CENTER for RETIREMENT RESEARCH at BOSTON COLLEGE

THE IMPACT OF PAST INCARCERATION ON LATER-LIFE DI AND SSI RECEIPT

Gary V. Engelhardt

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Center for Retirement Research at Boston College
Haley House
140 Commonwealth Avenue
Chestnut Hill, MA 02467
Tel: 617-552-1762 Fax: 617-552-0191
https://crr.bc.edu

Gary V. Engelhardt is a professor of economics at the Maxwell School of Citizenship and Public Affairs at Syracuse University and a faculty associate at the Syracuse University Aging Studies Institute. The research reported herein was pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement and Disability Research Consortium. The findings and conclusions expressed are solely those of the author and do not represent the views of SSA, any agency of the federal government, Syracuse University, or Boston College. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of the contents of this report. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply endorsement, recommendation or favoring by the United States Government or any agency thereof. All errors are the author's own.

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Affiliated Institutions:
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Abstract

In the three decades from 1980 to 2010, there was a steady rise in the number of men receiving Social Security Disability Insurance (DI) benefits. The number of beneficiaries peaked in 2012 and has declined significantly since the end of the Great Recession, tracking very closely the (pre-pandemic) fall in the national unemployment rate and improvement in other labor-market fundamentals. Although general population aging and the business cycle have had clear effects on the number of recipients, one factor that has gone relatively understudied is the aging of the formerly incarcerated population. This paper examines the relationship between past incarceration and later-life DI and SSI receipt, as well as poverty status. To isolate causal effects independently from other factors, this analysis uses detailed micro-data from three nationally representative surveys—the *Health and Retirement Study* (HRS), *National Longitudinal Survey of Youth 1979 Cohort* (NLSY79) and the *American Community Survey* (ACS)—and a novel econometric identification strategy. The strategy relies on the timing of the entry of crack cocaine in the 1980s that differed across locations (states) to form an instrumental variable for the likelihood of incarceration.

The paper found that:

- Past incarceration reduces the career years of employment, in general, and the likelihood of meeting the DI duration test, in particular, reducing eligibility for DI.
- Given the likely reduction in eligibility, however, past incarceration leads to a 30-percentage-point increase in the likelihood of applying for DI or SSI benefits, with an 18-percentage-point increase in the likelihood of benefit receipt.
- Past incarceration raises by about 20 percentage points the likelihood the individual is in poverty as measured by the federal poverty threshold.

The policy implications of the findings are:

- At the aggregate level, DI rolls are about 300,000 higher for 50-61-year-old men because of past incarceration; SSI rolls are about 50,000 higher.
- Incarceration has resulted in about 375,000 additional men between 50 and 61 years of age being under the federal poverty threshold in the 2010-2016 period.
- These results imply that the decline in aggregate DI receipt since 2012 was partially blunted by the decline in incarceration then and the consequent rise in the number of ex-prisoners in the civilian population.

Introduction

In the three decades from 1980 to 2010, there was a steady rise in the number of men receiving Social Security Disability Insurance (DI) benefits. The number of beneficiaries peaked in 2012 and has declined significantly since the end of the Great Recession, tracking very closely the (pre-pandemic) fall in the national unemployment rate and improvement in other labor-market fundamentals. Although general population aging and the business cycle have had clear effects on the number of recipients, one factor that has gone relatively understudied is the aging of the formerly incarcerated population, which is sizable (Neal and Rick, 2014; Pettit and Western, 2004; Aaronson, et al., 2014; Abraham and Kearney, 2018; Krueger, 2017; Shannon, et al., 2017), especially for Black men. At its peak in 2010, almost 1.5 million men were in state or federal prisons. Individuals part of the first cohorts to experience incarceration on a large scale when crack cocaine emerged in the 1980s were born in the late 1950s and early 1960s. These individuals have recently moved through the peak ages for DI applications and receipt. To the extent incarceration weakens human capital and the attachment to the labor force, as well as health capital, part of the time series changes in the size of the DI program may be due to the return of the prison population to the civilian labor force.

This report examines the relationship between past incarceration and later-life DI and SSI receipt, as well as poverty status. A positive correlation between incarceration and public benefit receipt is not necessarily evidence of a causal relationship, as those who became incarcerated as adults were not a random subset of the population of men in terms of their (counterfactual) evolution of employment and health over the lifecourse. To isolate causal effects independently from other factors, this analysis uses detailed micro-data from three nationally representative surveys—the *Health and Retirement Study* (HRS), *National Longitudinal Survey of Youth 1979 Cohort* (NLSY79) and the *American Community Survey* (ACS)—and a novel econometric identification strategy. The strategy relies on the timing of the entry of crack cocaine in the 1980s that differed across locations (states) to form an instrumental variable for the likelihood of incarceration. For the 36 largest states, Evans et al. (2016) estimated the year crack entered, based on the analysis of cocaine-related emergency room visits. Crack entered first in the gateway states of Florida, California, and New York in 1981 and slowly spread through the country. It did not arrive in Utah until 1988. Evans et al. (2016) argued the timing was plausibly exogenous and used it to estimate the impact of the emergence of crack on the educational

attainment for young men in this period. I use the same timing to form an instrument for incarceration and then calculate instrumental variable estimates of the impact of past incarceration on later-life employment, DI, SSI, and poverty outcomes in both the 2010-2018 waves of the HRS and the NLSY79 for birth cohorts of men who were under age 40 when crack entered and were 50-61 in the 2010s, the peak ages for DI receipt.

There are three primary findings. Past incarceration reduces the career years of employment, in general, and the likelihood of meeting the DI duration test, in particular, reducing eligibility for DI. Given the likely reduction in eligibility, however, past incarceration leads to a 30-percentage-point increase in the likelihood of applying for DI or SSI benefits, with an 18-percentage-point increase in the likelihood of benefit receipt. Despite this, past incarceration raises by about 20 percentage points the likelihood the individual is in poverty as measured by the federal poverty threshold.

This paper is organized as follows. Section 1 gives an overview of the time trends in employment, labor force participation, DI receipt, and incarceration in the last 40 years. It also describes the basic structure of DI eligibility and granular causal pathways. Sections 2 and 3 describe how incarceration is measured in the HRS and NLSY79, respectively. Section 4 describes the identification strategy and presents a graphical analysis. Section 5 discusses the OLS and IV estimation results. The final section discusses the implications of the results and outlines some caveats.

Background

Men's attachment to the labor market has been falling over the last four decades. Figure 1 shows the age profile of the labor force participation rate for all men using data from the 1980, 1990, 2000, and 2010 decennial censuses, and the 2016 ACS. Across all ages, labor force participation has fallen by approximately 10-15 percentage points. The decline is most pronounced in the 1990s and 2000s. Figure 2 replicates Figure 1, but for the employment rate, which paints a similar picture up until the beginning of the pandemic. Furthermore, as shown by the red line in Figure 3, the number of DI beneficiaries (in millions) rose over this time period until 2012 and then have fallen since. A key question is why.

Although population aging and the business cycle naturally play important roles in the aggregate paths of male employment, labor force participation, and DI receipt, one possible

explanation is the rapid growth in incarceration in the 1980-2010 period. The blue line in Figure 3 shows the number of men (in millions) incarcerated in state or federal prisons over the same period, based on data from the Department of Justice's Bureau of Justice Statistics (BJS). There was a dramatic increase in male incarceration for men from roughly 1980 to 2000, a plateau from 2000-2010, then a subsequent gradual decline. It roughly tracks the time series for male DI receipt.

