survey wave in 2017. While the level of unit missingness is substantial, the NLSY survey provides survey weights that attempt to correct for this form of missingness. The NLSY weights are updated in each survey wave so that the observed weighted cohort recapitulates known national demographics. See the NLSY97 documentation for detailed information of survey weights (*49*). All results presented in this report utilize the NLSY "Cumulating Cases" weights. As with all weighting-based approaches to nonresponse, bias may not be entirely eliminated if factors that are predictive of both response and outcomes are neglected. The NLSY97 weights account for age, race, and sex.

While unit nonresponse is approximately accounted for by incorporating NLSY-provided weights, item missingness is not directly addressed by weighting. When item missingness is associated with outcomes of interest, bias may be introduced when individuals with missing data are dropped. This may occur, for instance, if questions about criminal history are skipped more

often by individuals with criminal history records. Fortunately, the NLSY dataset has modest levels of item missingness, as summarized by Tables S5 and S6. For employment status in Table S6, see (*50*). In these early years, respondents are still coded as working "freelance" jobs and may not be actively searching for work if they are still in school. In Table S7 we detail the unweighted sample sizes of the unemployed male populations stratified by race. These sample sizes are relevant to the age-based estimates of $P(R \mid U)$ displayed in our main Figure 3.

Multiple imputation robustness test

The results reported in the main text of this report account for unit missingness by incorporating NLSY97 survey weights, and simply drop individuals with item missingness to define our primary criminal history and employment measures. To test the sensitivity of our results to these decisions surrounding the treatment of missing data, we also performed separate multiple imputation analysis using the MICE method and re-derived our primary findings using these multiply imputed data (*51*). Figure S2 recapitulates main-text Figure 3, where all missing data, due to either unit-missingness or item-missingness, is imputed using a fully conditional model. We use the mice command from R (*51*), deriving five independent full imputations of the data. Included in this model are sex, birth year, race, urbanicity, an indicator for arrests before 1997, and unemployment (U3) and criminal history variables (R1 and R2) in all years. The fully-conditional model imputes each missing observation conditional on all other variables. For example, for the imputation of U3 in year 2000, unemployment status observed in all other years is included in the imputation. Because all missing data is imputed (including data due to unit-missingness), weighted proportions utilize the initial sampling weight from the 1997 cohort for each individual in all years.

Significance testing for Tables 1 and 2

To test for significant associations in the variables presented in Tables 1 and 2, we performed both bivariate chi-square tests and multivariate logistic regressions. Both sets of analyses were performed on the pooled population of individuals aged 30-38 in their last observed survey. For the bivariate analyses, we performed a survey weighted chi-square test using the "svy: tabulate" command in Stata, adjusting for clustering variables vstrat_1997 and vpsu_1997 and utilize the cumulating cases weight corresponding to each individual's last observed survey. These bivariate analyses tests the independence between criminal history and race for each of the subpopulations defined by the rows of Tables 1 and 2. These results are summarized in Tables S8 and S9. For logistic regressions, we regress each of the three criminality measures (R_1, R_2, R_3) on race, highest degree of education, urbanicity, household net worth, wage, and marital status. For R_1, for instance, the logistic regression model is:

$$\text{logit}(R_1) = \text{Race} + \text{Education} + \text{Urbanicity} + \text{Household\_Net\_Worth} + \text{Wage} + \text{Marital\_Status}$$

We fit the above model separately for the unemployed and employed populations. We find statistically significant associations with highest levels of education across all criminality measures. For R_1 and R_2 we find significant associations with marital status. Regressions are run using the svyglm() command in R. We adjust for clustering variables vstrat_1997 and vpsu_1997 and utilize the cumulating cases weight corresponding to each individual's last observed survey. A summary of the model fits is presented in Table S10 and S11.

Analysis of Criminal History and Unemployment for Females

In the main text we focus our attention on males due to the large differences in arrest records for men relative to women. Figures S4-S6 parallel main Figures 1-3, for the female population represented in the NLSY97 dataset.

In Figure S4 we examine labor underutilization for women by race. Women, similarly to men, begin their working lives with relatively high rates of unemployment and underemployment that abates as workers age and find jobs that better match their skills and interests. As with Black and white men, Black and white women have similar trajectories as they age, but different levels; Black women generally experience more labor underutilization, and depending on their age, unemployment.

In Figure S5 we look at the criminal history records for women by race. Here we find large contrasts with men. Whereas more than 60 percent of Black men had been arrested by age 35, the corresponding rate for Black women is 20 percent. Conviction peaks at approximately 10 percent and incarceration is very low with approximately 5 percent of women ever being incarcerated. Also important is the finding that Black and white female criminal histories are statistically indistinguishable regardless of age or severity.

Figure S6 presents the proportion of unemployed women who have a criminal history record. We note, first, that the rates are much lower than men's rates owing largely to the smaller proportion of women arrested. Second, we note that Black women's rates are generally below those of white women. Third, due to the smaller sample size the 95 percent confidence bands are quite large so that at age 33 for Black women the estimate lies between 2 and 16 percent of unemployed Black women have an history of arrest. The corresponding estimate at age 33 for white women is 22 to 52 percent. Finally, insufficient sample size prevented us from estimating the proportion of unemployed Black women who have been incarcerated for some age groups.

Year-based estimates of primary findings for males

In addition to the primary findings, which detail age-based estimates of criminal history and unemployment, we also present findings by calendar year. Figures S7-S9 parallel main Figures 1-3. Rather than pooling together individuals of the same age across multiple survey years, these estimates pool individuals from the same survey year across multiple ages. Survey weighting simply uses NLSY-provided "Cumulating Cases" weights, re-computed in each survey wave.

Figure S1. Survey retention of each subpopulation relative to initial sample from 1997. Top panel shows retention from the full NLSY population, middle panel shows retention among males (broken down by race), and bottom panel shows retention among females (broken down by race).

