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ORIGINAL PAPER

Post-release Employment and Recidivism in Norway

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Abstract
Objectives Investigate the transition from prison to employment and the relationship between post-release employment and recidivism.
Methods We use a sample of every person released from Norwegian prisons in 2003 (N = 7,476), and they are followed through 2006 with monthly measures. We estimate the time to recidivism using discrete time survival models, conditioning upon both pre-release characteristics and post-release time-varying covariates (employment, educational enrollment and participation in labor market programs).
Results The majority of former inmates were employed at some point in our data window, but it took approximately 30 months for 30% of them to become employed. The hazard of recidivism is substantially lower (0.12, $p < .001$) when former inmates are employed compared with unemployed, although observable individual characteristics can account for a large share of this association (0.50, $p < .001$, after adjustment). The negative association between employment and recidivism remains when controlling for other post-release statuses. Although post-release employment periods are associated with a lower risk of recidivism for all categories of principal offence, the magnitude of the association varies. The association is smaller for those receiving social benefits.
Conclusion The findings are consistent with theories suggesting that employment reduces the risk of recidivism.

Keywords Release from prison · Recidivism · Post-release employment · Survival analysis

Introduction

One overarching goal for prison services, policymakers and social workers is to rehabilitate prisoners to a life without crime. However, it is well known that a large proportion

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recidivate within a short time (Baumer 1997; Berk et al. 1980; Langan and Levin 2002; O'Donnell et al. 2008).

It has long been recognized that inmates usually face major problems upon release from prison, and the post-release situation likely has major implications for recidivism. Preconditions for obtaining a new law-abiding life include establishing meaningful routine activities and finding a legitimate source of income, preferably a job (Harrison and Scheher 2004). A wide range of theoretical approaches assumes a crime-preventive effect of employment, including theories on social control (Laub and Sampson 2003), rational choice (Becker 1993; Ehrlich 1973), and changed identity (Giordano et al. 2002; Maruna 2001). Employment is the basis for several rehabilitation initiatives directed at individuals just (or soon to be) released from prison (Bushway and Reuter 1997; Harrison and Scheher 2004), and easing the transition from prison to employment is believed to lower recidivism rates.

Despite a large literature on recidivism, few studies include information on post-release employment. Consequently, little is known about the extent to which recidivism is affected by post-release employment. In fact, there is a lack of evidence regarding whether prisoners actually manage to enter the labor market at all, whether they manage to keep their jobs, and whether they are dependent on social welfare.

In this article, we address the relation between recidivism and employment using a large-scale observational dataset on a cohort of individuals released from Norwegian prisons in 2003. We follow them through multiple administrative registers (see Lyngstad and Skardhamar 2011) to the end of 2006 (N = 7,476 individuals). First, we explore to what extent individuals released from prison enter the labor market and whether their legal earnings each month are sufficient to keep them from collecting publicly provided social assistance. Second, we estimate the risk of recidivism when former inmates are employed compared with when they are not employed. One possible reason why they are not employed in a given month might be that they are enrolled in education; thus, we control for participating in education. The data allow us to estimate recidivism rates conditional on an array of observable individual characteristics, including pre-prison work experiences, family type, education, principal offence and previous prison sentences. Our outcome variable (recidivism) is taken from the police registers on solved cases, utilizing the date when the offence was *committed*. Thus, our measure of recidivism is virtually unaffected by the time needed for investigation and prosecution, and we circumvent the potential problem that being under investigation or prosecution could by itself lead to job loss. Moreover, because our measure of employment is taken at the *beginning* of the month within which the crime was committed, there is little room for any confusion on causal order.

Theoretical Background

There are several major obstacles to entering the labor market for a person who has just been released from prison. One of the most obvious is the lack of formal skills required in the labor market, as it is well known that the prison population to a large degree is characterized by low educational level and unstable previous employment histories (Entorf 2009; Raphael 2011; Skardhamar 2003). The lack of formal skills restricts the types of employment that former inmates can obtain because many jobs require formal qualifications. Moreover, serving time in prison is likely to deplete skills and human capital, and employers tend to be skeptical about hiring previously convicted individuals (Grogger

1995; Pager 2003). In sum, former inmates have severely reduced employment opportunities, and any remaining available licit employment might not be very attractive in terms of either pay or working conditions. The available avenues to legal, paid employment will rarely be completely blocked for these individuals, but the *effort* required to pursue these options may nevertheless be perceived as prohibitive. In such a situation, a life based solely on legal income sources may not appear very attractive compared with illicit opportunities.

Nevertheless, employment is believed to be of major importance for reducing recidivism and promoting successful re-entry into society after release. This argument follows from several theoretical perspectives that form a basis for policy initiatives. At the practical and economic levels, a job provides legal income, which increases the ability to provide for oneself and the family by legal means. Given that the person will consider his options for income, employment can lead to substitution of time between licit and illicit income-generating activities. Rational choice theories assume that the individual will allocate his or her time according to expected costs and benefits (Becker 1993; Ehrlich 1973), and—in accordance with strain theory—if desired economic goods are hard to achieve by legal means, then using illegal means is a possible strategy (Merton 1968). If the expected returns from licit work decline or the expected returns from crime increase, then illicit income opportunities become relatively more attractive.