Periods of incarceration are periods when an individual is out of the labor force and cannot work. In addition, the formerly incarcerated may face significant barriers to return to the labor force and lower earnings if employed. Finally, Bronson and Maruschak (2015), among others, have documented a high rate of self-reported disability among the prison population. In general, these factors suggest that past incarceration may result in an increase in later-life DI applications and receipt for those with sufficient work histories and SSI for those without.

Specifically, Social Security Disability Insurance (DI) and Supplemental Security Insurance (SSI) provide benefits to individuals who meet a variety of requirements for disability. To qualify for DI, the individual must pass two work tests to attain insured status. The first is the duration test, under which the individual must have accumulated a minimum number of credits by the time of disability onset. Up to four credits can be earned per year. Currently, each $1,640 of wage or self-employment income in covered employment earns 1 credit, so that $6,560 of covered earnings in a year earns 4 credits. Column 1 Table 1 shows the minimum number of credits by age at onset to pass the duration test. Column 2 shows the associated years of covered employment. The second is the recent work test, under which requires the individual to have worked recently prior to disability onset. For those younger than 24, this test requires 6 credits earned in the three-year period before onset; for those 24 through 30 years of age, the individual must have worked at least half of the time between age 21 and onset; for those 31 and older, the individual must have accumulated 20 credits in the ten years prior to onset. The combination of the two tests implies that, in general, those age 31 through 42 must have at least 20 credits to become insured. Work in prison does not count toward earnings credits.

Conditional on being insured, the individual must have a qualifying disability, for which there are five criteria. The first is whether the individual currently is earning more than the Substantial Gainful Activity (SGA) limit. Currently, if earnings average more than $1,470 per month, the individual is deemed not having a qualifying disability. The second is the disability

must be severe enough to limit for at least 12 months the ability to perform basic work-related tasks, such as sitting, standing, walking, lifting, or cognitive functioning such as memory. Third, the disability must be associated with a qualifying medical condition that SSA has deemed severe enough to prevent SGA. The last two criteria are whether the disabling condition prevents the individual from doing their current type of work and other work, respectively.[1]

Once awarded, the amount of the DI benefits depends on the individual's Average Monthly Indexed Earnings (AIME), a measure of career earnings in covered employment, and the Primary Insurance Amount (PIA). It is not contingent on the severity or duration of the disability. DI benefits cannot be received while incarcerated.

Based on this structure of eligibility and benefits, the impact of incarceration on DI eligibility and generosity is potentially complicated. First, time incarcerated represents time out of covered employment. This reduces the likelihood an individual has accumulated enough credits to satisfy the duration and current work tests needed for insured status. It also reduces the potential number of years of covered earnings that go into the AIME calculation. Second, human capital may decay while incarcerated, which may reduce post-release covered employment and earnings. Lower covered employment may result in fewer credits toward insured status and fewer years in the AIME calculation. Lower post-release earnings may increase the likelihood that earnings fall below the SGA and, hence, eligibility, but also conditional on eligibility may decrease benefit amounts through lower AIME. In the absence of human capital effects, incarceration, even for short periods of time, may have a negative labor-market signaling effect that reduces covered employment prospects and earnings. Third, health capital may decay while incarcerated. This may lead to increased true incidence of disability or the report of a disability. To the extent those disabilities limit the scope of productive work after release, the formerly incarcerated may be less likely to work and become disability insured, while those who do become insured may be more likely to apply for DI benefits. Finally, it is difficult to analyze DI without also analyzing impacts on SSI. This may be particularly salient for the formerly incarcerated, who may not have enough quarters of covered employment to be disability insured, or who may be insured, but have low enough means to qualify for SSI and DI concurrently.

[1] There are other, more specialized rules for individuals who are blind or vision impaired.

Against this backdrop, this report seeks to answer the top-line causal question of whether past incarceration results in an increase in DI and SSI applications and receipt. The micro-data used to measure incarceration and these outcomes, described in the next two sections, while detailed, are not rich enough to pin down the unique contribution of each pathway outlined above in determining applications and benefit receipt. Consequently, this project will estimate the net impact of incarceration, which is defined here as the combined effect of incarceration operating through all the various channels.

Measuring Past Incarceration in the HRS

Commenced in 1992, the HRS is a nationally representative longitudinal survey of Americans aged 50 and older, conducted every two years. Each wave, the HRS has asked about current employment, earnings, and DI and SSI applications and receipt (Agree and Wolf, 2017; Schimmel Hyde and Stapleton, 2020; Schimmel Hyde and Harrati, 2021; among others). These data are supplemented by an array of retrospective questions on employment and life history.

The data on incarceration come from two supplements to the main HRS. The first is the *Leave-Behind Survey* (LBS). Designed to gather additional information without lengthening the interview, the LBS is administered in each wave to half of the HRS respondents. Eligible respondents were asked to complete the leave-behind questionnaire and mail it to the HRS in a pre-addressed postage-paid envelope. The LBS response rates were 73.5 percent and 78.9 percent in 2012 and 2014, respectively. To measure past incarceration, the 2012 and 2014 versions asked

> "Have you ever been an inmate in a jail, prison, juvenile detention center, or other correctional facility?"

If yes, then

> "In your entire life, how much time in total have you been detained in a jail, prison, juvenile detention center, or other correctional facility?"

with possible responses of

> "less than one month, less than one year, 1-5 years, more than 5 years, or don't know."

After 2014, questions on incarceration appeared in the *Life History Mail Survey* (LHMS), which have been administered in 2015, 2017, and 2019. Eligibility for the LHMS differed from that for LBS. For example, in 2015 there were 11,256 eligible individuals. They consisted of all living HRS respondents not included in the 2015 *Consumption and Activities Mail Survey* (CAMS) and who had completed their most recent core interview in English (as opposed to Spanish). The response rate in 2015 was 58 percent. In 2017, the LHMS was administered to all respondents, including those in the CAMS and Spanish-speakers who had received a LHMS in 2015. The response rate was 74 percent for hose in the CAMS and 28 percent for Spanish-speakers. In an effort to complete the LHMS data collection, remaining HRS respondents who had not yet completed the survey were administered one in 2019. In summary, over a four-year period from 2015 through 2019, the HRS attempted to get life history information on all living respondents. For past incarceration, the LHMS was worded differently than the BLS. The LHMS asked

> "Before age 50, have you ever been in a jail, prison, or detention center for more than 3 days?"

with no further follow-up. In sum, these sources allow the retrospective measurement of past incarceration.

Column 1 of Table 2a gives descriptive statistics for selected variables in the HRS analysis sample. As the LHMS questions are anchored to age 50, the sample is limited to men born 1949-1969, 50-61 years old, and answered the incarceration question(s) in either the LBS or LHMS. This combination of ages and birth years effectively limits the sample to the 2010-2018 calendar years and, therefore, covers behavior prior to the COVID pandemic. To implement the IV identification strategy described below, the sample is further restricted to respondents who were native born, lived in the United States at age 10, and resided in one of the states for which Evans et al. (2016) were able to measure the date of entry of crack cocaine.

In total, there are 2,908 men in the main HRS sample, 65 percent of which are white. Almost 20 percent report having been incarcerated at some point. Just under 87 percent reported they had worked at least 10 years, which, if in covered employment, would have earned them enough credits for insured status. About 1-in-4 reported having ever applied for SSI or DI benefits, with 4 percent currently receiving SSI and 9.5 percent currently receiving DI. The

bottom panel of the table shows mean annual income from SSI and DI for those in current benefit receipt.

Columns 2-3 present similar statistics for the sub-samples of whites and non-whites, respectively. The incidence of past incarceration is substantially higher for non-white (27 percent) than white men (15 percent). Columns 4-5 split the sample by incarceration status. The formerly incarcerated are substantially less likely to be currently employed, worked at least 10 years, and have about 5 years less of career work experience on average. They also are more likely to have applied for SSI or DI and more likely to be in current benefit receipt. However, in the bottom panel, conditional on receipt, their annual SSI and DI income are lower than those for the never incarcerated, suggesting lower average career earnings.

