Ex-offenders and the Labor Market

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Executive Summary

We use Bureau of Justice Statistics data to estimate that, in 2008, the United States had between 12 and 14 million ex-offenders of working age. Because a prison record or felony conviction greatly lowers ex-offenders' prospects in the labor market, we estimate that this large population lowered the total male employment rate that year by 1.5 to 1.7 percentage points. In GDP terms, these reductions in employment cost the U.S. economy between $57 and $65 billion in lost output.

Our estimates suggest that in 2008 there were between 5.4 and 6.1 million ex-prisoners (compared to a prison population of about 1.5 million and a jail population of about 0.8 million in that same year). Our calculations also suggest that in 2008 there were between 12.3 and 13.9 million ex-felons.

In 2008, about one in 33 working-age adults was an ex-prisoner and about one in 15 working-age adults was an ex-felon. About one in 17 adult men of working-age was an ex-prisoner and about one in 8 was an ex-felon.

An extensive body of research has established that a felony conviction or time in prison makes individuals significantly less employable. It is not simply that individuals who commit crimes are less likely to work in the first place, but rather, that felony convictions or time in prison act independently to lower the employment prospects of ex-offenders.

Given our estimates of the number of ex-offenders and the best outside estimates of the associated reduction in employment suffered by ex-offenders, our calculations suggest that in 2008 the U.S. economy lost the equivalent of 1.5 to 1.7 million workers, or roughly a 0.8 to 0.9 percentage-point reduction in the overall employment rate.

Since over 90 percent of ex-offenders are men, the effect on male employment rates was much higher, with ex-offenders lowering employment rates for men by 1.5 to 1.7 percentage points.

Even at the relatively low productivity rates of ex-offenders (they typically have less education than the average worker), the resulting loss of output that year was likely somewhere between $57 and $65 billion.

The rise in the ex-offender population – and the resulting employment and output losses – overwhelmingly reflects changes in the U.S. criminal justice system, not changes in underlying criminal activity. Instead, dramatic increases in sentencing, especially for drug-related offenses, account for the mushrooming of the ex-offender population that we document here.

Substantial scope exists for improvement. Since high levels of incarceration are not the result of high levels of crime, changes in sentencing today can greatly reduce the size of the ex-offender population in the future. Moreover, the high cost in terms of lost output to the overall economy also suggests the benefits of taking action to reduce the substantial employment barriers facing ex-offenders.

In the absence of some reform of the criminal justice system, the share of ex-offenders in the working-age population will rise substantially in coming decades, increasing the employment and output losses we estimate here.

Introduction

Federal, state, and local governments in the United States currently hold about 2.3 million people in prisons and jails[1] and supervise another 5.1 million people on parole or probation.[2] As recent research from the Pew Center on the States has emphasized, these figures translate to about one in 100 American adults[3] behind bars and about one in 33 American adults[4] under some form of correctional control.[5] In this report, we examine an even larger population connected to the criminal justice system – the growing number of ex-offenders (ex-prisoners and ex-felons) – most of whom are not currently in prison or jail nor on probation or parole. (See **Figure 1** below.)[6]

An extensive body of research has established that a felony conviction or time in prison makes individuals significantly less employable. This effect is not simply that individuals who commit crimes were less likely to work in the first place. Rather, the best available evidence suggests that felony convictions or time in prison has an independent impact that further lowers the employment prospects of ex-offenders. Given the number of ex-offenders and the best estimate of the associated reduction in employment suffered by this population, our calculations suggest that in 2008 the US economy lost the equivalent of 1.5 to 1.7 million workers, or roughly a 0.8 to 0.9 percentage-point reduction in the overall employment rate. Since over 90 percent of ex-offenders are men, the effect on male employment rates was much higher, with ex-offenders lowering employment rates for men by 1.5 to 1.7 percentage points. Even at the relatively low productivity rates of ex-offenders (they typically have much less education than the average worker), the resulting loss of output that year was likely somewhere between $57 and $65 billion.

The rise in the ex-offender population – and the resulting employment and output losses – overwhelmingly reflect changes in the U.S. criminal justice system, not changes in underlying criminal activity. In 2008, for example, both violent and property crimes were below their 1980 rates, about when the current incarceration boom got underway. Instead, dramatic increases in sentencing probabilities and sentence lengths, especially for drug-related offenses, account for both the increase in the incarcerated population and the mushrooming of the ex-offender population that we document here.[7]

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1 Data on prison and jail inmates for 2008 from Sabol, West, and Cooper (2009). Prisons are state and federal facilities, usually run by the government, but sometimes on a contract basis by private companies, that usually hold convicted criminals with sentences of a year or longer; jails are local facilities, usually run by local governments, but sometimes by contractors, that usually hold convicted criminals with sentences of less than one year or unconvicted individuals awaiting trial.

2 Data for probation and parole for 2008 from Glaze and Bonczar (2009). "Probation is a court-ordered period of correctional supervision in the community generally as an alternative to incarceration. In some cases probation can be a combined sentence of incarceration followed by a period of community supervision. Parole is a period of conditional supervised release in the community following a prison term" (p. 1).

3 Public Safety Performance Project (2008). Separately, Schmitt, Warner, and Gupta (2010) estimate that one of every 48 working-age men was in prison or jail in 2008.

4 Public Safety Performance Project (2009).

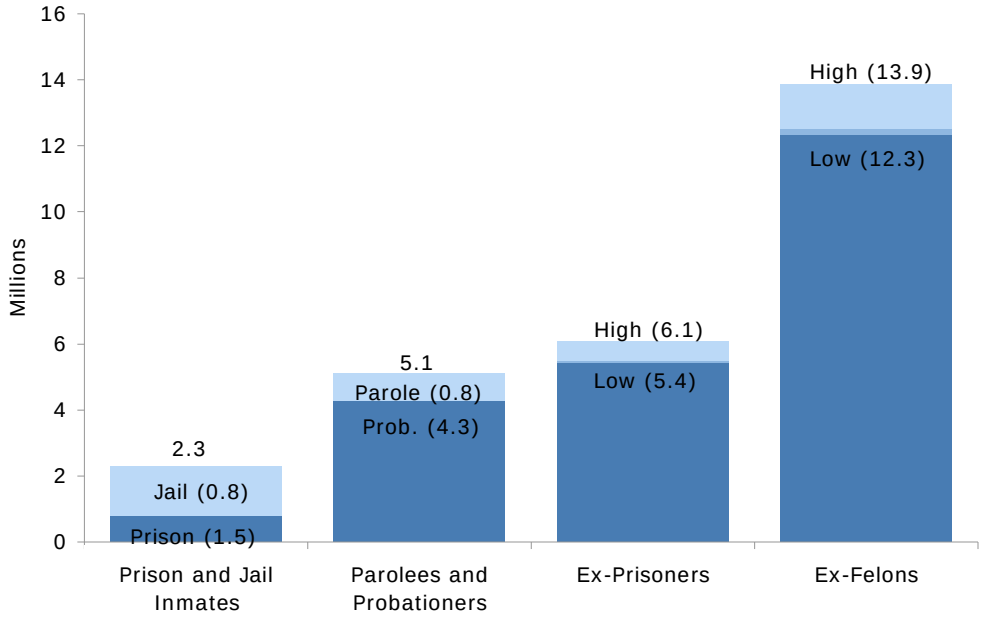
5 For a recent overview of incarceration and crime in the United States, see Schmitt, Warner, and Gupta (2010). For a modern history of incarceration in the United States, see Abramsky (2007).