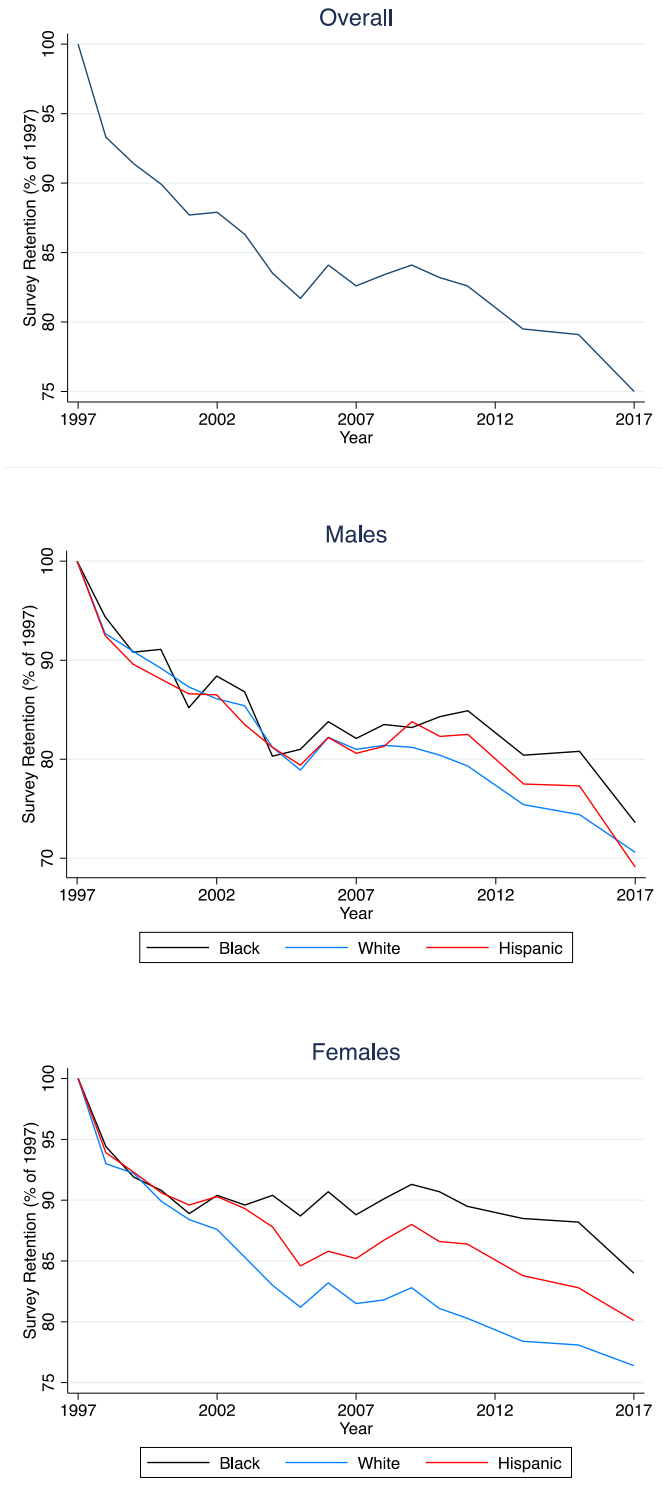

Figure S2. Multiple imputation robustness check for results displayed in main-text Figure 3. Each dot represents results from a fully imputed dataset, and the solid lines represent the means of the multiply imputed datasets. Plots display proportion of unemployed (U3) males with a criminal history record. Left panel shows arrests (R1), middle panel shows convictions/guilty pleas (R2), and right panel shows incarcerations (R3).

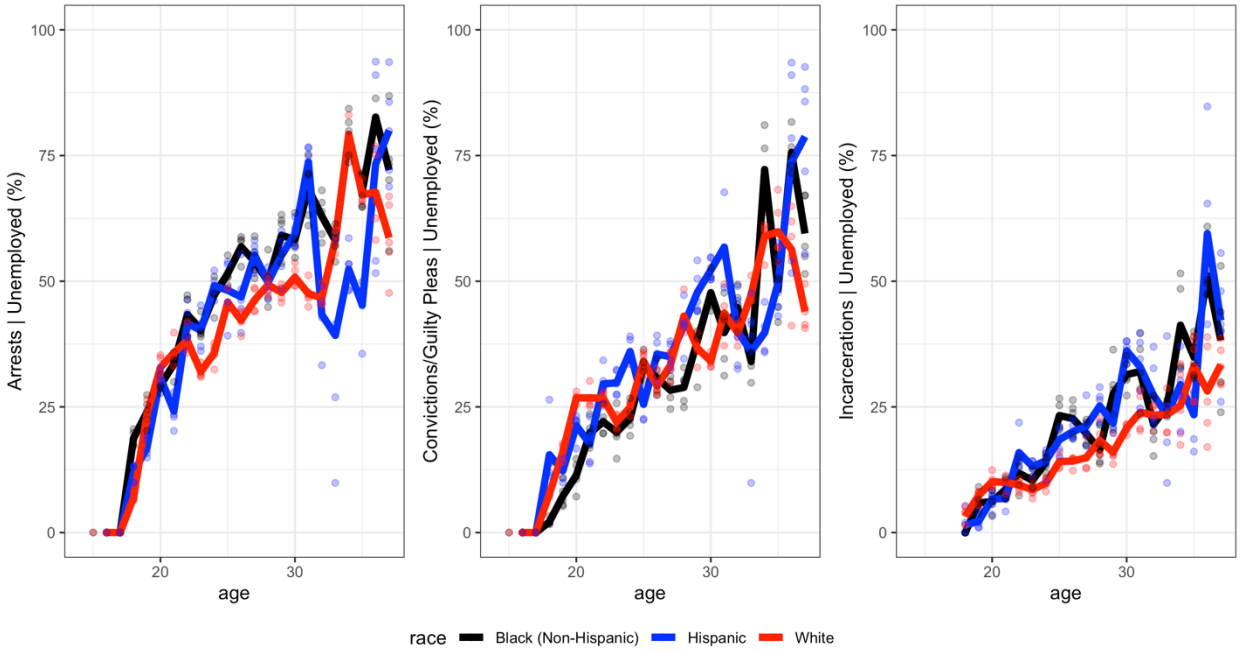

Figure S3. Companion figure to Figure 3 in the main text including 95 percent confidence intervals (shaded areas). The proportion of males having a criminal history record among the unemployed by age, race, and ethnicity.

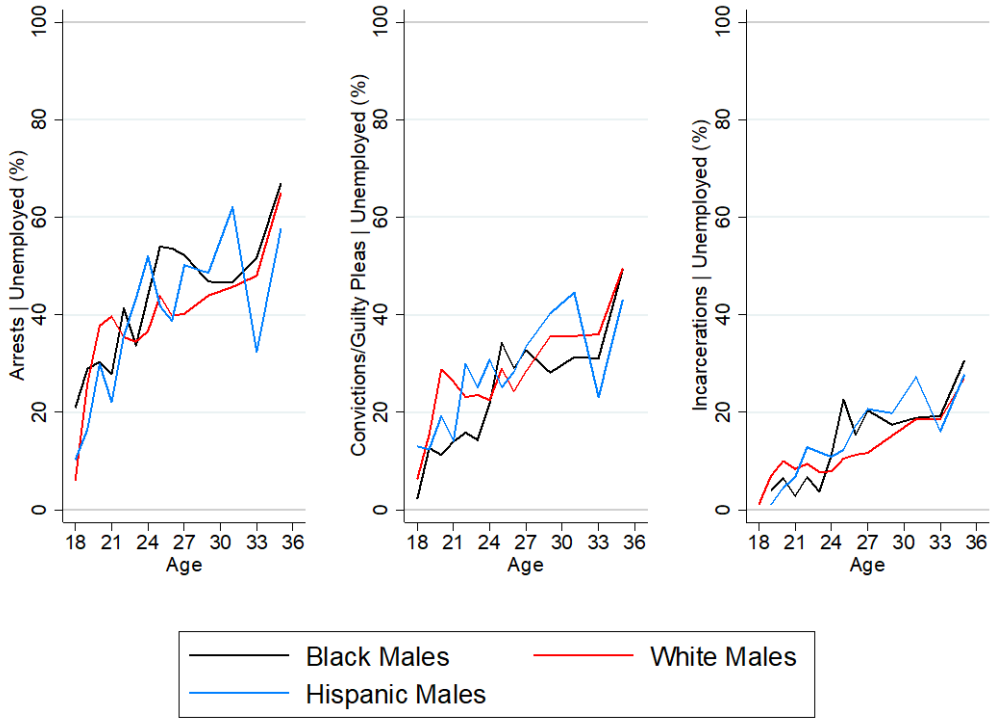

Figure S4. Proportion of unemployed among females. Note that unemployment is defined by having a spell of unemployment lasting four or more consecutive weeks and fewer than 39 weeks in the year. Students enrolled in any part of the year are not included in the sample. Sample is all unemployed with and without criminal history record. Shaded areas represent 95 percent confidence intervals.

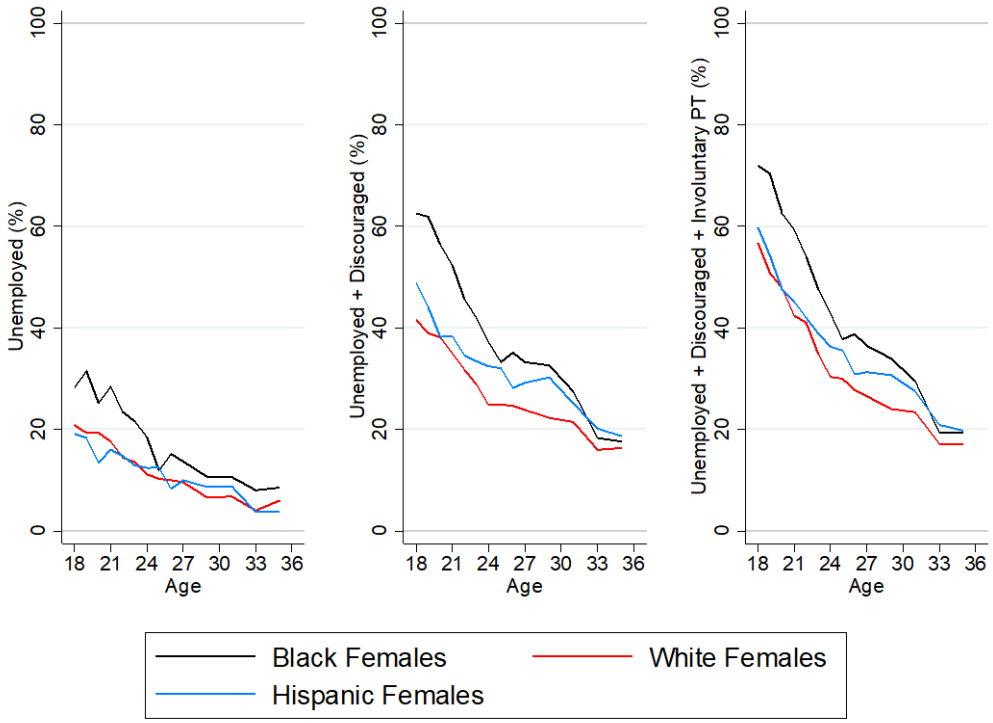

Figure S5. Proportion of females with criminal history record. Shaded areas represent 95 percent confidence intervals.