Measuring Past Incarceration in the NLSY79

The HRS has the advantage of detailed measures of income, DI and SSI applications and benefit receipt. Its primary disadvantage is that the information on incarceration is retrospective and possibly subject to recall bias. In addition, as there might be stigma associated with past incarceration, there might be strategic underreporting. To complement the HRS analysis, data from men in the NLSY79 are used.[2] This NLS cohort was 14-21 years old in 1979, which places them in the 1957-1964 birth cohorts. Although this is a narrower range of birth years than for the HRS sample, the NLSY79 provides larger sample sizes than the HRS.

A key distinction between the surveys is how incarceration is measured. Men in the NLSY79 were interviewed each year from 1979-1994 and then every two years thereafter. In each wave, the residence type of respondents was recorded at the time of interview, including whether the respondent was in a jail, prison, or juvenile detention center. This was combined with two additional fields: retrospective questions in 1980 about pre-1979 incarceration and the reason for non-interview, which starting in 2004 included whether the non-respondent was in jail or prison. Together, these three sources in the NLSY79 allow for the construction of an indicator for ever incarcerated, as well as a coarse measure of the number of years (more specifically, interviews) the individual was incarcerated. An important distinction between measurement in the HRS and the NLSY79 is that the latter is more likely to pick up long spells of incarceration

[2] Gordon et al. (2022) also use the NLSY79.

(i.e., ones that occur at the time of interviews), whereas the former is more likely to pick up all spells of incarceration if recall is truthful.

Table 2b gives descriptive statistics for selected variables in the NLSY79 analysis sample and is structured like Table for the HRS. Again, the NLSY79 sample is limited to person-year observations on men 1957-1964, and to match the calendar years in the HRS analysis, in the 2010-2018 calendar years. Likewise, the sample is further restricted to respondents who were native born, lived in the United States as a child, and resided in one of the states for which Evans et al. (2016) were able to measure the date of entry of crack cocaine.

In total, there are 3,361 men in the main NLSY79 sample. A comparison of Tables 2a and 2b confirms that the measured incidence of incarceration is higher in the HRS than the NLSY79 samples: 19.6 percent of men reported having ever been incarcerated in the HRS, compared to 12.6 percent in the NLSY79. Qualitatively speaking, the differences across subsamples in the HRS in Table 1 are replicated in the NLSY79.

Identification Strategy

Documenting a positive correlation between incarceration and public benefit receipt is not necessarily evidence of a causal relationship, as those who became incarcerated as adults were not a random subset of the population of men in terms of their (counterfactual) evolution of employment and health over the lifecourse. In an attempt to isolate causal effects independently from other factors, this analysis implements an econometric identification strategy that relies on the timing of the entry of crack cocaine in the 1980s that differed across locations (states) to form an instrumental variable for the likelihood of incarceration. For the 36 largest states, Evans et al. (2016) estimated the year crack entered, based on the analysis of cocaine-related emergency room visits. Crack entered first in the gateway states of Florida, California, and New York in 1981 and slowly spread through the country. It did not arrive in Utah until 1988. Evans et al. (2016) argued the timing was plausibly exogenous and used it to estimate the impact of the emergence of crack on the educational attainment for young men in this period. I use the same timing to form an instrument for incarceration and then calculate instrumental variable estimates of the impact of past incarceration on later-life employment, DI, SSI, and poverty outcomes in both the 2010-2018 waves of the HRS and the NLSY79 for birth cohorts of men who were under age 40 when crack entered and were 50-61 in the 2010s, the peak ages for DI receipt.

Figure 4a illustrates this variation and strategy in the HRS analysis sample. The horizontal axis measures the age of individual when crack entered his state based on his place of residence when he was 10 years old. It ranges from age 15 to age 39 in the figure.[3] The vertical axis measures the percent of men ever incarcerated. The blue line is the non-parametric profile of incarceration by age at entry from a local polynomial regression of the former on the latter. There is a non-linear relationship: 20.5 percent of men who were 18 in the year when crack entered reported they had been incarcerated, which drops of sharply if crack entered at younger ages, and more gradually if crack entered at older ages. Those who were 36 or older when crack entered—with completed schooling and likely established in the labor market—had the lowest exposure. Figure 4b shows a similar pattern for the smaller age range measured in the NLSY79. Together, these figures illustrate graphically the simple first-stage relationship between the instrument based on age at entry and past incarceration.

The red line in Figure 5a is the non-parametric profile of number of years employed by age at entry, which illustrates graphically the simple reduced-form relationship between the instrument based on age at entry and career employment. It is read off the right-hand vertical axis. For comparison, the incarceration-age at entry profile from Figure 4a is shown in blue. It is read off the left-hand side vertical axis. There is a clear inverse relationship: high incarceration rates are associated with fewer years of lifetime employment. Note that the axes have different scales. Years of employment range from 17 to 33 years, so that small changes in the incidence of incarceration have large effects on lifetime employment. Figure 5b shows a similar pattern in the NLSY79.

Not all outcomes are measured in all samples, and for brevity not all reduced-form relationships are shown graphically. That said, Figures 6a and 6b illustrate the reduced-form relationship for SSI receipt, an outcome that is measured in the HRS, NLSY79, and the ACS. The latter does not have information on incarceration but has large samples for labor-market and benefit receipt and allows for reduced-form analysis. Figure 6c shows the reduced-form for SSI receipt in the ACS, where age at entry is measured for the individual's state of birth. Overall, there looks to be a good first-stage and reduced-form relationship with age at crack entry as the instrument.

[3] Due to small cell sizes, ages 14 and 15 are pooled in the figure, as are ages 39 and 40.

Estimation Results

Next, the analysis moves from the simple comparisons in Figures 4a-6c to a regression-based framework. Let i, a, s, and t index individuals, age, state of residence, and calendar time, respectively. Then the econometric model is

$$Y_{ist} = \alpha + \beta D_{is}^{Incarc} + \theta D_{i}^{White} + \omega_{at} + \gamma_{t} + \varphi_{s} + \tau_{st} + u_{ist} \quad (1)$$

In (1), Y is a labor-market, application, or benefit receipt outcome. D^{Incarc} is an indicator for whether the individual was incarcerated in the past: 1 if previously incarcerated, 0 otherwise. D^{White} is an indicator for race: 1 if white, 0 otherwise. α is the intercept. The parameters ω, γ, and φ represent year-of-birth, calendar-year, and state-of-residence fixed effects, respectively.

The rise in incarceration shown in Figure 3 was a combination not just of the emergence of crack cocaine, but also the adoption of truth-in-sentencing laws at the state level (including, for example, three-strikes laws), which sought stricter punishments for drug and drug-related crimes. If states that adopted truth-in-sentencing policies earlier were also states in which crack cocaine entered earlier, then omission of these policies from the econometric model might confound the IV estimates. To control for this, the specification includes τ, which measures the number of years of exposure to truth-in-sentencing policies in state of residence *s* in year *t*. It takes on a value of 0 in years in which there were no truth-in-sentencing laws in the state and the number of years of exposure (the difference between the truth-in-sentencing adoption year and the calendar year) after the laws were adopted. Therefore τ acts as a state-year linear trend in the years after truth-in-sentencing was adopted.