6 High and low estimates for ex-prisoners and ex-felons vary according to assumptions about recidivism; see text below for details.

7 See Schmitt, Warner, and Gupta (2010), pp. 7-9.

While we cannot undo the felony convictions and the prison sentences that have created today's large ex-offender population, we have substantial scope for improvement going forward. Since high levels of incarceration are not the result of high levels of crime (and since the research consensus also suggests that incarceration has a relatively small effect on lowering crime[8]), changes in sentencing today can greatly reduce the size of the ex-offender population in the future. The high cost in terms of lost output to the overall economy also suggests the benefits of taking action to reduce the substantial employment barriers facing current ex-offenders.[9]

FIGURE 1
Estimates of Correctional Populations, 2008



Source: Authors' analysis of BJS data. High and low estimates for ex-prisoners and ex-felons vary according to assumptions about recidivism.

Every indication is that, in the absence of some reform of the criminal justice system, the share of ex-offenders in the working-age population will rise substantially in coming decades. Even if imprisonment rates remain at current levels, the aging of today's younger cohorts – which have much higher rates of imprisonment than the older cohorts they will eventually replace – will continue to raise the share of ex-offenders in the total population. In either case, the future employment and output losses would be higher than what we have estimated here for 2008.

Estimating the Size of the Ex-offender Population

Unfortunately, there are no publicly available data that can provide a direct estimate of the ex-offender population. Instead, we produce two indirect estimates of the formerly imprisoned population, and then use these calculations as the basis for estimating the ex-felon population.

8 See, among others, Austin, et al. (2007), Irwin, Schiraldi, and Ziedenberg (1999), Public Safety Performance Project (2007), Schmitt, Warner, and Gupta (2010), and Stemen (2007).
9 See Center for Employment Opportunities (2006) and Emsellem (2010).

Table 1 reports our final estimates of the ex-offender population using these various approaches. The first two columns show the result of an analysis of administrative data that count the number of prisoners released from state and federal prisons in each year from 1962 through 2008. Beginning with the cohort of prisoners released in 1962, we "track" each year's cohort of released prisoners over time, assuming that the released population has an age and gender structure identical to the incarcerated prison population in the year they were released. We use the assumed age structure to "age" ex-prisoners out of the working-age population as they turn 65; similarly, we apply an estimate of the annual death rate, by age, using a death rate that reflects this high-risk population. Finally, we apply a high and a low estimate of the recidivism rate (about 40 percent of ex-prisoners return to prison within three years of release), which substantially reduces our estimate of the ex-offender population.[10] (For further details, see the **Appendix**.) This first procedure suggests that the ex-prisoner population in the United States in 2008 stood at between 5.4 million (using a high estimate of recidivism) and 6.1 million (using a low estimate of recidivism).

TABLE 1
Estimated Size of Ex-offender Population, Age 18-64, 2008
(thousands)

Ex-prisoners			Ex-felons		
Release data Recidivism		Lifetime	Release data Recidivism		Lifetime
Low	High	probability	Low	High	probability
6,094	5,427	5,504	13,851	12,333	12,508

Notes: Ex-felon population estimated from ex-prisoners, assuming: 90% of prisoners are state prisoners, 10% are federal prisoners, 42% of felons convicted in state courts are sentenced to prison, 62% of felons convicted in federal courts are sentenced to prison (authors' analysis of BJS data, 1992-2006, see text for details).

The third column shows the results of a separate analysis, which draws on survey data rather than administrative records. We took the total number of men of each age from 18 to 64 in 2008 (from the 2008 Current Population Survey), applied an age-specific estimate of their probability of ever having been imprisoned, and then summed these across all age levels to produce an estimate of the total male population age 18 to 64 that had ever been imprisoned. We estimated the age-specific probability of ever having been imprisoned by age 30-to-34 from estimates[11] at three periods of time (for birth cohorts from 1945-49, 1965-69, and 1975-79) and used linear interpolation for years where no direct data were available. (For further details, see the Appendix.) The resulting estimate is 5.5 million.[12]

The first three estimates in Table 1 are fairly close to each other. They are also close to two independent estimates made by earlier researchers. Thomas Bonczar (2003) of the Bureau of Justice Statistics (BJS), for example, used generation life table techniques (which were also the basis for the Western (2006) and Western and Pettit (2010) estimates that we use here) to estimate the lifetime probability of imprisonment in the U.S. population. Assuming age-specific rates of first incarceration

10 Our approach is similar in spirit to Uggen, Manza, and Thompson (2006), who generated estimates of the ex-prisoner and ex-felon populations through 2004.

11 Western and Pettit (2010) and Western (2006).

12 This estimate is based on data for men only, which we have scaled up for a total ex-prisoner population, using the average share of men in the prison population in Table 2.

remained at 2001 levels, Bonczar concluded that the number of adults having ever served time in prison would rise to 7.3 million by 2008. Given that about 1.6 million people were in state and federal prisons in 2008, Bonczar's forecast implies a 2008 ex-prisoner population of about 5.7 million.[13] Uggen, Manza, and Thompson (2006), using an approach similar to the one we have used here, concluded that there were about 4.0 million ex-prisoners in 2004.[14]

The final three columns of Table 1 give estimates of the ex-felon population. The ex-felon population is larger than the ex-prisoner population because not all felons serve prison terms (more than half are sentenced to jail or probation only). To produce these estimates, we used administrative data[15] on the share of all felons sentenced to state or federal prison (about 44 percent) in order to "scale up" the ex-prisoner population in the first half of Table 1 to the implied ex-felon population.[16] (For details, see the Appendix.) This procedure suggests that the total ex-felon population in 2008 was somewhere between 12.3 million and 13.9 million people. Again, our estimates for 2008 are broadly consistent with the only other estimate of the ex-felon population of which we are aware, by Uggen, Manza, and Thompson (2006), for 2004.[17] They used a more elaborate estimation procedure than we do and concluded that there were about 11.7 million ex-felons in the United States in 2004.

The share of ex-offenders in the working-age population will likely rise substantially in coming decades. The most recent available data, for example, suggest that about 9.7 percent of 30-to-34 year-old men today have been in prison – the highest rate recorded since these kinds of data became available in the 1970s.[18] As this cohort – and younger cohorts with as high or higher lifetime probabilities of imprisonment – age, they will replace older cohorts that have lower rates, which will raise the share of ex-offenders in the working-age population above current levels. Moreover, the BJS has estimated that about 11.3 percent of males born in 2001 will be imprisoned at some point during their lifetime, compared to just 3.6 percent of those born in 1974.[19] These higher projected imprisonment rates for cohorts below age 30 imply large additional increases in the ex-offender population over time.