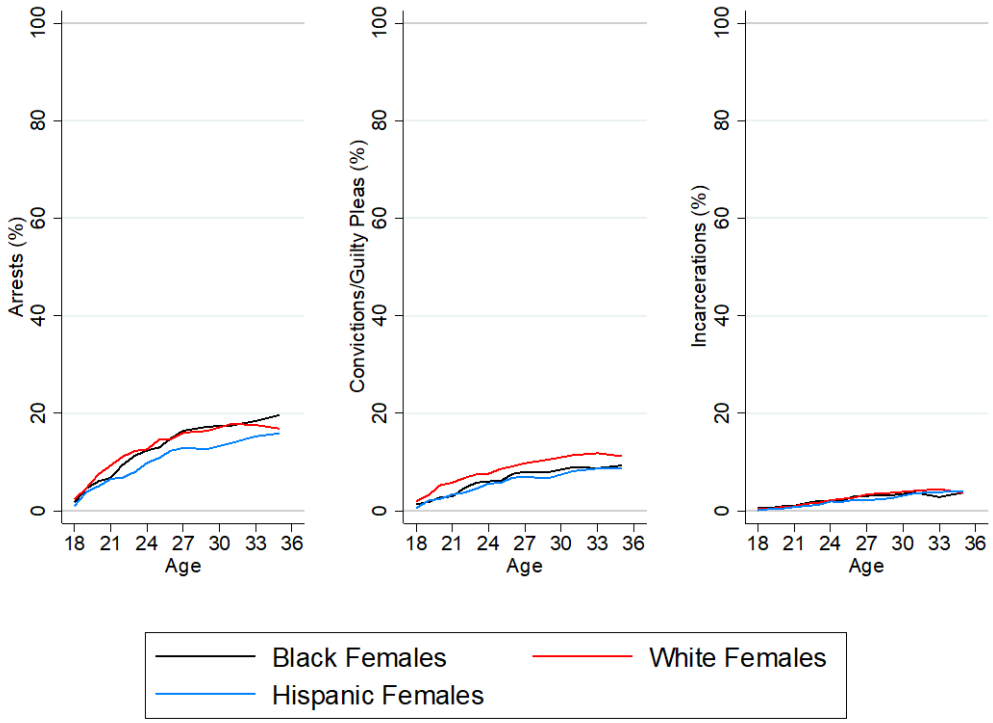

Figure S6. Proportion of unemployed females with a criminal history record. Unemployed is defined as having a spell of unemployment lasting four or more consecutive weeks in the year but less than 39 weeks. Students enrolled in any part of the year are not included in the sample. Shaded areas represent 95 percent confidence intervals.

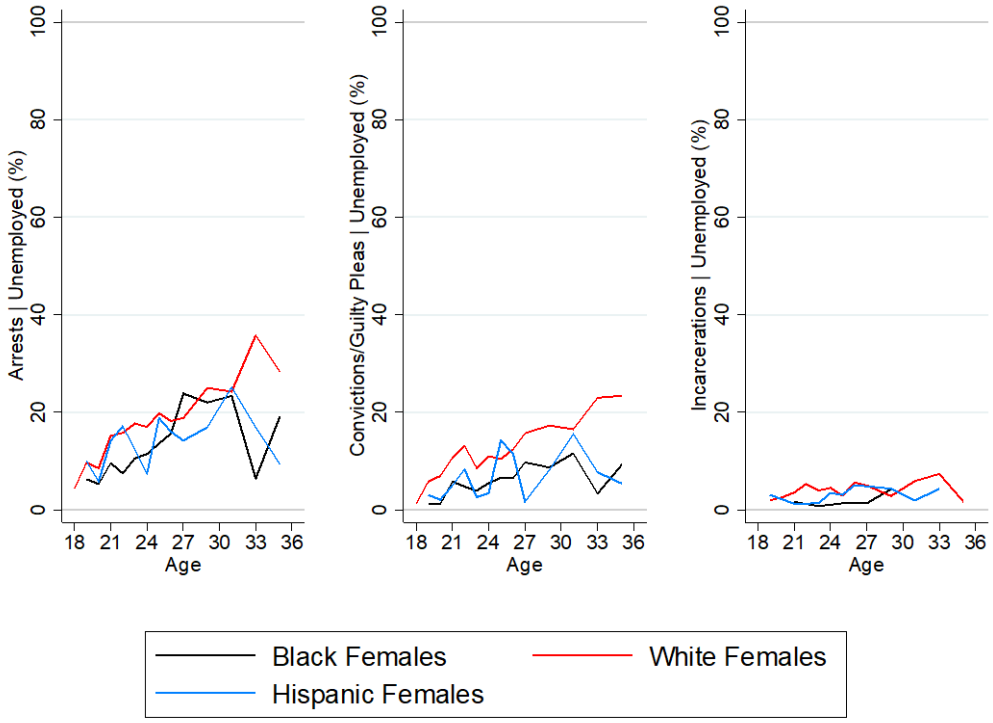

Figure S7. Male unemployment and underemployment rates by year and race (year-based estimates corresponding to Figure 1 of main text). Shaded areas represent 95 percent confidence intervals.

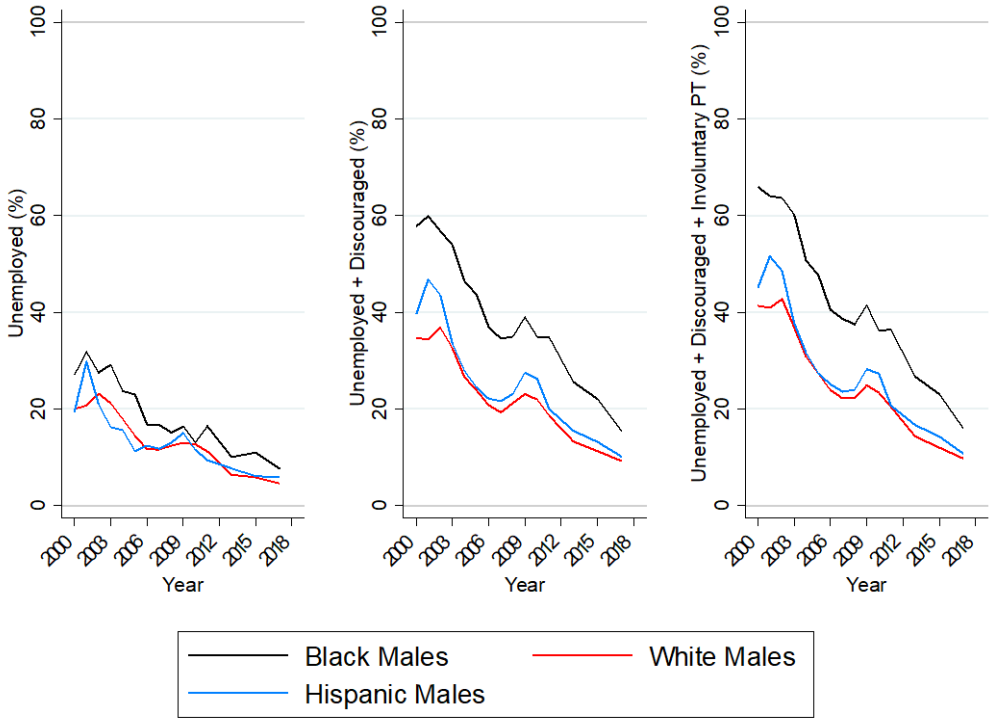

Figure S8. Proportion of males with arrests, convictions/guilty pleas, and incarcerations by year and race (year-based estimates corresponding to Figure 2 of main text). Shaded areas represent 95 percent confidence intervals.