The focal parameter is β, which measures the effect of having been previously incarcerated on the outcome of interest. The central empirical objective is to get consistent estimates of β in (1), conditional on the other controls and fixed effects. To do so, the analysis uses as instruments for past incarceration a set of indicator variables D_{ei}^{Entry} that take on a value of 1 if crack entered for individual *i* when he was age *e* (based on his state of residence when he was age 10 in the HRS and state of birth in the NLSY79) and 0 otherwise. The first-stage model is:

$$D_{is}^{Incarc} = \alpha + \sum_{e=L}^{U} D_{ei}^{Entry} + \theta D_{i}^{White} + \omega_{at} + \gamma_{t} + \varphi_{s} + \tau_{st} + u_{ist}. \quad (2)$$

In (2), the entry ages e range from a lower bound L to an upper bound U. In the HRS, the bounds are $L = 14$ and $B = 39$. In the NLSY79, which covers a narrow range of birth years, the bounds are $L = 17$ and $B = 29$. The set of indicators allows for the type of non-linear response of entry age on past incarceration illustrated in Figures 4a-4b. The fundamental identifying assumption is that conditional on exposure to truth-in-sentencing policies, race, year of birth, calendar-year, and state-of-residence fixed effects that the age at which crack entered the state of residence in childhood is exogenous.

Panel A of Table 3a shows the OLS estimates of β for five labor-market outcomes in the HRS analysis sample. In column 1, the dependent variable is the number of years employed based on retrospective employment questions. Having been incarcerated is associated with 3.75 fewer years of employment. The associated IV estimate is shown in panel B.[4] It is of similar magnitude. The dependent variable in column 2 is an indicator for whether the individual was OASI fully insured, measured here as having reported at least 10 years (or 40 quarters) of employment. Similarly, the dependent variable in column 3 is an indicator for whether the individual had met the DI duration test, measured here as having reported at least enough years of employment to meet the test requirements for their age as shown in Table 1. The dependent variable in column 4 is an indicator for whether the individual is currently employed, whereas the outcome in column 5 is current OASDI taxable earnings. It is measured as reported earnings in the year below that year's covered earnings cap, then deflated into 2023 dollars using the all-items CPI. Across these five measures, the OLS estimates suggest that past incarceration is associated with worse labor market outcomes, with the associated IV estimates giving the same flavor but imprecisely estimated (based on the standard errors clustered by age at entry shown in parentheses).[5]

Table 3b shows a sharper set of results in the NLSY79 analysis sample. The IV estimates in first row in panel B indicate that past incarceration reduces career employment and the likelihood that the individual will be fully insured or have met the DI duration test.[6] The second row in Panel B shows a parallel set of estimates when the focal explanatory variable in (1),

[4] The *F*-statistic on the instrument set in the first stage was 3.33.
[5] The HRS has constructed measures of Social Security wealth every six years that in principle can be used to estimate the impact of ever having been incarcerated on the present value of the entitlement to Social Security benefits. In practice, however, those data cannot be merged with the geo-code data used in this analysis to form the instrument, so that the Social Security wealth data cannot appear in the current analysis.
[6] The *F*-statistic on the instrument set in the first stage was 5.18.

D_i^{Incarc}, measuring ever incarcerated is replaced with $Years_{it}^{Incarc}$, the cumulative number of years the individual has been incarcerated as of year *t.* These estimates also show that longer spells of incarceration are associated with even worse labor market outcomes.[7] Overall, past incarceration results in lower career labor-market attachment, making former prisoners less likely to attain eligibility for OASDI benefits.

Table 4a shows OLS and IV estimates for an array of DI and SSI outcomes. Column 1 shows estimates for disability status, whereas column 2 shows estimates for ever having applied for DI or SSI. In panel B, past incarceration raises the likelihood of having applied for DI or SSI by 30 percentage points, which is a large effect; and in column 3, the likelihood of currently receiving DI or SSI benefits by 25 percentage points, most of which operates through DI receipt (column 5) rather than SSI receipt (column 7). Finally, past incarceration has a market effect on later-life poverty, raising the absolute poverty rate, as measured by the federal poverty threshold, by 23 percentage points.

Table 4b shows for the NLSY79 analysis sample a parallel set of estimates for a subset of the outcomes in Table 5a for the HRS. In particular, the NLSY79 did not start to measure DI receipt until 2018 and did not ask questions on DI and SSI applications. The IV estimates in the first row of panel B, for which the focal explanatory variable is the indicator for ever incarcerated, are equivocal. For the second row in panel B, the results are sharper: the cumulative number of years incarcerated raises the likelihood of SSI receipt and being in poverty substantially.

Implications and Caveats

This report examined the relationship between past incarceration and later-life DI and SSI receipt, as well as poverty status. To isolate causal effects independently from other factors, this analysis used detailed micro-data from three nationally representative surveys—the *Health and Retirement Study* (HRS), *National Longitudinal Survey of Youth 1979 Cohort* (NLSY79) and the *American Community Survey* (ACS)—and a novel econometric identification strategy. The strategy relied on the timing of the entry of crack cocaine in the 1980s that differed across the states to form an instrumental variable for the likelihood of incarceration. The empirical analysis focused on the impact of past incarceration on later-life employment, DI, SSI, and poverty

[7] The *F*-statistic on the instrument set in the first stage was 5.12.

outcomes in both the 2010-2018 waves of the HRS and the NLSY79 for birth cohorts of men who were under age 40 when crack entered and were 50-61 in the 2010s, the peak ages for DI receipt.

Although the point estimates and their precision differ somewhat across measures and samples, when seen in combination there were three primary findings. Past incarceration reduced the career years of employment in general and the likelihood of meeting the DI duration test in particular, reducing eligibility for DI. Given the likely reduction in eligibility, however, past incarceration led to a 30-percentage-point increase in the likelihood of applying for DI or SSI benefits, with an 18-percentage-point increase in the likelihood of benefit receipt. Despite this, past incarceration raises by about 20 percentage points the likelihood the individual is in poverty as measured by the federal poverty threshold.

With appropriate caveats, these estimates can be used to calculate the additional 50- to 61-year-old men who received DI and SSI benefits related to past incarceration for the calendar years spanning the analysis. In particular, Shannon et al. (2017) generated national estimates of the number of formerly incarcerated men by year up through 2010. These were extended through 2016, the last year with available data. Then the estimated 2008 age distribution of former prisoners from Schmitt and Warner (2010) was used to calculate the number of formerly incarcerated men in the 50-61 age range nationally. Then assuming the 2008 age distribution for ex-prisoners held in the 2010-2016 period, the IV estimates from Table 5a were applied for three outcomes: DI receipt, SSI receipt, and poverty status.

The results are plotted in Figure 7. For each year, the blue line measures the additional number of men (in thousands) who received DI benefits due to past incarceration, assuming the IV estimates in Table 5a represent causal effects. On average, DI rolls are about 300,000 higher for 50-61-year-old men because of past incarceration. SSI rolls are about 50,000 higher (the red line). Finally, incarceration has resulted in about 375,000 additional men between 50 and 61 years of age being under the federal poverty threshold in the 2010-2016 period. These results imply that the decline in aggregate DI receipt since 2012 shown in Figure 3 was partially blunted by the decline in incarceration then and the consequent rise in the number of ex-prisoners in the civilian population.