We are also interested in the basic demographic characteristics of the ex-offender population. We approximate these characteristics by applying demographic data for prisoners to the ex-prisoner and ex-felon populations estimated in Table 1 and making some adjustments to reflect differences in recidivism and sentencing across different populations. **Table 2** provides some basic demographic information on prisoners in 1960, 1980, 2000, and 2008. Across the entire period, men are the overwhelming majority of prisoners (in excess of 90 percent). The prison population is also generally far less educated than the general population. In 2008, more than one-third of prisoners had less

13 Bonczar (2003), p. 7. Bonczar estimated the ex-prisoner population to be about 4.3 million in 2001, up from about 1.6 million in 1974 (see Bonczar, 2003, Table 1).

14 Uggen, Manza, and Thompson (2006), Table 1.

15 Langan and Graziadei (1995), Langan (1996), Langan and Brown (1997), Brown and Langan (1997), Brown and Langan (1999a), Brown and Langan (1999b), Durose, Levin, and Langan (2001), Durose and Langan (2003), Durose and Langan (2004), Durose and Langan (2007), and Rosenmerkel, Durose, and Farole (2009).

16 For example, if we had estimated that there were 440,000 ex-prisoners, we would assume that these 440,000 ex-prisoners represented 44 percent of the total ex-felon population (the rest were sentenced to jail or probation), giving us an estimate of total ex-felons of one million (440,000 / 0.44 = 1,000,000).

17 Uggen, Manza, and Thompson (2006), Table 2.

18 Calculation based on Western and Pettit (2010), Table 1.

19 Bonczar (2003), p. 1.

than a high school degree (compared to just over 10 percent in the non-institutional population[20]); just over half had only a high school degree (compared to about 30 percent in the non-institutional population); and only about 11 percent of prisoners had had any college-level education (compared to almost 60 percent of the non-institutional population). In 1960, a large majority of prisoners were white (about 62 percent, but this figure includes Latinos). The share of whites, however, has fallen steadily to about only one-third in 2008. Meanwhile, African Americans have become heavily over-represented in prison, making up almost 40 percent of prisoners in 2008 (compared to less than 15 percent of the non-institutional population). The share of Latinos in the total prison population has been rising since at least 1980 and Latinos are also now substantially over-represented in the prison population (just over 20 percent of prisoners in 2008, compared to about 15 percent of the non-institutional population in the same year). Finally, prisoners are generally much younger than the non-institutional population.

TABLE 2
Estimated Prisoner Demographics, 1960-2008
(percent)

	1960	c. 1980	c. 2000	c. 2008
Female	3.8	4.0	6.7	8.5
Male	96.2	96.0	93.3	91.5
Men only				
Less than high school	85.5	51.0	39.6	36.6
High school	10.6	35.0	49.3	52.0
Any college	3.9	14.0	11.1	11.4
White	*62.3*	42.9	35.3	33.3
Black	*36.1*	42.5	46.3	39.2
Latino	--	12.3	16.7	20.6
Other	*1.6*	2.2	1.7	6.9
18-19	6.3	4.9	2.7	1.7
20-24	19.7	22.7	16.1	14.5
25-29	18.2	19.7	18.8	17.2
30-34	16.2	15.6	18.9	16.6
35-39	12.7	12.9	17.2	15.8
40-44	8.6	9.6	12.1	14.1
45-49	6.2	5.8	6.7	9.5
50-54	4.2	3.4	3.7	5.3
55-59	2.8	1.9	1.8	2.7
60-64	1.4	1.0	0.9	1.3
18-64	*96.4*	*97.6*	*98.9*	*98.7*

Notes: In 1960, Latino was not treated as a separate category (all 1960 data from Tables 4 and 25 of U.S. Bureau of the Census, 1961); for 1980, race is for jail and prison inmates (Ewert, Pettit, and Sykes, 2010, Table 1); 1980 gender from BJS (1981b); all education data is for state prisoners only, federal prisoners (10% of all prisoners) are slightly more educated; 1980 education is for 1979 (Pettit and Western, 2004, Table 2); 2000 education is for 1997 (Harlow, 2003, Table 6); 2008 education is for 2004 (Glaze and Maruschak, 2008, Appendix Table 16); 1980 age groups interpolated from 1970 and 1991 data (U.S. Bureau of the Census, 1972 and Gilliard and Beck, 1998); remaining data for 2000 from Harrison and Beck (2001), with age groups 45-49 and 50-54 broken out from 45-54 age group, age groups 55-59 and 60-64 broken out from 55+ age group, based on proportions from closest year available (2007, from West and Sabol, 2008); remaining data for 2008 from Sabol, West, and Cooper (2009).

20 Authors' analysis of the CEPR extract of the CPS Outgoing Rotation Group.

Table 3 gives estimates of the basic demographic characteristics of the ex-offender population. We have assumed that the ex-offender population has the average demographic characteristics as the prison population in Table 2 and have made adjustments to reflect the higher recidivism rate and the higher likelihood of imprisonment conditional on committing a felony for black and Latino offenders.[21] We use these estimates of the characteristics of the ex-offender population below when we analyze the impact of the large ex-offender population on various labor-market outcomes. While we believe that these estimates for subgroups can provide a general idea of the differences in the sizes of relative subgroups in the ex-offender population, these calculations have a larger range of uncertainty than our calculations for total ex-offender or the total male ex-offender populations and should be taken as broadly indicative rather than as definitive estimates.

TABLE 3
Estimated Size of Ex-offender Population, Age 18-64, by Education and Race or Ethnicity, 2008
(thousands)

	Ex-prisoners			Ex-felons		
	Release data Recidivism		Lifetime	Release data Recidivism		Lifetime
	Low	High	probability	Low	High	probability
All	6,094	5,427	5,504	13,851	12,333	12,508
Female	449	400	406	1,021	909	922
Male	5,645	5,026	5,098	12,829	11,424	11,585
LTHS	2,743	2,443	2,477	6,235	5,552	5,630
HS	2,073	1,846	1,872	4,712	4,195	4,255
College	829	738	748	1,883	1,677	1,701
White	2,230	1,985	2,013	5,867	5,224	5,298
Black	2,251	2,004	2,033	4,593	4,090	4,148
Latino	874	778	789	1,784	1,588	1,611

Notes: Authors' analysis, using data in Tables 1 and 2. Race and ethnicity categories exclude the "other" category in Table 2.

21 We use the average over the period 1980-2008. Based on BJS data for 1983 and 1994, we assume that, on average, African American ex-prisoners have a recidivism rate that is about 9 percent higher than the average, Latinos about 14 percent higher than average, and whites about 9 percent lower than average. In the absence of good data on recidivism rates by education, we apply the overall African American rate to less than high school educated workers, the average rate to high school educated workers, and then adjust the population of ex-offenders with more education so that all three educational categories sum to the total ex-offender population as calculated using the average rate across all groups. A higher recidivism rate lowers estimates of the ex-offender population. Based on BJS data covering 1992 through 2006, we assume that blacks (and Latinos, for which no separate data are available, though Harris, Steffensmeier, Ulmer, and Painter-Davis (2009) suggest that Latinos face at least the same disadvantage as blacks) have about an 11 percent higher chance than the average of being sentenced to prison after committing a felony and that whites (which includes Latinos in these data) have about a 14 percent lower probability than average of being sentenced to prison after a felony conviction. A higher probability of being sentenced to prison after committing a felony reduces our estimates of ex-felons. The resulting calculations changes the mix of ex-offenders across the three groups, but yields a total for these groups that is quite close to what the average imprisonment rate for ex-felons implies; the small remaining discrepancy changes the share of the "other" racial and ethnic group in the total male ex-offender population (not shown in Table 3). We also adjust the overall male and female shares to adjust for the lower recidivism rate among women; but in the absence of data, we make no additional adjustment by gender for the probability of being sentenced to prison conditional on a felony conviction.