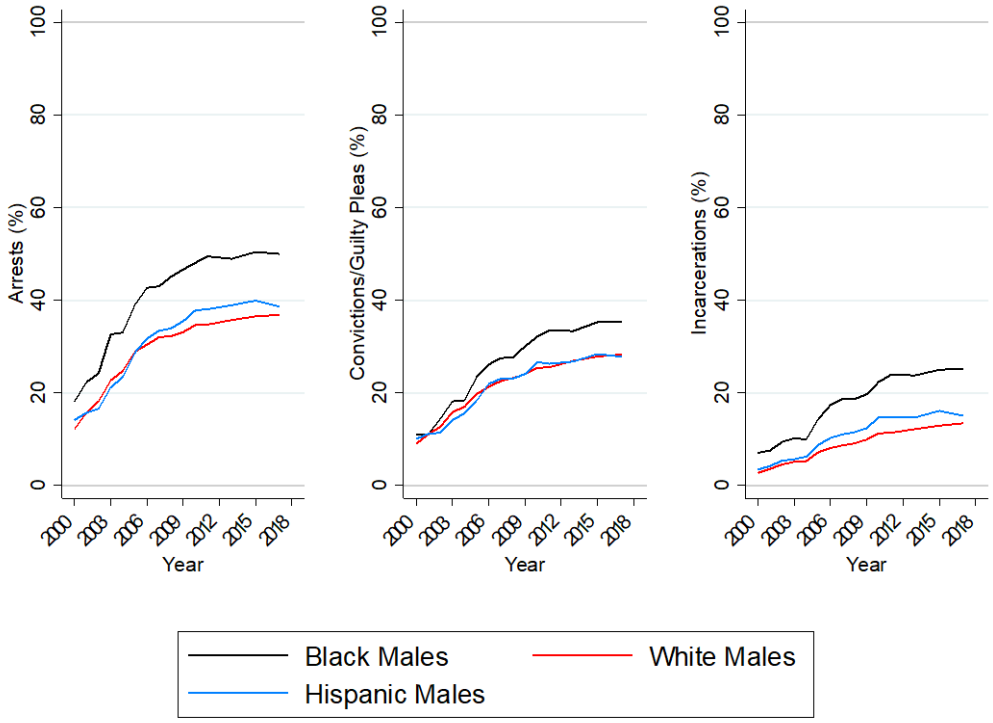

Figure S9. Proportion of males of having a criminal history among the unemployed, by year and race (year-based estimates corresponding to Figure 3 of main text). Shaded areas represent 95 percent confidence intervals.

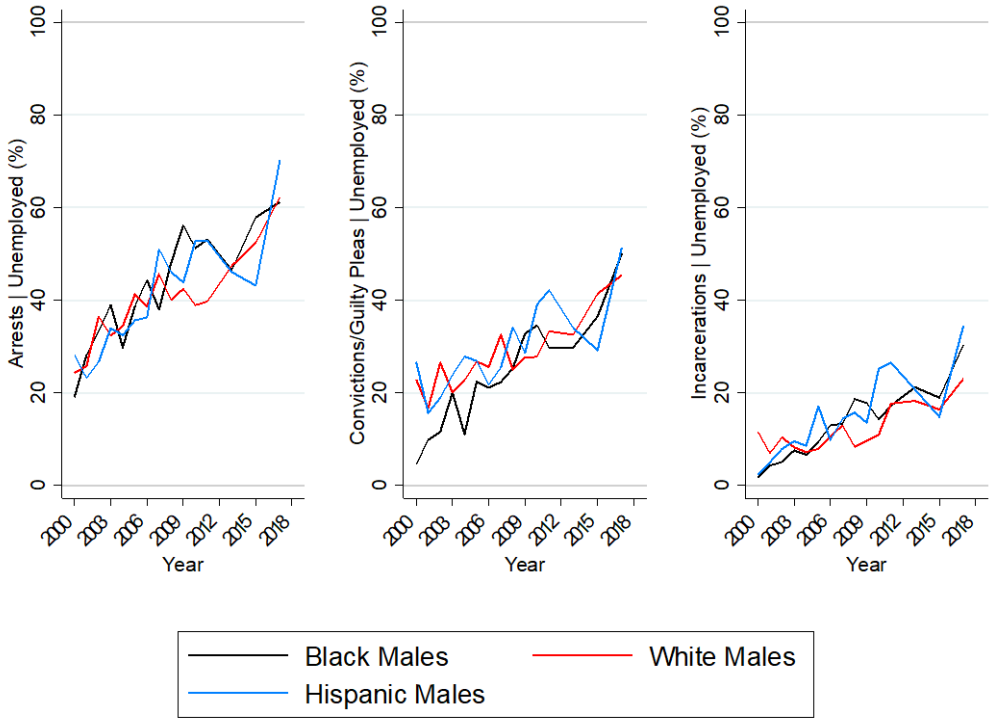

Figure S10. Proportion of males of having a criminal history among the employed, by age and race. Shaded areas represent 95 percent confidence intervals.

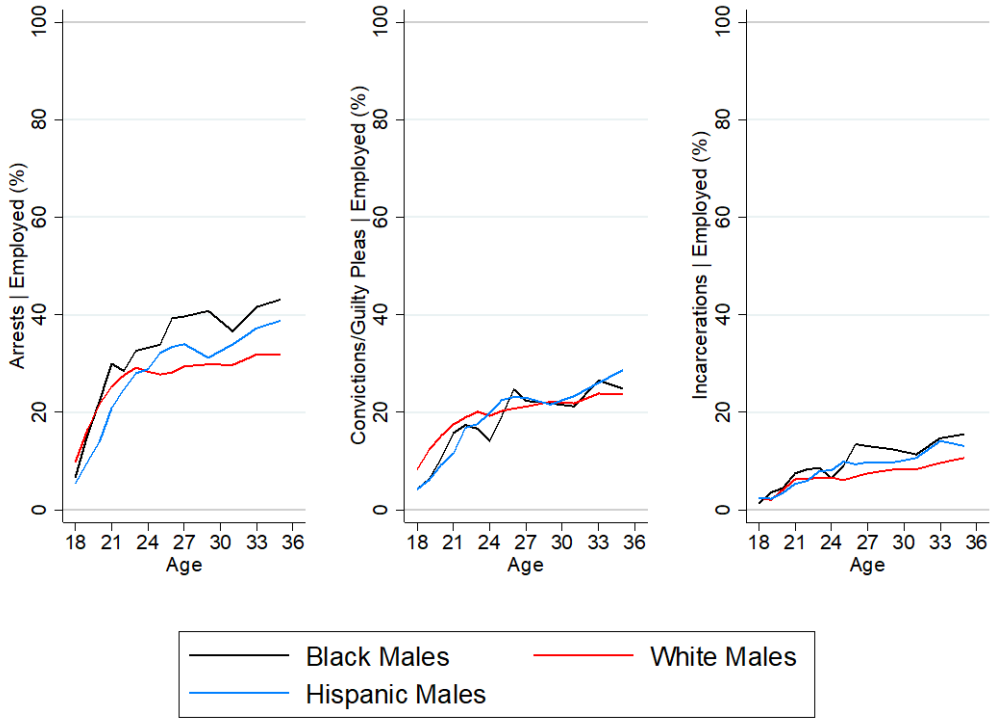

Figure S11. Proportion of males of having a criminal history among job switchers, by age and race. Shaded areas represent 95 percent confidence intervals.