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Table 1. Minimum Number of Credits (and Years of Employment) to Satisfy the DI Eligibility Duration Test by Age of Disability Onset

	(1)	(2)
	Minimum Number of	
Age at Onset:	Credits	Years of Employment
28 or younger	6	1.50
29	7	1.75
30	8	2.00
31	9	2.25
32	10	2.50
33	11	2.75
34	12	3.00
35	13	3.25
36	14	3.50
37	15	3.75
38	16	4.00
39	17	4.25
40	18	4.50
41	19	4.75
42	20	5.00
43	21	5.25
44	22	5.50
45	23	5.75
46	24	6.00
47	25	6.25
48	26	6.50
49	27	6.75
50	28	7.00
51	29	7.25
52	30	7.50
53	31	7.75
54	32	8.00
55	33	8.25
56	34	8.50
57	35	8.75
58	36	9.00
59	37	9.25
60	38	9.50
61	39	9.75

Table 2a. Mean of Selected Variables in the HRS Analysis Sample, Standard Deviation in Parentheses

Variable:	(1) Full	(2) White	(3) Non-White	(4) Ever Incarcerated	(5) Never Incarcerated
White	0.647	1	0	0.509	0.680
Ever Incarcerated	0.196	0.154	0.273	1	0
Age at Crack Entry	27.6	27.8	27.4	27.5	27.6
	(4.1)	(4.1)	(4.1)	(4.0)	(4.1)
Currently Employed	0.704	0.765	0.592	0.550	0.742
Annual Covered Earnings	50,083	58,750	33,319	28,348	55,377
	(52,523)	(54,600)	(43,624)	(40,305)	(53,779)
OASI Fully Insured	0.866	0.918	0.770	0.784	0.886
Number of Years Employed	26.0	28.4	21.8	22.2	27.0
	(12.5)	(11.4)	(13.1)	(13.1)	(12.1)
Met DI Duration Test	0.876	0.927	0.783	0.801	0.894
Ever Applied for DI or SSI	0.240	0.180	0.348	0.438	0.191
Currently Receiving DI or SSI	0.118	0.084	0.181	0.205	0.097
Currently Receiving DI	0.095	0.072	0.136	0.144	0.082
Currently Receiving SSI	0.040	0.020	0.076	0.093	0.027
Currently Under Poverty Threshold	0.140	0.088	0.237	0.252	0.113
Conditional on Receipt:					
Annual Combined DI and SSI Income	13,319	14,893	11,979	11,979	14,012
	(7,302)	(7,947)	(6,413)	(6,204)	(7,723)
Annual DI Income	13,275	14,863	11,742	12,500	13,606
	(6,321)	(7,040)	(5,096)	(5,887)	(6,474)
Annual SSI Income	7,939	9,016	7,413	7,057	8,680
	(5,036)	(5,515)	(4,708)	(4,410)	(5,584)
Length of Current Receipt Spell (Years)	9.4	9.1	9.6	9.0	9.5
	(7.8)	(7.6)	(8.0)	(7.3)	(8.0)
Number of Person-Year Observations	8,636	5,779	3,157	1,753	7,183
Number of Persons	2,908	1,886	1,022	553	2,355

Note: Column 1 presents the unweighted mean of each variable for the full HRS analysis sample of 8,636 person-year observations on 2,908 persons. Standard deviations for continuous variables are shown in parentheses. Columns 2 and 3 split the sample by race; columns 4 and 5 split the sample by part incarceration.

Table 2b. Mean of Selected Variables in the NLSY79 Analysis Sample, Standard Deviation in Parentheses

Variable:	(1) Full	(2) White	(3) Non-White	(4) Ever Incarcerated	(5) Never Incarcerated
White	0.521	1	0	0.252	0.559
Ever Incarcerated	0.126	0.061	0.197	1	0
Age at Crack Entry	23.7	24.0	23.4	23.2	23.8
	(2.9)	(2.9)	(2.9)	(2.9)	(2.9)
Currently Employed	0.731	0.803	0.652	0.473	0.767
Annual Covered Earnings	58,145	71,236	43,643	21,492	63,399
	(50,935)	(52,000)	(45,531)	(30,945)	(51,078)
OASI Fully Insured	0.951	0.976	0.924	0.826	0.969
Number of Years Employed	28.1	30.6	25.8	19.5	29.3
	(8.4)	(7.2)	(9.0)	(9.1)	(7.5)
Met DI Duration Test	0.965	0.983	0.946	0.869	0.979
Currently Receiving SSI	0.072	0.044	0.102	0.182	0.056
Currently Under Poverty Threshold	0.147	0.077	0.228	0.424	0.109
Conditional on Receipt:					
Annual SSI Income	10,859	11,122	10,734	10,096	11,212
	(7,549)	(8,064)	(7,296)	(6,327)	(8,032)
Number of Person-Year Observations	14,529	7,564	6,965	1,830	12,699
Number of Persons	3,361	1,747	(1,614)	(457)	(2,904)

Note: Column 1 presents the unweighted mean of each variable for the full NLSY79 analysis sample of 14,529 person-year observations on 3,361 men. Standard deviations are shown in parentheses. Means for the subsamples of whites, non-whites, ever incarcerated, and never incarcerated men are shown in columns 2-5, respectively.

Table 3a. Ordinary Least Squares (OLS) and Instrumental Variable (IV) Estimates of the Impact of Incarceration on Selected Measures of Employment and Earnings, in the HRS Analysis Sample, Standard Errors Clustered by Age at Crack Entry in Parentheses

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable:				
Focal Explanatory Variable:	Cumulative Number of Years Employed	OASI Fully Insured	Met the DI Duration Test	Currently Employed	Current Taxable Earnings
A. OLS Estimates					
Ever Incarcerated	-3.75	-0.079	-0.072	-0.164	-22,475
	(0.71)	(0.024)	(0.024)	(0.015)	(1,925)
B. IV Estimates					
Ever Incarcerated	-2.75	-0.005	0.016	-0.172	-43,506
	(3.52)	(0.114)	(0.097)	(0.136)	(24,398)

Note: The first row in Panel A gives OLS estimates of the impact of ever having been incarcerated on the outcome shown in the respective column, based on the sample of 8,636 person-year observations on 2,908 men 50-61 years old in the HRS in 2010-2018, as described in column 1 of Table 3a and the text. The second row shows the estimate for cumulative years incarcerated at that point in time in the panel. All specifications control for a dummy variable for white, a full set of year-of-birth, calendar-year, and state-of-residence dummy variables, plus the number of years exposed to truth-in-sentencing laws in the state of residence, which acts like a linear state trend for those states that adopted those laws. Panel B shows the parallel associated IV estimates using the set of dummy variables for age at crack entry as instruments. The first-stage *F*-statistic is 3.33. All standard errors are clustered on the age at crack entry.

Table 3b. Ordinary Least Squares (OLS) and Instrumental Variable (IV) Estimates of the Impact of Incarceration on Selected Measures of Employment and Earnings, in the NLSY79 Analysis Sample, Standard Errors Clustered by Age at Crack Entry in Parentheses

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable:				
Focal Explanatory Variable:	Cumulative Number of Years Employed	OASI Fully Insured	Met the DI Duration Test	Currently Employed	Current Taxable Earnings
A. OLS Estimates					
Ever Incarcerated	-8.77	-0.133	-0.102	-0.255	-34,569
	(0.48)	(0.021)	(0.015)	(0.028)	(1,827)
Cumulative Years Incarcerated	-1.69	-0.036	-0.029	-0.035	-4,716
	(0.08)	(0.004)	(0.003)	(0.003)	(352)
B. IV Estimates					
Ever Incarcerated	-12.67	-0.414	-0.373	-0.011	-19,443
	(4.23)	(0.146)	(0.095)	(0.308)	(28,501)
Cumulative Years Incarcerated	-2.32	-0.106	-0.083	-0.063	-4,919
	(0.96)	(0.020)	(0.017)	(0.043)	(4,000)
Sample Size	14,529	14,529	14,529	14,421	13,296

Note: The first row in Panel A gives the OLS estimates of the impact of ever having been incarcerated on the outcome shown in the respective column heading. The second row shows the estimate for cumulative years incarcerated at that point in time in the panel, which is from a separate regression. All specifications control for white, year-of-birth, calendar-year, state-of-residence, plus the number of years exposed to truth-in-sentencing laws. Panel B shows the parallel associated IV estimates using dummies for age at crack entry as instruments. The first-stage F-statistic is 5.2 for ever incarcerated and 5.1 for cumulative years incarcerated. All standard errors are clustered on the age at crack entry.