The Effects of Imprisonment and Felony Conviction on Subsequent Employment

A felony conviction or a prison or jail term can have a substantial negative impact on future job prospects.[22] Researchers have identified several distinct channels for this effect.[23] Time behind bars can lead to deterioration in a worker's "human capital," including formal education, on-the-job experience, and even "soft skills" such as punctuality or customer relations. Incarceration can also lead to the loss of social networks that can help workers find jobs; and, worse, provide former inmates with new social networks that make criminal activity more likely. Incarceration or a felony conviction can also impart a stigma that makes employers less likely to hire ex-offenders. In many states, a felony conviction also carries significant legal restrictions on subsequent employment,[24] including limitations on government employment and professional licensing.

Quantifying the impact of incarceration or a felony conviction on subsequent labor-market outcomes, however, is challenging. Many ex-prisoners and ex-felons struggled in the labor market before their convictions and likely would have continued to have had problems even without trouble with the law.[25] Nevertheless, a fairly large body of research has attempted to isolate the labor-market effects of prison time and felony convictions. The five most common approaches have used: (1) surveys of individuals that track offenders before and after their incarceration; (2) surveys of employers attitudes about ex-felons; (3) "audits" that compare the employment prospects of otherwise identical job applicants with and without felony convictions; (4) aggregate state- or city-level data that compare labor-market outcomes across demographic groups with different experiences of incarceration; and (5) administrative data that track offenders before and after their incarceration. Taken together, this research consistently shows a substantial negative effect of a felony conviction or time in prison or jail on the employment prospects of ex-offenders.

Longitudinal Surveys of Individuals

Probably the most influential research on the impact of incarceration on subsequent labor-market outcomes has used survey data that follows a large sample of individuals over time, and is thus able to compare both offenders to non-offenders, and offenders before and after their time in prison and jail. Almost all of this research has used the National Longitudinal Survey of Youth (NLSY), a nationally representative sample of about 13,000 young men and women who were 14 to 22 years old when they were first interviewed in 1979; these respondents were re-interviewed every year until

22 Incarceration may also work to improve an offender's labor-market prospects if the time in prison or jail has a rehabilitative effect or leads to the acquisition of additional education or training. High recidivism rates and the results of empirical investigations (see below) suggest that this countervailing effect is likely to be small.

23 For recent reviews of research on the labor-market consequences of a criminal or prison record, see: Pager (2007, Chapter 3); Holzer (2007, pp. 10-29); Western (2006, Chapter 5); The Pew Charitable Trusts (2010, pp. 9-17).

24 Ex-prisoners may also be less likely to work because some face high implicit marginal tax rates stemming from child-support obligations, which generally accumulate while they are in prison. Between ongoing obligations and prison-related arrears, some ex-prisoners have large sums deducted from their pay checks for child support (Holzer 2007; Holzer, Raphael, and Stoll 2004; Mincy and Sorenson 1998; and Garfinkel 2001.

25 The direction of causality is complicated. As Western (2002) notes: "men with few economic opportunities may turn to crime" (p. 526) but also "desistance from crime is associated with social attachments and the normative bonds of regular employment" (pp. 526-27).

1994 and every-other year since then.[26] Unlike most large, nationally representative surveys, the NLSY interviews respondents even when they are in prison and jail, and notes the location of the interview, which allows researchers to identify those initial respondents who were subsequently incarcerated. Since the share of young women interviewed in prison or jail was small, all of the NLSY studies reviewed here focused exclusively on men.

The earliest research using the NLSY identified large employment effects of incarceration. Freeman (1991), for example, found that incarceration led to a 15 to 30 percentage-point decline in subsequent employment rates. Grogger (1992) concluded that differences in incarceration rates between young white and young black men accounted for about one third of the black-white employment gap in the NLSY data.

Later research based on the NLSY, generally using more refined estimation techniques, has found somewhat smaller, but still large, employment effects. Western and Beckett (1999) estimated that incarceration reduced ex-offenders' average annual weeks of work by about five weeks, relative to a baseline of 42 weeks (about a 12 percent decline in employment). The effect diminishes over time, but remains statistically significant over the seven year period they studied.[27] Western (2006) found that time in jail or prison cut employment by about five weeks per year (9.7 percent) for young white men; about eight weeks per year (15.1 percent) for young black men; and about eight weeks per year (13.7 percent) for young Hispanic men.[28] Raphael (2007) concluded that incarceration lowered annual weeks worked by 6-11 weeks (which, assuming an average of 48 weeks per year, is roughly a 13 to 23 percent decline in employment). The most recent analysis of the NLSY data, by the Pew Charitable Trusts (2010), found that incarceration reduced the average number of weeks worked by a 45 year old male by about 9 weeks (about 19 percent).[29]

Geller, Garfinkel, and Western (2006) have used another (short) longitudinal study, the Fragile Families and Child Wellbeing Survey (FFCWS),[30] to produce independent estimates that also suggest a large effect of incarceration on employment. The FFCWS follows the families of a cohort of almost 5,000 children born in 20 U.S. cities between 1998 and 2000, including the children's married and unmarried parents. The survey has detailed information on the parents' economic situation as well as their incarceration status.[31] They conclude that "...employment rates of formerly incarcerated men are about 6 percentage points lower than for similar men who have not been incarcerated."

Employer Surveys

Harry Holzer and collaborators (Holzer, 1996; Holzer, Raphael, and Stoll, 2004, 2006, 2007) have asked employers directly about their attitudes toward hiring job applicants with criminal records. They interviewed about 3,000 employers in four large metropolitan areas (Atlanta, Boston, Detroit, and Los Angeles) over the period 1992-94, and then did a follow-up study of 600 employers in Los

26 For more details on the NLSY, see the Bureau of Labor Statistics, http://www.bls.gov/nls/nlsy79.htm.
27 See Western and Beckett (1999), Figure 3 and discussion on pages 1050-51.
28 See Western (2006), Figure 5.1 and discussion on p. 119.
29 See Pew Charitable Trusts (2010), Figure 4. Bruce Western and Becky Pettit conducted the data analysis for The Pew Charitable Trusts.
30 For more information, see The Fragile Families and Child Wellbeing Study at http://www.fragilefamilies.princeton.edu/.
31 Geller, Garfinkel, and Western also focus exclusively on men; they use fathers' self-reported incarceration status as well as independent reports of fathers' incarceration status provided by mothers.