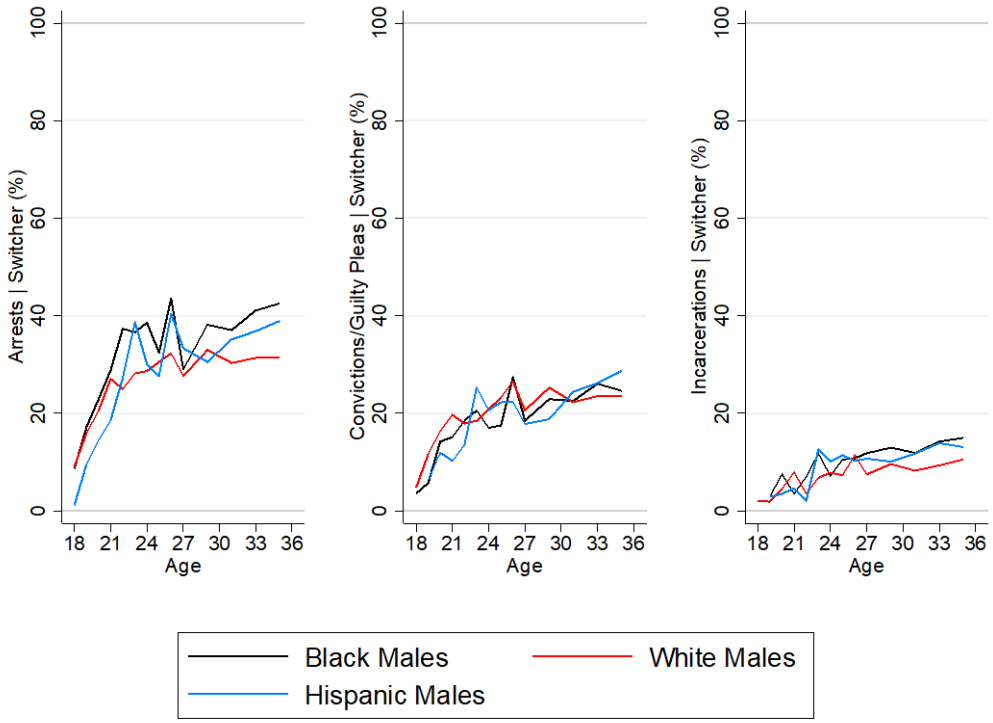

Figure S12. The proportion of males having a criminal history record among the unemployed plus discouraged workers (U4) by age and race. Shaded areas represent 95 percent confidence intervals.

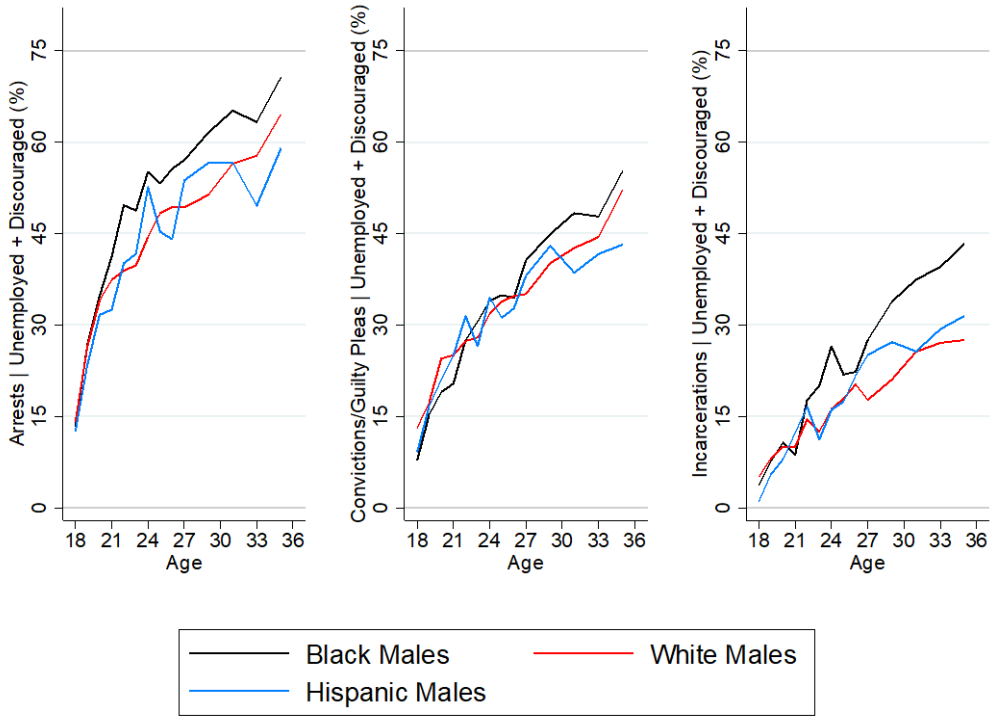

Figure S13. The proportion of males having a criminal history record among the unemployed plus discouraged workers plus part-time involuntary (U6) by age and race. Shaded areas represent 95 percent confidence intervals.

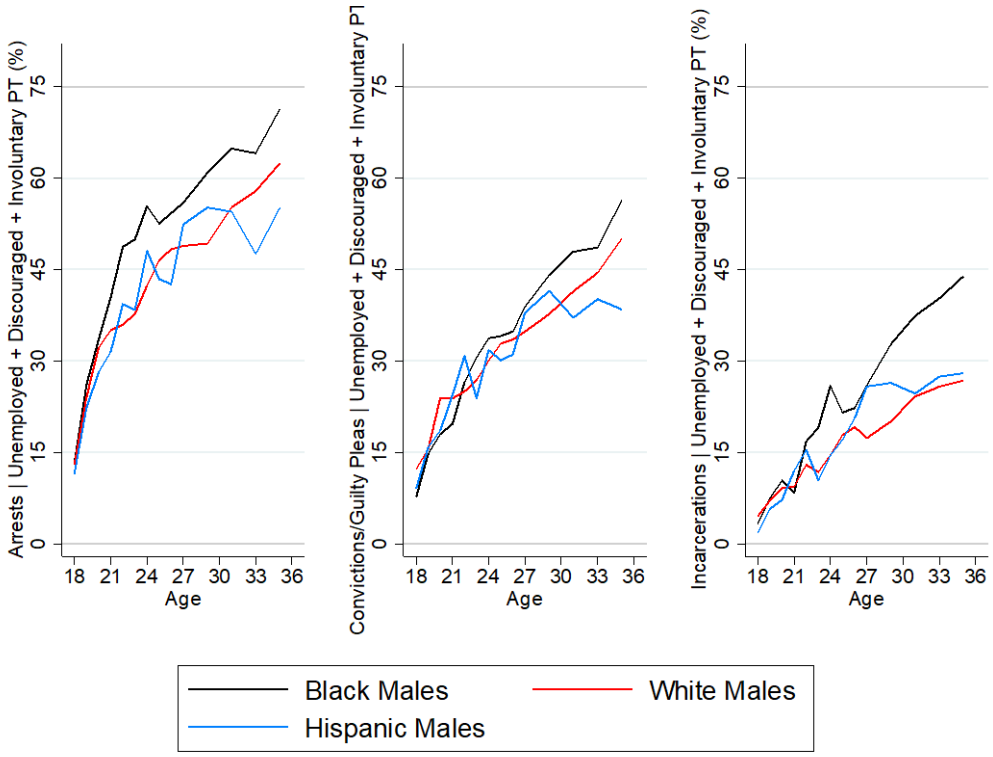

Table S1. Demographics of Round 1 NLSY Samples. Source: (*50*).

Panel 1: Cross-Sectional Sample

	Race/Ethnicity				
Sex	Non-Black, non-Hispanic	Black, non-Hispanic	Hispanic/Latino	Mixed Race	Total
Male	2,413	537	469	40	3,459
Female	2,252	544	452	41	3,289
Total	4,665	1,081	921	81	6,748

Panel 2: Oversample

	Race/Ethnicity		
Sex	Black, non-Hispanic	Hispanic/Latino	Total
Male	632	508	1,140
Female	622	472	1,096
Total	1,254	980	2,236

Table S2. Description of criminal history measures. Each variable is defined for each survey year.