Table 4a. Ordinary Least Squares (OLS) and Instrumental Variable (IV) Estimates of the Impact of Incarceration on Selected Measures of DI, SSI, and Poverty, in the HRS Analysis Sample, Standard Errors Clustered by Age at Crack Entry in Parentheses

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dependent Variable:								
Focal Explanatory Variable:	Disabled	Ever Applied for DI or SSI	Currently Receiving DI or SSI	Years Receiving DI or SSI	Currently Receiving DI	Annual DI Income	Currently Receiving SSI	Annual SSI Income	Under Federal Poverty Threshold
A. OLS Estimates									
Ever Incarcerated	0.200	0.219	0.091	0.85	0.050	1,261	0.056	484	0.115
	(0.016)	(0.020)	(0.020)	(0.27)	(0.014)	(399)	(0.014)	(160)	(0.012)
B. IV Estimates									
Ever Incarcerated	0.195	0.301	0.254	1.82	0.183	3,643	0.038	-53	0.228
	(0.125)	(0.140)	(0.119)	(1.88)	(0.109)	(2,173)	(0.070)	(714)	(0.071)

Note: The first row in Panel A gives OLS estimates of the impact of ever having been incarcerated on the outcome shown in the respective column, based on the sample of 8,636 person-year observations on 2,908 men 50-61 years old in the HRS in 2010-2018, as described in column 1 of Table 3a and the text. The second row shows the estimate for cumulative years incarcerated at that point in time in the panel. All specifications control for a dummy variable for white, a full set of year-of-birth, calendar-year, and state-of-residence dummy variables, plus the number of years exposed to truth-in-sentencing laws in the state of residence, which acts like a linear state trend for those states that adopted those laws. Panel B shows the parallel associated IV estimates using the set of dummy variables for age at crack entry as instruments. The first-stage *F*-statistic is 3.33. All standard errors are clustered on the age at crack entry.

Table 4b. Ordinary Least Squares (OLS) and Instrumental Variable (IV) Estimates of the Impact of Incarceration on Selected Measures of DI, SSI, and Poverty, in the NLSY79 Analysis Sample, Standard Errors Clustered by Age at Crack Entry in Parentheses

	(1)	(2)	(3)	(4)
	Dependent Variable:			
Focal Explanatory Variable:	Disabled	Currently Receiving SSI	Annual SSI Income	Under Federal Poverty Threshold
A. OLS Estimates				
Ever Incarcerated	0.143	0.112	-1,534	0.278
	(0.018)	(0.018)	(430)	(0.029)
Cumulative Years Incarcerated	0.018	0.018	-191	0.047
	(0.003)	(0.003)	(71)	(0.004)
B. IV Estimates				
Ever Incarcerated	0.015	0.198	-573	0.212
	(0.213)	(0.136)	(2,937)	(0.236)
Cumulative Years Incarcerated	0.052	0.039	140	0.087
	(0.037)	(0.018)	(371)	(0.030)
Sample Size	14,529	14,400	1,036	12,440

Note: The first row in Panel A gives the OLS estimates of the impact of ever having been incarcerated on the outcome shown in the respective column heading. The second row shows the estimate for cumulative years incarcerated at that point in time in the panel, which is from a separate regression. All specifications control for white, year-of-birth, calendar-year, state-of-residence, plus the number of years exposed to truth-in-sentencing laws. Panel B shows the parallel associated IV estimates using dummies for age at crack entry as instruments. The first-stage F-statistic is 5.2 for ever incarcerated and 5.1 for cumulative years incarcerated. All standard errors are clustered on the age at crack entry.