Angeles in 2001.[32] In the initial survey, they sought to "gauge... employer willingness to hire a variety of workers with various stigmas – such as having a criminal record, being a welfare recipient, having an unstable work history, etc. – into the job filled by the last worker hired at the firm" (Holzer, 2007, pp. 11-12) In the follow-up survey, they "also asked about actual hiring of ex-offenders, as well as self-reported willingness to do so; and asked a more detailed set of questions about employer perceptions of offenders and their willingness to hire them" (Holzer, 2007, p. 12).

Employers reported that they were much less likely to hire ex-offenders. The vast majority of employers (80 to 90 percent), for example, said that they would 'definitely' or 'probably' hire "former welfare recipients, workers with little recent work experience or lengthy unemployment, and other stigmatizing characteristics" (Holzer, 2007, p. 14). By contrast, only about 40 percent of employers would 'definitely' or 'probably' hire applicants with criminal records, especially for jobs that involved dealing with customers or handling money.[33]

Audit Studies

Another group of studies goes beyond employers' self-reported attitudes to examine actual employer behavior using "audit" studies. In audit studies, researchers present actual employers filling actual vacancies with carefully constructed job applications or specially trained actors posing as applicants. In both situations, the basic features of the applications or the applicants are designed to be identical on all relevant hiring dimensions except the feature of interest, in this case, criminal record. Researchers can then measure the extent of barriers facing ex-offenders by examining differences in "call back" and job offer rates across the two groups.

The earliest research used "correspondence" studies, involving letters or paper applications rather than in-person applicants. Richard Schwartz and Jerome Skolnick (1962), for example, had a researcher, posing as an employment agent, present prospective employers with files on possible employees. The researcher then asked if the employer would be interested in hiring the candidate. Employers were less likely to express interest in applicants with a criminal record. Moreover, as Pager (2007, p. 50) notes: their "findings ... suggest that *mere contact* [emphasis in original] with the criminal justice system can have significant repercussions, with records of "arrest," "conviction," and "incarceration" conveying a stigma differing in degree but not kind."[34]

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32 For more information on the "Multi-City Study of Urban Inequality" see http://www.sociology.emory.edu/MCSUI/.

33 The research by Holzer, Raphael, and Stoll also suggests that employers may engage in statistical discrimination against members of groups (particularly, young less-educated black men) with high incarceration rates. As Holzer (2007) points out, this may reduce estimates of the effect of incarceration on subsequent wages and employment in studies using the NLSY or the FFCWS.

34 Pager (2007) has identified two other related studies using correspondence methodologies with broadly consistent findings. The first is R.H. Finn and Patricia A. Fontaine (1985, p. 353): "Employment applications were prepared for 20 fictitious job applicants, and were then rank ordered by 225 undergraduate students enrolled in personnel management classes based on perceived suitability for employment in an entry-level job. Job applicants differed from each other on three treatments: type of crime allegedly committed, judicial outcome, and sex. Employability scores were derived for each applicant by converting the rank orders to a normal distribution with a given mean and standard deviation. Analysis of the data revealed a clear bias against all applicants who had allegedly committed a crime. The magnitude of the bias was related to the type of crime allegedly committed, and to the judicial outcome." And Dov Cohen and Richard E. Nisbett (1997).

More recently, Devah Pager (2003) carried out a large, carefully designed in-person audit of 350 employers in Milwaukee in 2001 (see also Pager 2007). She sent out pairs of otherwise identical white applicants (100) and otherwise identical black applicants (250), where one member of each matched pair had a criminal record. She found that respondents with a criminal record were less than half as likely as those with no criminal record to get a call back.[35]

Aggregated Geographic Data

Harry Holzer, Paul Offner, and Elaine Sorensen (2005) have used variation in incarceration rates across the U.S. states to measure the effect of incarceration on employment rates of young black men. They conclude that "...post-incarceration effects ... contribute to the decline in employment activity among young black less-educated men in the past two decades, especially among those age 25-34" (p. 1). More specifically, they estimate that "the roughly 3 percentage point increase in lagged incarceration from the early 1980s through the year 2000 reduced employment of young black men by 2-4 percentage points" (pp. 19-20).

Administrative Data

A final set of studies uses administrative data, rather than survey data, to track the labor-market outcomes of inmates before and after their time in prison or jails. Typically, these studies link state or federal data on released prisoners to their employment record (including employment status and earnings), as revealed by their participation in state unemployment insurance systems. In strong contrast to the other research reviewed so far, these studies have generally found little or no negative effect of incarceration on employment (see Waldfogel (1994); Needels (1996), using data from Georgia; Grogger (1992), using data from California; Cho and LaLonde (2005), using data from Illinois; Kling (2006), using data from California and Florida; Pettit and Lyons (2007), using data from Washington; and Sabol (2007), using data from Ohio).

Holzer (2007), however, reviews most of these studies and argues: "a number of problems plague all of these studies based on administrative data ... [unemployment insurance] records only capture earnings in formal jobs ... [and] would automatically exclude public sector jobs, any employment that occurs in another state, any self-employment, and most importantly – any casual and informal work for cash... "[36] (p. 22). He notes that the employment rates, both before and after incarceration, tend to be "dramatically lower" in the administrative-data studies than they are in the NLSY studies (p. 23). He continues: "Another problem arises from the absence of a clear control or comparison group of non-offenders in at least some of these studies. Simple pre-post incarceration comparisons of employment and earnings outcomes may tell us little about the counterfactual situation that would have existed in the absence of incarceration" (p. 23). He concludes that: "These considerations suggest that the studies based on administrative data might well understate the negative impacts of incarceration on subsequent earnings or employment" (p. 25).

Assessment of Employment Effects

The preceding review suggests that most of the available research finds that incarceration or a criminal record has moderate to large effects on subsequent employment levels. The wide range of

35 See Pager, 2007, Figure 5.1, p. 91.

36 Holzer (2007, p. 22) notes that: "*part-time and casual employment likely characterize much work among offenders and ex-offenders, both pre- and post-incarceration.*" [emphasis in original]

research techniques, different populations studied, and metrics used to express the employment impact, however, present a specific challenge for our purposes. We are interested in estimating the likely employment impact of the large ex-offender population on the employment rate of all working-age men. But, the preceding estimates of effects generally do not translate directly to the exercise we are conducting here. The estimates based on longitudinal surveys of individuals come closest to capturing the effect we are trying to measure, and generally suggest moderate to large employment effects. The findings based on aggregate state-level data are consistent with small to moderate effects, but are not as directly applicable. The employer surveys and audit studies are generally consistent with large, negative effects of incarceration on subsequent employment, but are even more difficult to translate to the kinds of reduction in employment probabilities that are most useful for our analysis. The administrative studies, which find at most only small negative effects of incarceration on employment, are more in spirit methodologically with the longitudinal studies, but have technical difficulties and are inconsistent with all the other available data.

In the analysis we conduct in the next section of the paper, therefore, we use three separate estimates of the employment effects of incarceration. In the low-effects scenario, we assume that ex-prisoners or ex-felons pay an employment penalty of five percentage points (roughly consistent with the largest effects estimated using administrative data and the lower range of effects estimated using the aggregate data and survey data). In the medium-effects scenario, we assume that the employment penalty faced by ex-prisoners and ex-felons is 12 percentage points, which is consistent with the bulk of the survey-based studies. In the high-effects scenario, we assume that the employment penalty is 20 percentage points, which is consistent with the largest effects estimated in the survey-based studies, as well as, arguably, the findings of the employer surveys and audit studies.