Criminal history measure	Definition
Cumulative Arrest History Since Turning 18	Respondent has been arrested at least once since turning 18 years old, up to and including current survey year.
Cumulative Convictions/Guilty Plea History Since Turning 18	Respondent has been convicted/pled guilty to at least one offense since turning 18 years of age, up to and including current survey year.
Cumulative Incarceration History Since Turning 18	Respondent has been incarcerated at least once since turning 18 years old, up to and including current survey year.

Table S3. Description of employment measures and the distinctions between BLS and NLSY-derived definitions.

Employment status	CPS	NLSY-derived	Distinction
Unemployed	An individual is unemployed during the reference week prior to the week interviewed.	An individual experiences at least four consecutive weeks of unemployment in a given year, not exceeding 39 consecutive weeks of non-employment.	Measured over the course of several weeks as opposed to status as of a single week.
Not in the labor force	An individual did not actively search for work in the four weeks prior to being interviewed.	An individual experiences zero weeks of employment/unemployment OR experienced a non-employment spell of at least 39 weeks OR is enrolled in school at any point in a given year	Measured over the course of several weeks as opposed to status as of a single week.
Employed	An individual is employed during the reference week prior to the week interviewed.	An individual is defined as employed if he/she is classified as neither unemployed nor NILF and has a positive number of employed weeks	Worker cannot experience any non-employment in a given calendar year
Discouraged worker	An individual is NILF because they believe there are no jobs available for them in their area of expertise or geographic location; they were previously unable to gain employment; they are untrained/lack experience/do not have sufficient educational experience; or they were subject to discrimination (e.g., too young or too old).	An individual is NILF because they believe no work is available/could not find work OR they experienced a non-employment spell of at least 39 weeks but have been employed in the past 52 weeks.	We now include people that experience long-term unemployment as discouraged workers that left the labor force
Part-time for economic reasons	A worker that is employed part-time as of the reference week prior to interview and states the reason for part-time employment as due to economic conditions	A worker is employed part-time for the majority of weeks worked in a given year and has actively searched for employment while employed.	Part-time status is inferred based on job search activity, not as a result of a stated reason.
Job Switcher	N/A	A worker that is employed and switches jobs at least once at a given age/in a given year	N/A

Table S4. Definitions of key derived criminal history and employment variables.

Variable name	*Definition*
R1	*Cumulative Arrest History since 18*
R2	*Cumulative Convictions/Guilty Plea History since 18*
R3	*Cumulative Incarceration History since 18*
U3	*Unemployed*
U4	*Unemployed OR Discouraged*
U6	*Unemployed OR Discouraged OR Part Time*

Table S5. Item missingness of criminal history data. Cells indicate the percent and number of individuals with missing data.

Year	Arrest Status	Incarceration Status	Convictions or Guilty Pleas
1997	0.0% (0)	0.0% (0)	0.3% (1)
1998	0.0% (0)	0.0% (0)	0.9% (3)
1999	0.0% (0)	0.0% (0)	1.0% (3)
2000	0.0% (0)	0.0% (0)	0.9% (3)
2001	0.0% (0)	0.0% (0)	0.5% (2)
2002	0.0% (0)	0.0% (0)	0.0% (0)
2003	0.0% (0)	0.0% (0)	0.6% (2)
2004	0.0% (0)	0.0% (0)	5.7% (16)
2005	0.0% (0)	0.0% (0)	6.0% (17)
2006	0.0% (0)	0.0% (0)	5.0% (18)
2007	0.0% (0)	0.0% (0)	5.6% (16)
2008	0.0% (0)	0.0% (0)	5.6% (15)
2009	0.0% (0)	0.0% (0)	4.1% (10)
2010	0.0% (0)	0.0% (0)	4.3% (12)
2011	0.0% (0)	0.0% (0)	5.9% (12)
2012	0.0% (0)	0.0% (0)	NA
2013	0.0% (0)	0.0% (0)	4.5% (12)
2014	0.0% (0)	0.0% (0)	NA
2015	0.0% (0)	0.0% (0)	4.2% (9)
2016	0.0% (0)	0.0% (0)	NA
2017	0.0% (0)	0.0% (0)	2.4% (4)
2018	0.0% (0)	0.0% (0)	NA

Table S6. Item missingness of employment data. Cells indicate the percent and number of individuals with missing data.

Year	Employment Status	Hours Worked	Reason Not Looking for Work	On-the-job Search	Any School Enrollment
1997	24.8% (79737)	1.5% (1011)	0.0% (0)	0.0% (0)	0.0% (2)
1998	22.2% (91190)	1.1% (1334)	0.0% (0)	0.0% (0)	0.0% (2)
1999	16.6% (75942)	1.4% (2451)	0.2% (9)	0.0% (1)	0.1% (5)
2000	7.7% (35344)	2.6% (6021)	0.2% (11)	0.0% (1)	0.1% (7)
2001	3.4% (14972)	2.1% (5358)	0.3% (13)	0.0% (0)	0.2% (13)
2002	1.7% (7235)	2.7% (7192)	0.2% (7)	0.0% (0)	0.2% (18)
2003	1.8% (7636)	2.6% (7347)	0.3% (10)	0.0% (1)	0.3% (22)
2004	1.6% (6944)	2.5% (7521)	0.9% (28)	0.1% (9)	0.3% (21)
2005	1.4% (5933)	2.2% (6931)	0.8% (22)	0.1% (6)	0.3% (21)
2006	1.2% (4891)	2.5% (7885)	1.0% (27)	0.0% (0)	0.2% (18)
2007	1.1% (4722)	3.0% (9570)	1.1% (27)	0.1% (4)	0.3% (23)
2008	1.3% (5519)	3.2% (10213)	1.8% (40)	0.2% (11)	0.4% (31)
2009	1.0% (4183)	2.9% (8688)	1.1% (23)	0.0% (1)	0.5% (41)
2010	0.9% (3609)	2.6% (7772)	0.9% (20)	0.1% (4)	0.6% (45)
2011	1.0% (3959)	2.6% (7757)	1.1% (21)	0.1% (4)	0.7% (49)
2013	1.3% (5183)	3.0% (8914)	2.3% (56)	0.1% (5)	0.6% (41)
2015	1.2% (4634)	3.6% (10601)	1.7% (38)	0.2% (11)	0.7% (47)
2017	1.2% (4002)	8.9% (23037)	1.2% (23)	0.1% (5)	0.5% (31)

Table S7. Unweighted sample sizes of unemployed (U3) male populations, stratified by race and criminal history.

Age (years)	Criminal History of Arrest			Criminal History of Conviction/Guilty Pleas			Criminal History of Incarceration		
	No	Yes	Total	No	Yes	Total	No	Yes	Total
White Unemployed Men									
18	88	6	94	88	6	94	93	1	94
19	105	37	142	120	22	142	132	10	142
20	118	70	188	135	53	188	170	18	188
21	95	61	156	116	40	156	143	13	156
22	105	57	162	125	37	162	147	15	162
23	110	59	169	129	40	169	156	13	169
24	107	62	169	131	38	169	156	13	169
25	80	62	142	102	40	142	128	14	142
26	87	58	145	110	35	145	129	16	145
27	89	59	148	107	41	148	131	17	148
29	118	91	209	135	74	209	178	31	209
31	67	57	124	80	44	124	101	23	124
33	41	39	80	51	29	80	65	15	80
35	19	37	56	28	28	56	41	15	56
Black Unemployed Men									
18	29	6	35	34	1	35	35	0	35
19	72	22	94	85	9	94	91	3	94
20	78	30	108	96	12	108	102	6	108
21	89	27	116	100	16	116	112	4	116
22	61	41	102	85	17	102	95	7	102
23	67	30	97	84	13	97	94	3	97
24	56	44	100	81	19	100	91	9	100
25	52	51	103	73	30	103	84	19	103
26	38	42	80	58	22	80	67	13	80
27	39	41	80	56	24	80	66	14	80
29	50	43	93	68	25	93	77	16	93
31	40	34	74	51	23	74	59	15	74
33	27	30	57	39	18	57	46	11	57
35	16	29	45	23	22	45	31	14	45

Hispanic Unemployed Men									
18	34	5	39	34	5	39	39	0	39
19	55	9	64	57	7	64	63	1	64
20	54	17	71	60	11	71	68	3	71
21	47	16	63	54	9	63	58	5	63
22	48	26	74	54	20	74	65	9	74
23	41	32	73	53	20	73	64	9	73
24	35	35	70	48	22	70	62	8	70
25	38	30	68	51	17	68	58	10	68
26	38	29	67	46	21	67	54	13	67
27	34	34	68	47	21	68	53	15	68
29	46	42	88	55	33	88	69	19	88
31	21	35	56	30	26	56	39	17	56
33	17	7	24	19	5	24	20	4	24
35	12	17	29	16	13	29	20	9	29

Table S8. p-values of bivariate tests corresponding to summary statistics of the unemployed population (Table 1). For each subpopulation of the unemployed population defined in a row, a chi-square test is performed that tests for independence between race and a binary indicator of criminal history (i.e., no arrest, arrest, conviction, and incarceration).