Figure 1. Labor Force Participation Rate by Age for Men Since 1980

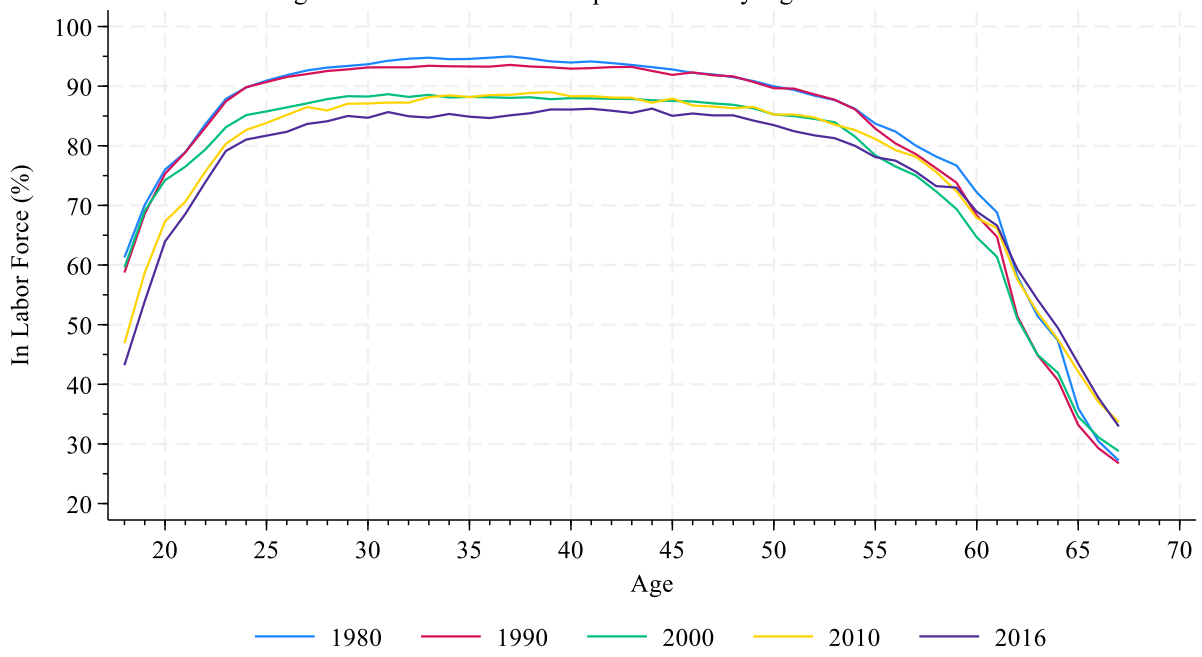


Figure 2. Employment Rate by Age for Men Since 1980

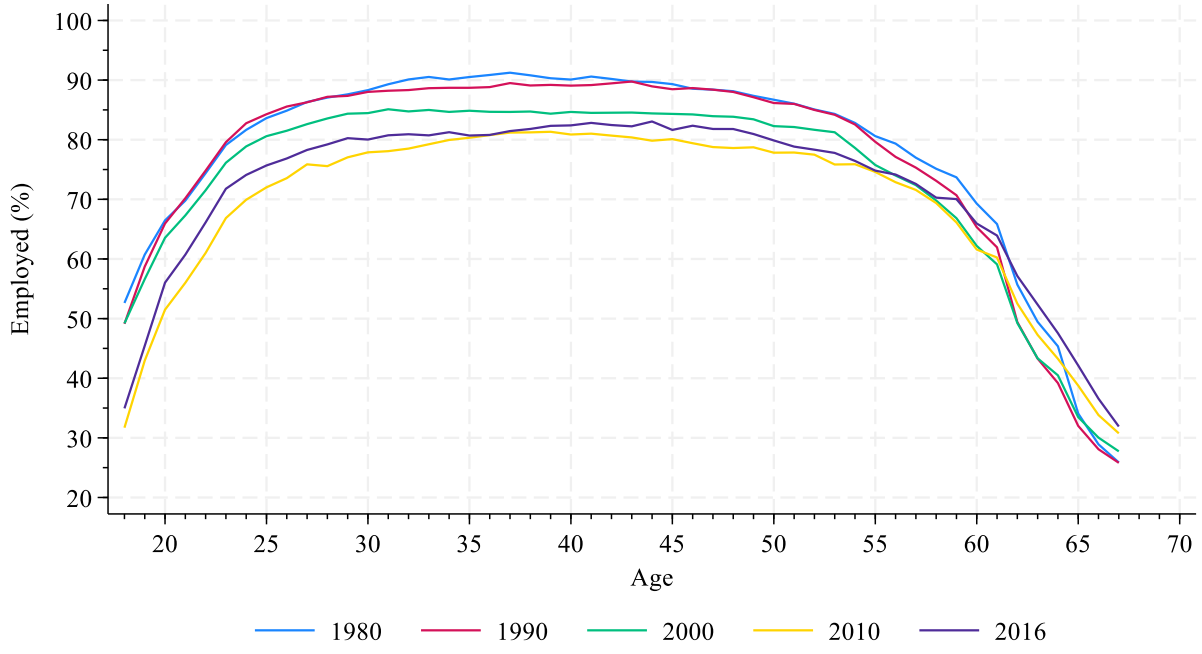


Figure 3. Number of Men Receiving DI Benefits and Incarcerated, 1977-2021

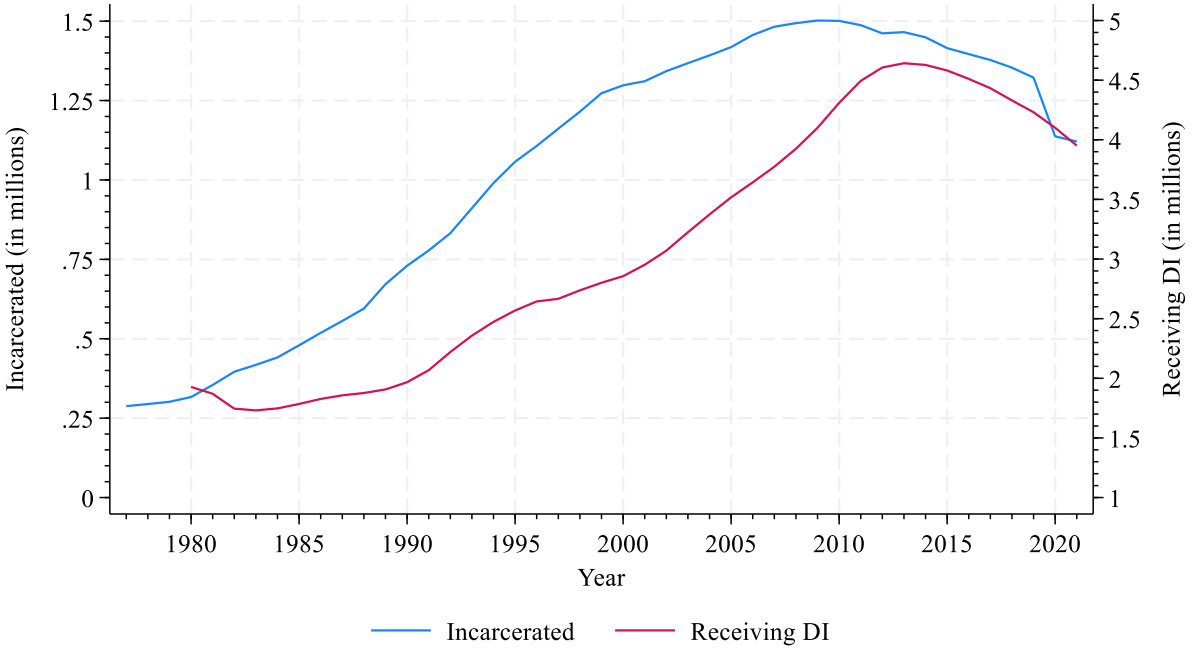


Figure 4a. Past Incarceration by Age When Crack Entered for Men in the HRS

Figure 4b. Past Incarceration by Age When Crack Entered for Men in the NLSY79

Figure 5a. Past Incarceration and Years Employed by
Age When Crack Entered for Men in the HRS

Figure 5b. Past Incarceration and Years Employed by
Age When Crack Entered for Men in the NLSY79

Figure 6a. Past Incarceration and SSI Receipt by
Age When Cracked Entered for Men in the HRS

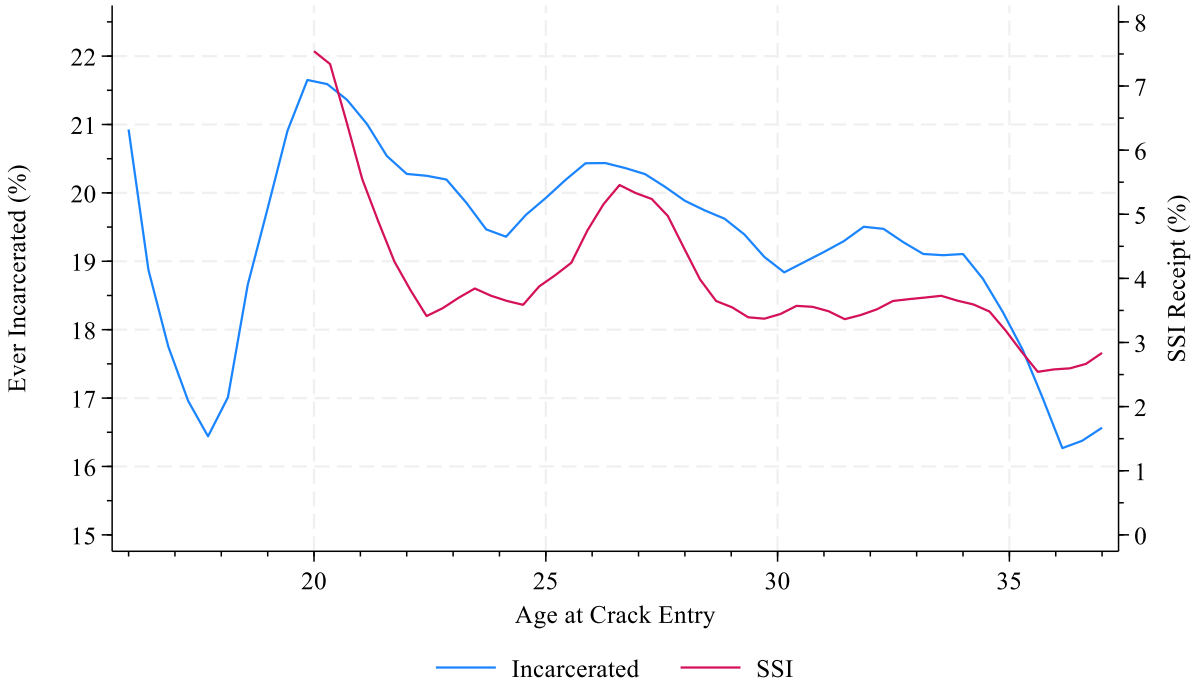


Figure 6b. Past Incarceration and SSI Receipt by
Age When Crack Entered for Men in the NLSY79