Estimating the Impact of the Ex-offender Population on Total Employment and Output

In this section, we use our estimates of the size of the ex-offender population (Section II) and the outside estimates of the impact of having a prison or felony record on subsequent employment probabilities (Section III) to assess the likely impact of the large and growing ex-offender population on key labor-market outcomes.

As a first step, we compare the size of the ex-offender population to the total non-institutional working-age population. **Table 4** expresses the estimated ex-offender population in Table 3 as a percent of the total non-institutional working-age population.[37] In 2008, ex-prisoners were 2.9 to 3.2 percent of the total working-age population (excluding those currently in prison or jail), or about one in 33 working-age adults. Ex-felons were a larger share of the total working-age population: 6.6 to 7.4 percent, or about one in 15 working-age adults. Ex-offenders were heavily concentrated among men. Between 5.4 and 6.1 percent, or about one in 17 working-age adults, were ex-prisoners; between 12.3 and 13.9 percent, or about one in 8 working-age adults, were ex-felons. African-American men and men with less than a high school degree had the highest concentration of ex-offenders.

37 Total population age 18 to 64 from the 2008 CPS.

TABLE 4
Estimated Ex-offender Population as Share of Civilian Non-institutional Population, 2008
(percent)

	Ex-prisoners			Ex-felons		
	Release data Recidivism		Lifetime	Release data Recidivism		Lifetime
	Low	High	probability	Low	High	probability
All	3.2	2.9	2.9	7.4	6.6	6.7
Female	0.5	0.4	0.4	1.1	1.0	1.0
Male	6.1	5.4	5.5	13.9	12.3	12.5
LTHS	25.2	22.4	22.7	57.2	50.9	51.6
HS	6.8	6.1	6.1	15.5	13.8	14.0
College	1.6	1.4	1.5	3.7	3.3	3.3
White	3.6	3.2	3.3	9.5	8.5	8.6
Black	21.4	19.1	19.4	43.8	39.0	39.5
Latino	6.0	5.3	5.4	12.2	10.9	11.0

Notes: Authors' analysis of Table 3 and Current Population Survey data for population.

Next, we use the relative size of the ex-offender population in Table 4 to estimate the impact on employment rates in 2008. **Table 5** shows the impact on the working-age male population assuming a low, medium, and high effect of imprisonment or a felony record on subsequent employment. Assuming a low effect (a reduction of about 5 percentage points relative to a comparable worker without prison time or a felony conviction), in 2008, the ex-offender population lowered overall male employment about 0.3 to 0.7 percentage points. Assuming a mid-range effect (a 12-percentage-point employment penalty), ex-offenders lowered overall male employment between 0.7 and 1.7 percentage points. Finally, assuming a large effect (a 20-percentage-point penalty), ex-offenders cut male employment rates 1.1 to 2.8 percentage points.

TABLE 5
Estimated Reduction in Employment-to-Population Rate, All Males 2008

Ex-prisoners			Ex-felons		
Release data Recidivism		Lifetime	Release data Recidivism		Lifetime
Low	High	probability	Low	High	probability
(a) Assuming 5-percentage-point employment penalty for ex-offenders					
0.3	0.3	0.3	0.7	0.6	0.6
(b) Assuming 12-percentage-point employment penalty for ex-offenders					
0.7	0.7	0.7	1.7	1.5	1.5
(c) Assuming 20-percentage-point employment penalty for ex-offenders					
1.2	1.1	1.1	2.8	2.5	2.5

Notes: Authors' analysis of Table 4.

Table 6 presents results of a similar exercise for additional groups of workers, using only the mid-range estimate of the employment penalty (a 12-percentage-point employment penalty for ex-offenders). According to these estimates, in 2008, the ex-offender population reduced employment

rates for 18 to 64 year olds as a whole by 0.3 to 0.9 percentage points. The impact was biggest for African-American men, lowering employment rates between 2.3 and 5.3 percentage points. Men with less than a high school education were also especially hard hit, with an estimated decline in employment rates of 2.7 to 6.9 percentage points as a result of the large ex-offender population; to put this decline in context, between 1979 and 2008, employment rates for less than high school educated men in the non-institutional population fell a total of 9.3 percentage points.

TABLE 6
Estimated Decline in Employment Rates in 2008
(Percentage points; Assuming 12-percentage-point Employment Penalty)

	Ex-prisoners			Ex-felons		
	Release data Recidivism		Lifetime	Release data Recidivism		Lifetime
	Low	High	probability	Low	High	probability
All	0.4	0.3	0.4	0.9	0.8	0.8
Female	0.1	0.1	0.1	0.1	0.1	0.1
Male	0.7	0.7	0.7	1.7	1.5	1.5
LTHS	3.0	2.7	2.7	6.9	6.1	6.2
HS	0.8	0.7	0.7	1.9	1.7	1.7
College	0.2	0.2	0.2	0.4	0.4	0.4
White	0.4	0.4	0.4	1.1	1.0	1.0
Black	2.6	2.3	2.3	5.3	4.7	4.7
Latino	0.7	0.6	0.6	1.5	1.3	1.3

Notes: Authors' analysis of Tables 4 and 5.

Ex-offenders, of course, bear the direct cost of these lower employment rates, in the form of lower lifetime earnings. But, the economy as a whole also pays a price in reduced output of goods and services. Using the estimated reduction in total employment rates of 0.8 to 0.9 percentage points (from columns four and five of the first row of Table 6), and assuming that ex-offenders produce only one-half the output of the average worker, we estimate that the large ex-offender population cost the United States about 0.4 to 0.5 percentage points of GDP in 2008, or roughly $57 to $65 billion.

Conclusion

Bruce Western and Katherine Beckett (1999) have rightly called the criminal justice system a U.S. labor-market institution. Our estimates suggest that ex-offenders lower overall employment rates as much as 0.8 to 0.9 percentage points; male employment rates, as much as 1.5 to 1.7 percentage points; and those of less-educated men as much as 6.1 to 6.9 percentage points. These employment losses hit ex-offenders hardest, but also impose a substantial cost on the U.S. economy in the form of lost output of goods and services. In GDP terms, we estimate that in 2008 these employment losses cost the country $57 to $65 billion per year.

Appendix

We use two methods to estimate the number of ex-prisoners ages 18-64 in the United States. The first is based on annual releases from state and federal prisoners in the United States. The second is based upon lifetime probabilities of being incarcerated.

Releases

We start with published data on total prisoners, total admissions, and from 1977 on, total releases, in each year. Before 1977, we estimate that total number of releases each year from federal and state prison admissions using data on total prison admissions and the total prison population. For example, in 1962 (the first year we look at because an 18-year-old released in that year would be 64 in 2008), there were 89,082 admissions; adding this figure to the total number of prisoners in 1961 (220,149) results would give a total of 309,231 prisoners in 1962. However, we know from data on the total prisoner population in 1962 that there were only 218,830 prisoners in that year, which implies that there were 90,401 releases in 1962. We do a similar calculation for each year up through 1976, and from 1977 we use the directly reported release figure. (See **Appendix Table 1**).