Unemployed	No Arrest	Arrest	Convict	Incarceration
Overall	0.82	0.82	0.61	0.40
Less than high school/GED	0.57	0.57	0.70	0.76
High school	1.00	1.00	0.28	0.66
Some college	0.41	0.41	0.78	0.94
Bachelors or more	0.35	0.35	0.50	0.91
Urban	0.58	0.58	0.58	0.88
(-inf, 0)	Not computed because other, non-Hispanic had no data			
[0, 10,000)	0.36	0.36	0.15	0.52
[10,000, inf)	0.67	0.67	0.37	0.89
Never married	0.52	0.52	0.63	0.57
Married	0.51	0.51	0.66	0.29
Separated/divorced/widowed	0.52	0.52	0.46	0.49

Table S9. p-values of bivariate tests corresponding to summary statistics of the employed population (Table 2). For each subpopulation of the employed population defined in a row, a chi-square test is performed that tests for independence between race and a binary indicator of criminal history (i.e., no arrest, arrest, conviction, and incarceration).

Employed	No Arrest	Arrest	Convict	Incarceration
Overall	0.00	0.00	0.15	0.01
Less than high school/GED	0.48	0.48	0.46	0.73
High school	0.13	0.13	0.67	0.26
Some college	0.22	0.22	0.06	0.33
Bachelors or more	0.97	0.97	0.22	0.91
Urban	0.00	0.00	0.02	0.00
(-inf, 0)	0.24	0.24	0.30	0.90
[0, 10,000)	0.50	0.50	0.64	0.75
[10,000, inf)	0.00	0.00	0.08	0.19
Never married	0.13	0.13	0.05	0.38
Married	0.00	0.00	0.39	0.04
Separated/divorced/widowed	0.14	0.14	0.35	0.18
Part-time employed	0.05	0.05	0.31	0.03

Table S10. Regression results corresponding to descriptive Tables 1. Significance codes: '***' 0.001 '**' 0.01 '*' 0.05.

	Arrested			**Plead Guilty/Convicted**			**Incarcerated**		
Variable	OR	CI	p-val	OR	CI	p-val	OR	CI	p-val
Race reference = Black)									
Hispanic	0.85	(0.36, 2.00)	-	1.90	(0.74, 4.89)	-	1.19	(0.46, 3.07)	-
White	0.45	(0.11, 1.91)	-	0.23	(0.03, 1.73)	-	0.44	(0.06, 3.12)	-
Other (non-Hispanic)	1.42	(0.75, 2.72)	-	2.26	(1.16, 4.40)	*	1.10	(0.47, 2.56)	-
Highest education (reference = Less than high school + GED)									
High school	0.33	(0.19, 0.58)	***	0.43	(0.25, 0.75)	**	0.29	(0.16, 0.51)	***
Some college	0.14	(0.05, 0.37)	***	0.20	(0.08, 0.53)	**	0.02	(0.00, 0.21)	**
Bachelor's or more	0.14	(0.06, 0.34)	***	0.17	(0.06, 0.46)	***	0.03	(0.00, 0.21)	***
Urbanicity (reference = Rural)									
Urban	1.84	(0.96, 3.55)	-	2.03	(1.14, 3.59)	*	1.30	(0.65, 2.59)	-
Household net worth	1.00	(1.00, 1.00)	-	1.00	(1.00, 1.00)	-	1.00	(1.00, 1.00)	-
Wage	1.00	(1.00, 1.00)	-	1.00	(1.00, 1.00)	-	1.00	(1.00, 1.00)	-
Marital status (reference = Never married)									
Married	0.44	(0.23, 0.87)	*	0.61	(0.34, 1.09)	-	0.83	(0.44, 1.55)	-
Separated/Divorced/Widowed	0.79	(0.35, 1.80)	-	0.88	(0.35, 2.18)	-	2.86	(1.02, 8.04)	*

Table S11. Regression results corresponding to descriptive Tables 2. Significance codes: '***' 0.001 '**' 0.01 '*' 0.05.

	Arrested			Plead Guilty/Convicted			Incarcerated		
Variable	OR	CI	p-val	OR	CI	p-val	OR	CI	p-val
Race reference = Black)									
Hispanic	0.71	(0.47, 1.09)	-	1.01	(0.64, 1.61)	-	0.84	(0.47, 1.48)	-
White	0.82	(0.58, 1.15)	-	1.30	(0.88, 1.91)	-	0.97	(0.59, 1.60)	-
Other (non-Hispanic)	0.63	(0.26, 1.54)	-	0.72	(0.30, 1.72)	-	0.95	(0.27, 3.37)	-
Highest education (reference = Less than high school + GED)									
High school	0.32	(0.23, 0.46)	***	0.34	(0.24, 0.49)	***	0.23	(0.14, 0.38)	***
Some college	0.23	(0.13, 0.42)	***	0.28	(0.16, 0.50)	***	0.25	(0.12, 0.52)	***
Bachelor's or more	0.14	(0.09, 0.22)	***	0.13	(0.07, 0.22)	***	0.06	(0.02, 0.16)	***
Urbanicity (reference = Rural)									
Urban	1.08	(0.79, 1.46)	-	1.31	(0.96, 1.79)	-	1.08	(0.71, 1.63)	-
Household net worth	1.00	(1.00, 1.00)	-	1.00	(1.00, 1.00)	-	1.00	(1.00, 1.00)	-
Wage	1.00	(1.00, 1.00)	-	1.00	(1.00, 1.00)	-	1.00	(1.00, 1.00)	-
Marital status (reference = Never married)									
Married	0.52	(0.39, 0.70)	***	0.60	(0.44, 0.83)	**	0.67	(0.43, 1.04)	-
Separated/Divorced/Widowed	0.93	(0.58, 1.48)	-	1.04	(0.62, 1.76)	-	0.85	(0.39, 1.86)	-

Legends for Reference Materials S1 to S8

Data Repository Material Part 1
* Analysis Code
* Any Charges
* Arrest Status
* BLS
* Conviction/Guilty Plea

Data Repository Material Part 2
* Hours worked per week part 1

Data Repository Material Part 3
* Hours worked per week part 2

Data Repository Material 4
* Educational Attainment
* Emp Military Flag
* Figures/Tables
* Geography

Data Repository Material 5
* EMP History

Data Repository Material 6
* Date Interviewed
* Incarceration Status
* Marstat Collapsed
* Net Worth_Age 35
* On the job search
* Race/ethnicity_individual

Data Repository Material 7
* Reason_noninterview
* Reason_not looking for work
* School enrollment year
* Temp
* Variance Stratum

Data Repository Material 8
* Wage Income
* Weights
* .DS_Store
* Rapp history
* Readme.rtf
* Variable Workbook

REFERENCES AND NOTES

1. R. Brame, M. G. Turner, R. Paternoster, S. D. Bushway, Cumulative prevalence of arrest from ages 8 to 23 in a national sample. *Pediatrics* **129**, 21–27 (2012).

2. C. Arnold, J. Dimon, "Nearly 70 million Americans have criminal records. We must give them a second chance," *CNN Buisiness*, 2021.

3. K. Aromaa, M. Heiskanen, *Crime and Criminal Justice Systems in Europe and North America 1995–2004* (Helsinki, Finland: Hakapaino Oy, 2008).