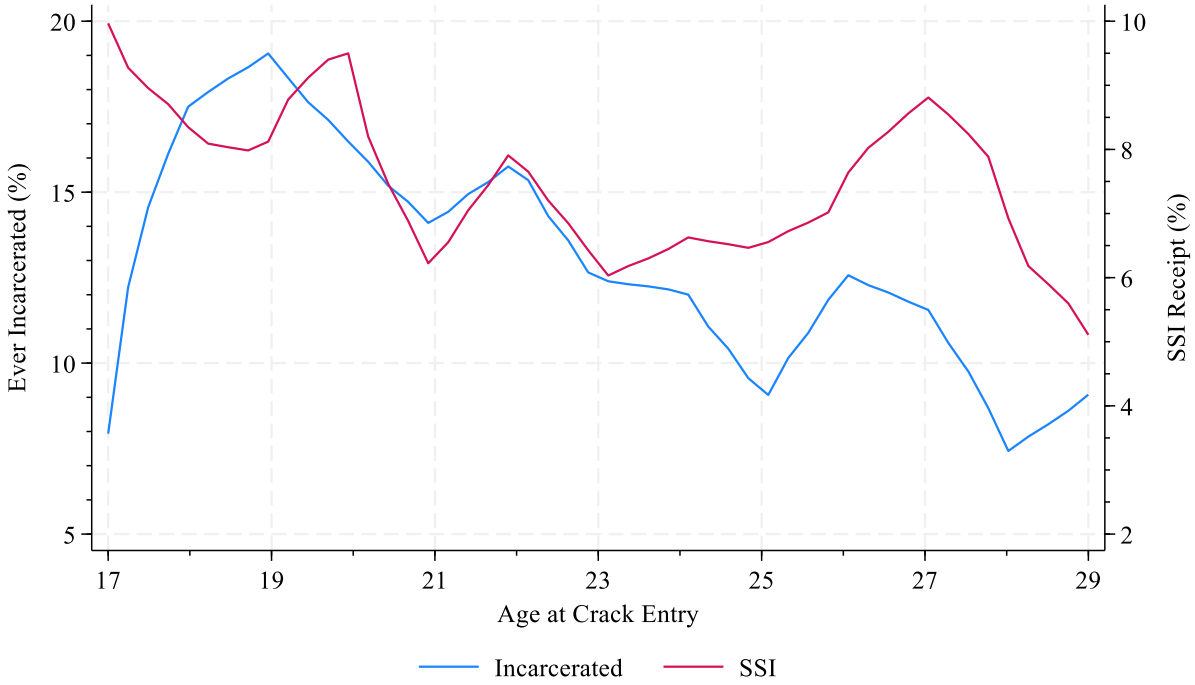


Figure 6c. SSI Receipt by Age at Crack Entry in the ACS

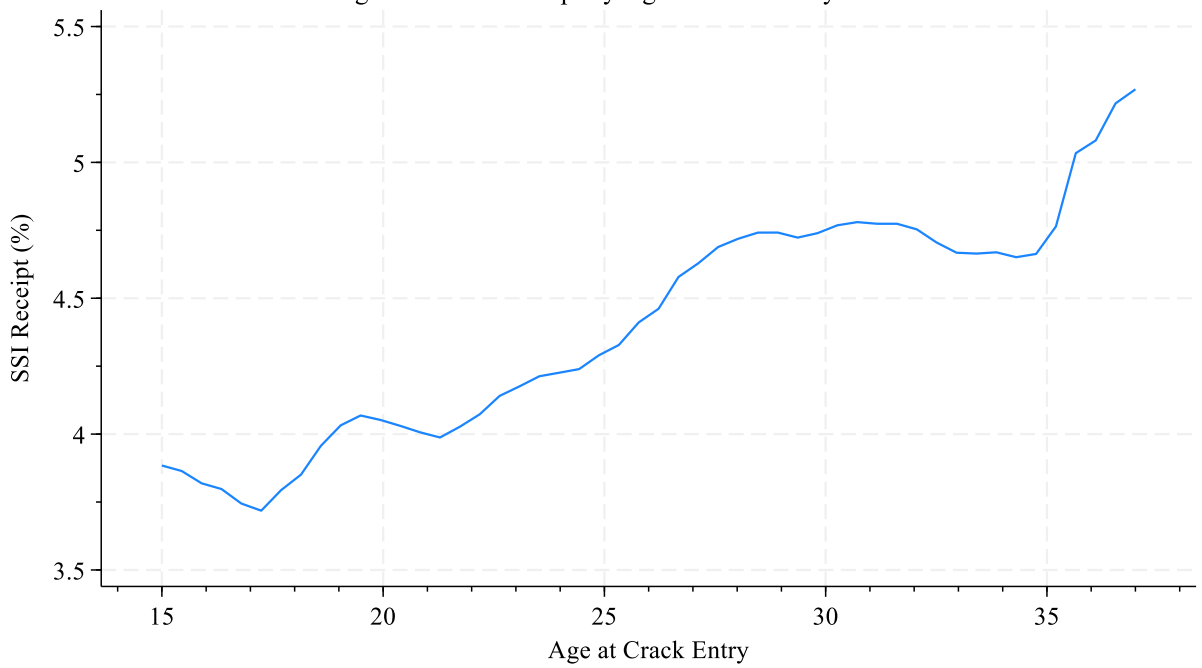
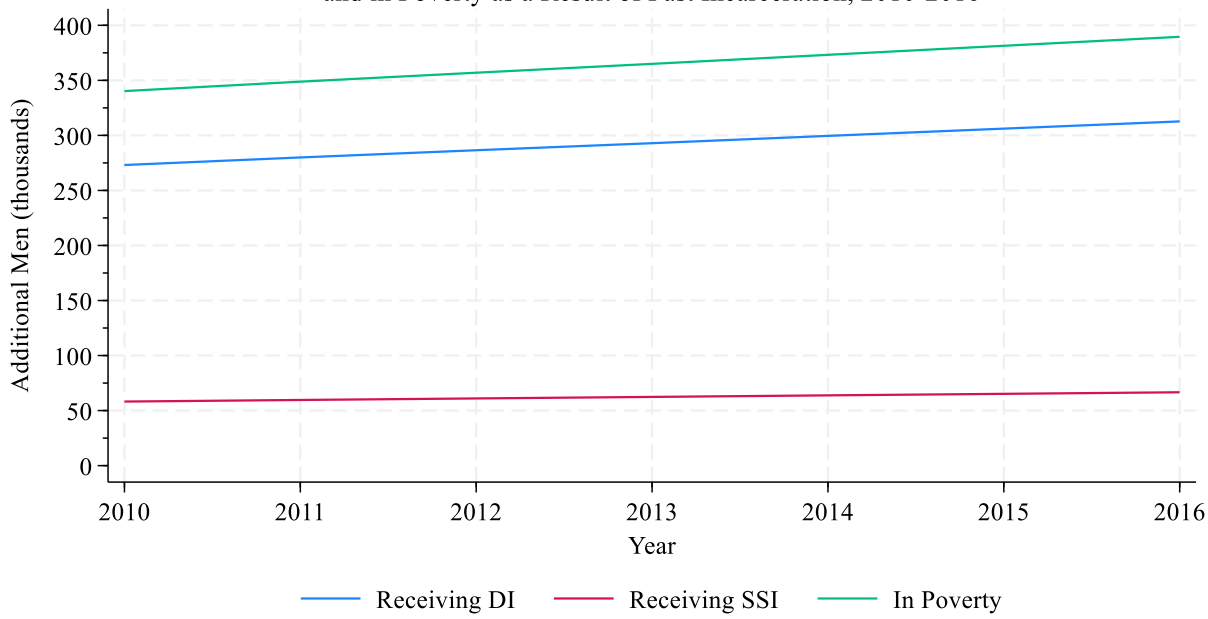


Figure 7. Estimated Additional 50-61 Year Old Men Receiving DI, SSI, and in Poverty as a Result of Past Incarceration, 2010-2016



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