APPENDIX TABLE 1
Total, Admitted, and Released Prisoners, 1962-2008

Year	Total	Admissions	Releases	Year	Total	Admissions	Releases
1961	220,149	N/A	N/A	1985	480,568	271,366	234,496
1962	218,830	89,082	90,401	1986	522,084	304,858	263,181
1963	217,283	87,826	89,373	1987	560,812	339,762	305,098
1964	214,336	87,578	90,525	1988	603,732	379,742	336,822
1965	210,895	87,505	90,946	1989	680,907	460,798	385,479
1966	199,654	77,857	89,098	1990	739,980	474,128	419,783
1967	194,896	77,850	82,608	1991	789,610	480,046	436,991
1968	187,914	72,058	79,040	1992	846,277	495,756	447,105
1969	196,007	75,277	67,184	1993	932,074	518,562	456,408
1970	196,429	79,351	78,929	1994	1,016,691	541,434	456,942
1971	198,061	89,395	87,763	1995	1,085,022	562,724	491,858
1972	196,092	99,440	101,409	1996	1,137,722	555,992	504,289
1973	204,211	109,484	101,365	1997	1,194,334	584,177	528,848
1974	218,466	119,529	105,274	1998	1,248,370	615,226	561,020
1975	240,593	129,573	107,446	1999	1,304,188	614,985	574,804
1976	262,833	146,388	124,148	2000	1,329,367	625,219	604,858
1977	285,456	163,203	147,895	2001	1,345,217	638,978	628,626
1978	294,396	162,574	154,484	2002	1,380,516	661,712	630,176
1979	301,470	172,753	166,132	2003	1,408,361	686,437	656,384
1980	315,956	182,617	169,826	2004	1,433,793	699,812	672,202
1981	353,673	212,264	174,955	2005	1,462,866	733,009	701,632
1982	395,516	230,834	188,435	2006	1,504,660	749,798	713,473
1983	419,346	250,061	225,856	2007	1,532,850	742,875	721,161
1984	443,398	246,260	221,768	2008	1,540,036	739,132	735,454

Source: 1962-1970, 1975 admissions from Cahalan (1986) p. 36 (data for missing years was not available, and so was interpolated from adjacent years); 1961-1976 total from Cahalan, p. 35; 1977-1998 data from the BJS's National Corrections Reporting Program, available at http://bjs.ojp.usdoj.gov/content/dtdata.cfm; 1999-2008 data from BJS, various years.

Next, we break down these annual releases into age groups (18-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64) assuming that the released prisoners have same age structure as inmates (see Table 2) in that year; where no direct estimates of the population structure were available for a particular year, we use linear interpolation between available estimates. **Appendix Table 2** shows the resulting estimates of the

age structure in each year. (Within each age group, for simplicity, we further assume that individuals are evenly spread across each age; for example, we assume that one-fifth of the 20-24 year olds are 20, one-fifth 21, and so on). We use the one-year age cohorts to "age-out" ex-prisoners after they turn 65.

APPENDIX TABLE 2
Released Prisoners by Age Group, 1962-2008

Year	18-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
1962	5,668	18,879	16,830	14,305	11,103	7,741	5,465	3,602	2,402	1,239
1963	5,585	19,239	16,813	13,927	10,785	7,626	5,328	3,478	2,298	1,195
1964	5,638	20,070	17,207	13,889	10,730	7,697	5,320	3,439	2,250	1,180
1965	5,645	20,749	17,464	13,735	10,585	7,705	5,269	3,371	2,182	1,155
1966	5,512	20,901	17,284	13,242	10,178	7,521	5,087	3,220	2,061	1,101
1967	5,093	19,910	16,186	12,079	9,260	6,949	4,647	2,909	1,840	993
1968	4,856	19,559	15,641	11,367	8,690	6,625	4,380	2,710	1,693	924
1969	4,114	17,058	13,426	9,501	7,243	5,610	3,666	2,242	1,381	763
1970	4,816	20,548	15,927	10,972	8,339	6,567	4,241	2,560	1,555	869
1971	5,222	22,487	17,853	12,509	9,433	7,335	4,685	2,818	1,722	957
1972	5,879	25,567	20,794	14,812	11,085	8,513	5,379	3,223	1,982	1,095
1973	5,722	25,139	20,950	15,162	11,265	8,547	5,341	3,188	1,973	1,084
1974	5,782	25,675	21,930	16,118	11,892	8,916	5,511	3,276	2,041	1,115
1975	5,737	25,763	22,557	16,829	12,333	9,140	5,587	3,309	2,075	1,127
1976	6,440	29,258	26,266	19,883	14,477	10,606	6,413	3,782	2,388	1,288
1977	7,446	34,246	31,531	24,207	17,516	12,690	7,589	4,457	2,833	1,519
1978	7,542	35,137	33,187	25,829	18,579	13,313	7,874	4,604	2,947	1,571
1979	7,858	37,103	35,960	28,362	20,283	14,378	8,410	4,897	3,156	1,671
1980	7,773	37,230	37,036	29,591	21,044	14,761	8,538	4,950	3,213	1,691
1981	7,741	37,635	38,440	31,101	21,999	15,272	8,736	5,042	3,296	1,723
1982	8,051	39,760	41,708	34,162	24,038	16,518	9,344	5,368	3,536	1,836
1983	9,305	46,727	50,359	41,741	29,224	19,882	11,121	6,359	4,220	2,177
1984	8,798	44,970	49,809	41,767	29,100	19,605	10,843	6,171	4,126	2,114
1985	8,946	46,587	53,049	44,991	31,199	20,817	11,385	6,448	4,345	2,210
1986	9,639	51,204	59,967	51,421	35,495	23,461	12,686	7,150	4,856	2,453
1987	10,709	58,104	70,015	60,686	41,706	27,311	14,602	8,189	5,605	2,811
1988	11,309	62,761	77,844	68,183	46,657	30,276	16,004	8,929	6,162	3,068
1989	12,354	70,243	89,717	79,391	54,101	34,792	18,182	10,092	7,022	3,470
1990	12,814	74,768	98,385	87,935	59,682	38,044	19,656	10,852	7,614	3,734
1991	12,673	76,036	103,130	93,079	62,927	39,766	20,310	11,153	7,892	3,841
1992	12,817	76,604	101,865	93,668	66,693	42,922	22,272	12,230	8,035	3,911
1993	12,929	77,165	100,876	94,326	70,042	45,698	24,012	13,186	8,172	3,977
1994	12,788	76,374	98,396	93,399	71,756	47,303	25,114	13,791	8,160	3,971
1995	13,612	81,377	103,583	99,602	78,693	52,334	28,019	15,386	8,776	4,271
1996	13,937	83,475	104,566	101,334	81,806	54,466	29,298	16,088	8,833	4,299
1997	14,279	83,558	98,895	101,539	92,548	63,991	35,163	19,309	9,270	4,512
1998	14,944	88,501	104,887	108,009	98,148	67,743	37,363	20,517	9,859	4,798
1999	15,103	90,532	107,441	110,963	100,527	69,264	38,345	21,056	10,127	4,929
2000	15,795	94,954	113,039	116,747	105,713	73,070	40,518	22,250	10,748	5,231
2001	17,253	104,310	120,160	121,423	108,986	72,938	40,080	22,011	9,984	4,859
2002	17,211	103,723	120,660	122,258	109,566	73,455	39,993	21,957	9,896	4,815
2003	12,249	102,187	114,251	110,944	106,286	92,174	57,380	31,487	14,917	7,261
2004	11,533	104,454	118,613	110,690	107,877	93,484	59,406	32,577	17,397	8,473
2005	13,206	110,736	124,902	116,018	108,815	96,858	63,140	34,631	16,964	8,255
2006	10,971	99,265	124,010	116,316	110,711	102,352	71,443	39,173	20,237	9,846
2007	11,621	103,272	123,267	120,256	115,693	103,413	68,644	37,639	19,149	9,316
2008	11,843	105,010	125,306	122,536	118,190	105,249	70,198	38,585	19,675	9,646