4. A. Agan, S. Starr, Ban the box, criminal records, and racial discrimination: A field experiment. *Q. J. Econ.* **133**, 191–235 (2018).

5. J. B. Jacobs, *The Eternal Criminal Record* (Harvard Univ. Press; 2015).

6. W. Williams, *Unemployment Rates: The Highest and Lowest in the World* (Investopedia, 2021).

7. J. Pfaff, *Locked In: The True Causes of Mass Incarceration-and How to Achieve Real Reform* (Basic Books, 2017).

8. M. Gottschalk, *Caught: The Prison State and the Lockdown of American Politics* (Princeton Univ. Press; 2016).

9. National Research Council, *The Growth of Incarceration in the United States: Exploring Causes and Consequences*, J. Travis, B. Western, S. Redburn, Eds. (Washington, DC: National Academies Press, 2014).

10. S. K. S. Shannon, C. Uggen, J. Schnittker, M. Thompson, S. Wakefield, M. Massoglia, The growth, scope, and spatial distribution of people with felony records in the United States, 1948–2010. *Demography* **54**, 1795–1818 (2017).

11. D. H. Autor, D. Dorn, The growth of low-skill service jobs and the polarization of the US labor market. *Am. Econ. Rev.* **103**, 1553–1597 (2013).

12. D. H. Autor, D. Dorn, G. H. Hanson, Untangling trade and technology: Evidence from local labour markets. *Econ. J.* **125**, 621–646 (2015).

13. E. Anderson, *Code of the Street: Decency, Violence, and the Moral Life of the Inner City* (WW Norton & Company, 1999).

14. P. Bourgois, *In Search of Respect: Selling Crack in El Barrio* (Cambridge Univ. Press, 2003).

15. V. M. Rios, *Punished: Policing the lives of Black and Latino boys* (New York Univ. Press, 2011).

16. W. J. Wilson, *When Work Disappears: The World of the New Urban Poor* (Vintage, 2011).

17. W. J. Wilson, *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy* (University of Chicago Press, 2012).

18. M. Alexander, *The New Jim Crow : Mass Incarceration in the Age of Colorblindness* (Perseus Distribution, 2010).

19. J. M. Gau, R. K. Brunson, Procedural injustice, lost legitimacy, and self-help: Young males' adaptations to perceived unfairness in urban policing tactics. *J. Contemp. Crim. Justice* **31**, 132–150 (2015).

20. E. Hinton, *From the War on Poverty to the War on Crime* (Harvard Univ. Press, 2017).

21. C. Mosher, Racial profiling/biased policing. *Sociol. Compass* **5**, 763–774 (2011).

22. V. M. Rios, G. Prieto, J. M. Ibarra, *Mano Suave–Mano Dura*: Legitimacy policing and Latino stop-and-frisk. *Am. Sociol. Rev.* **85**, 58–75 (2020).

23. S. D. Bushway, N. Kalra, A policy review of employers' open access to conviction records. *Annu. Rev. Criminol.* **4**, 165–189 (2021).

24. S. E. Lageson, *Digital Punishment: Privacy, Stigma, and the Harms of Data-Driven Criminal Justice* (New York, NY, Oxford Univ. Press, 2020).

25. D. Pager, *Marked: Race, Crime, and Finding Work in an Era of Mass Incarceration* (University of Chicago Press, 2017).

26. T.-A. Craigie, A. Grawert, C. Kimble, J. E. Stiglitz, Conviction, Imprisonment, and Lost Earnings: How Involvement with the Criminal Justice System Deepens Inequality, 2020.

27. R. B. Freeman, D. A. Wise (Eds.), *The Youth Labor Market Problem: Its Nature, Causes, and Consequences* (University of Chicago Press, 1982).

28. T. A. Mroz, T. H. Savage, The long-term effects of youth unemployment. *J. Hum. Resour.* **41**, 259–293 (2006).

29. National Bureau of Economic Research. US Business Cycle Expansions and Contractions n.d. (updated 19 July 2021); www.nber.org/research/data/us-business-cycle-expansions-and-contractions.

30. D. P. Farrington, Age and Crime. *Crime Justice* **7**, 189–250 (1986).

31. M. Friedman, A. Grawert, J. Cullen, "Crime Trends: 1990–2016" (Brennan Center for Justice 2017).

32. G. Sweeten, Who will graduate? Disruption of high school education by arrest and court involvement *Justice Quarterly* **23**, 462–80 (2006).

33. A.R. Hocschild, *Strangers in their Own Land: Anger and Mourning on the American Right* (The New Press, 2018).

34. D. Pager, The mark of a criminal record. *Am. J. Sociol.* **108**, 937–75 (2003).

35. J. L. Doleac, B. Hansen, The unintended consequences of "ban the box": statistical discrimination and employment outcomes when criminal histories are hidden. *J. Labor Econ.* **38**, 321–374 (2020).

36. T.-A. Craigie, Ban the box, convictions, and public employment. *Econ. Inq.* **58**, 425–445 (2020).

37. M. Emsellem, B. Avery, *Racial Profiling in Hiring: A Critique of New "Ban the Box" Studies* (National Employment Law Project, 2016).

38. D. Shoag, S. Veuger, Ban-the-box measures help high-crime neighborhoods. *J. Law Econ.* **64**, 85–105 (2021).

39. S. D. Bushway, Labor market effects of permitting employer access to criminal history records. *J. Contemp. Crim. Justice* **20**, 276–291 (2004).

40. P. B. Edelman, H. J. Holzer, Connecting the disconnected: Improving education and employment outcomes among disadvantaged youth, in *What Works for Workers?* S. Luce, J. Luff, J. A. McCartin, R. Milkman, Eds. (Russell Sage Foundation, 2013).

41. R. W. Eberts, C. J. O'Leary, S. A. Wandner, *Targeting employment services* (W.E. Upjohn Institute, 2002).

42. D. A. Black, J. A. Smith, M. C. Berger, B. J. Noel, Is the threat of reemployment services more effective than the services themselves? Evidence from random assignment in the UI system *Am. Econ. Rev.* **93**, 1313–1327 (2003).

43. M. Michaelides, P. Mueser, Are reemployment services effective? Experimental evidence from the great recession. *J. Policy Anal. Manage.* **37**, 546–570 (2015).

44. CareerOneStop. Your Conviction n.d., U.S. Department of Labor Employment and Training Administration; www.careeronestop.org/ExOffender/FindAJob/GetInterviewReady/your-conviction.aspx.

45. CareerOneStop. Find Openings n.d., U.S. Department of Labor Employment and Training Administration; www.careeronestop.org/ExOffender/FindAJob/FindOpenings/who-hire-ex-offenders.aspx.

46. U.S. Bureau of Labor Statistics, NLSY97 data overview (updated 28 May); www.bls.gov/nls/nlsy97.htm.

47. National Longitudinal Surveys, (n.d.) Appendix 6: Event history creation and documentation (National Longitudinal Surveys, U.S. Bureau of Labor Statistics); www.nlsinfo.org/content/cohorts/nlsy97/other-documentation/codebook-supplement/appendix-6-event-history-creation-and.

48. National Longitudinal Surveys, (n.d.) Employers & jobs (National Longitudinal Surveys, U.S. Bureau of Labor Statistics); www.nlsinfo.org/content/cohorts/nlsy97/topical-guide/employment/employers-jobs.

49. National Longitudinal Surveys, (n.d.) Sample weights & design effects: Methedology for calculating weights (National Longitudinal Surveys, U.S. Bureau of Labor Statistics); www.nlsinfo.org/content/cohorts/nlsy97/using-and-understanding-the-data/sample-weights-design-effects/page/0/1/.

50. National Longitudinal Surveys, (n.d.) Table: NLSY97 sample sizes by subsample, race/ethnicity & gender (National Longitudinal Surveys, U.S. Bureau of Labor Statistics); www.nlsinfo.org/content/cohorts/nlsy97/intro-to-the-sample/nlsy97-sample-introduction-0/table-nlsy97-sample-sizes.

51. S. van Buuren, K. Groothuis-Oudshoorn, Mice: Multivariate imputation by chained equations in R. *J. Stat. Softw.* **45**, 1–67 (2011).