Source: 1960: U.S. Bureau of the Census (1961), Table 4; 1970: U.S. Bureau of the Census (1972), Table 3; 1991, 1997, 1999-2008: BJS Prisoner Series reports. For years where no data was available for prisoners' ages, we interpolate data from adjacent years. 1991, 1997, 1999-2006 age-groups 45-49 and 50-54 estimated from 45-54 age group, 55-59 and 60-64 from 55+ age group, based on 2007 proportions.

Next, we apply age-group-specific three-year recidivism rates (with an upward adjustment to account for any recidivism beyond the initial three-year period after release; see **Appendix Table 3**) to the share of releases in each year that eventually returned to prison. This procedure helps us to avoid double counting (which would occur if released prisoners were released in one year, readmitted to prison later, and released again in a subsequent year).

APPENDIX TABLE 3
Age-group-specific Recidivism Rates, 1962-2008

Year	18-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
(a) 3-year Recidivism Rate plus 10 percentage points (high recidivism estimate)										
1962-1983	54.9	54.9	53.2	53.0	46.5	40.7	35.7	35.7	35.7	35.7
1984	55.5	55.5	54.0	54.1	47.9	42.5	37.1	37.1	37.1	37.1
1985	56.2	56.2	54.9	55.1	49.3	44.2	38.5	38.5	38.5	38.5
1986	56.8	56.8	55.7	56.2	50.7	46.0	39.8	39.8	39.8	39.8
1987	57.5	57.5	56.6	57.3	52.1	47.7	41.2	41.2	41.2	41.2
1988	58.1	58.1	57.4	58.4	53.5	49.5	42.6	42.6	42.6	42.6
1989	58.8	58.8	58.3	59.4	55.0	51.2	44.0	44.0	44.0	44.0
1990	59.4	59.4	59.1	60.5	56.4	53.0	45.4	45.4	45.4	45.4
1991	60.1	60.1	60.0	61.6	57.8	54.7	46.8	46.8	46.8	46.8
1992	60.7	60.7	60.8	62.7	59.2	56.5	48.1	48.1	48.1	48.1
1993	61.4	61.4	61.7	63.7	60.6	58.2	49.5	49.5	49.5	49.5
1994-2008	62.0	62.0	62.5	64.8	62.0	60.0	50.9	50.9	50.9	50.9
(b) 3-year Recidivism Rate plus 5 percentage points (low recidivism estimate)										
1962-1983	49.9	49.9	48.2	48.0	41.5	35.7	30.7	30.7	30.7	30.7
1984	50.5	50.5	49.0	49.1	42.9	37.5	32.1	32.1	32.1	32.1
1985	51.2	51.2	49.9	50.1	44.3	39.2	33.5	33.5	33.5	33.5
1986	51.8	51.8	50.7	51.2	45.7	41.0	34.8	34.8	34.8	34.8
1987	52.5	52.5	51.6	52.3	47.1	42.7	36.2	36.2	36.2	36.2
1988	53.1	53.1	52.4	53.4	48.5	44.5	37.6	37.6	37.6	37.6
1989	53.8	53.8	53.3	54.4	50.0	46.2	39.0	39.0	39.0	39.0
1990	54.4	54.4	54.1	55.5	51.4	48.0	40.4	40.4	40.4	40.4
1991	55.1	55.1	55.0	56.6	52.8	49.7	41.8	41.8	41.8	41.8
1992	55.7	55.7	55.8	57.7	54.2	51.5	43.1	43.1	43.1	43.1
1993	56.4	56.4	56.7	58.7	55.6	53.2	44.5	44.5	44.5	44.5
1994-2008	57.0	57.0	57.5	59.8	57.0	55.0	45.9	45.9	45.9	45.9

Source: Beck and Shipley (1989) and Langan and Levin (2002). Data on recidivism of the overall prison population is only available for years 1983 and 1994. For years before 1983, the rate in 1983 was used; for years after 1994, the rate in 1994 was used; for years between these two, data was estimated by interpolation.

Finally, we also apply an age-specific mortality rate using general population rates, adjusted up by 20 percent, following Bonczar (2003, p. 11), to allow for this higher-risk population. This procedure lowers our estimate of the ex-prisoner population slightly.

Appendix Table 4 shows our final estimates of the ex-prisoner population, by age, in 2008, excluding those in prison in that same year.

APPENDIX TABLE 4
Ex-Prisoners in 2008 by Age Group, Estimated from Releases

	18-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	Total
						High Recidivism Rate					
Number	6,707	142,320	364,643	542,658	709,261	863,463	906,816	795,535	624,589	470,638	5,426,630
% of total	0.1	2.6	6.7	10.0	13.1	15.9	16.7	14.7	11.5	8.7	100.0
						Low Recidivism Estimate					
Number	7,590	161,046	412,867	615,743	804,392	975,935	1,018,434	887,251	692,225	518,865	6,094,349
% of total	0.1	2.6	6.8	10.1	13.2	16.0	16.7	14.6	11.4	8.5	100.0

Lifetime Probability

Separately, we also estimated the lifetime probability of imprisonment using estimates of the share of men ages 30-34 that had ever spent time in prison at three points in time (men born in 1945-49, 1965-69, and 1975-79), drawn from Western (2006) and Western and Pettit (2010), based on BJS estimates (including Bonczar, 2001).

For each year between 1944 and 2008, we calculated the approximate share of 30-34 year olds that had ever been incarcerated; where available, we used estimates that corresponded to the year; when no direct estimates were available we used linear interpolation; for birth years that had not yet reached 30-34 in 2008, we adjusted the 1974-79 birth-year rates down based on the ratio of incarceration rate for each age younger age group to the rate for the 30-34 year old cohort, using Bonczar (2003), Table 3.

We then multiplied these probabilities by the corresponding male population of each age in 2008 (from published Census estimates), and summed these to produce an estimate of the total population that had ever been incarcerated. This estimate is based on data for men only, which we have scaled up for a total ex-prisoner population, using the average share of men in the prison population in Table 2.

For more details, spreadsheets of the data and calculations described here are available upon request.

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