On a related note, routine activity theory (Felson 1998) points out that, even though people might be motivated to offend, they cannot do so unless an opportunity is present, and how individuals allocate their time is also a central factor in this perspective. Thus, exposure to criminogenic settings through lifestyle has a major impact on offending. Less structured routine activities, like being without steady employment, increase idle time, during which an individual might be more exposed to criminogenic settings (Warr 1998). This idea extends effects of employment on recidivism to types of crime that are not rationally purposeful or do not necessarily generate income.

Where and with whom one spends time are related to the degree of informal social control. The core idea is that individuals' bonds to society restrain them from breaking rules (Hirschi 1969). On the one hand, employers and co-workers exert direct social control on an individual. On the other hand, a job implies investments and commitment to conform to a lifestyle with changed social roles. This latter point is emphasized in the theory of age-graded social control (Laub and Sampson 2003) as it is a *stable* job that leads to desistance from crime—the gradual investment in a new lifestyle implies that there is increasingly more at stake. A key argument is that employment is one of the most important sources of social control and bonds to society in adulthood, and this would make employment one of the most important social institutions to promote desistance from crime (Uggen et al. 2004).

It should also be noted that the theory of cognitive transformation (Giordano et al. 2002) holds that agents actively seek and participate in their own desistance. Opportunities for change, such as employment, serve as 'hooks for change' that the agent actively seeks and grasps. Change is then conditional on initial motivation as well as on the presence of an opportunity for change. Neither a motivation nor an opportunity is sufficient, so there is necessarily a reciprocal relationship between the opportunities and how the person re-evaluates his or her situation. This argument implies that there is systematic selection of initially motivated individuals into employment and those who manage to keep a job and change his life.

In sum, there are practical and economic reasons why income and social inclusion associated with formal employment would influence recidivism. This relation would be primarily relevant for crimes for profit, and licit income is important. Second, a number of

theories suggest that social integration is also important for other kinds of crime. Note that this implies that, e.g., licit income from social welfare would not necessarily be a hindrance to additional crime unless one is involved in other meaningful daytime activity, such as employment, labor market programs or education.

Previous Studies

Prior research on recidivism has used various types of samples, measures and follow-up periods, and thus, the results vary considerably. A longer follow-up period yields higher recidivism rates, and measuring recidivism by imprisonment gives lower recidivism rates than measuring by convictions or arrests. It is nevertheless indisputable that a substantial proportion of those released from prison recidivate. For example, of those released from US prisons in 1994, 68% were rearrested and 50% reincarcerated within 3 years (Langan and Levin 2002), but figures vary by context (Baumer 1997; O'Donnell et al. 2008). Recidivism rates based upon conviction date will obviously depend on how long it takes to investigate and/or be processed through the legal system. Thus, if the measure is closer to the date when the offence was committed, the recidivism rate will be lower due to the shorter time lag.

Most previous studies have access to basic information on the individual's background, such as age, sex, citizenship, type of crime, and sometimes previous criminal history (Mears et al. 2008; O'Donnell et al. 2008; Visher and Travis 2003; Wartna and Nijssen 2006). Thus, a number of facts and predictors of recidivism are well known: it decreases with age, is higher for men, more likely for property offenders than violent offenders, increases with prior sentences, and is lower for married offenders and those with a higher education (for an overview, see Baumer 1997).

Information on the former inmate's post-release situation, including employment, is typically lacking in large-scale observational studies. One reason for this is that only certain types of data are readily available from the administrative registers of prison services, and it is costly and difficult to track individuals with unstable life situations after their release.

Of the few studies that do consider the post-release situation, Visher et al. (2008) followed 145 men released from Illinois prisons in 2002 and 2003 for up to 16 months after their release. They found that almost half of the sample was unemployed at 16 months after release, and those who had worked for at least 1 week had a substantially lower predicted probability of reincarceration compared to those who had not. In a related study, 740 respondents from three states were interviewed at 2 and 8 months after release. In this study, nearly half were re-arrested within a year, but those employed were less likely to be re-arrested (Visher et al. 2008). Another exception is the study by Berg and Huebner (2010), where parole officers collected employment information for 401 males paroled from prison. Berg and Huebner find that those parolees holding a full-time job at about 4 weeks after starting parole have a much lower likelihood of reconviction. Piquero, et al. (2002) followed 524 young offenders for 7 years after release from the California Youth Authority. They used a "stakes in conformity index" based on employment information and marital status. Although not explicitly studying the effects of employment, they concluded that the association between arrests and stakes in conformity was relatively small, although statistically significant. Horney et al. (1995) analyzed a sample of 658 newly incarcerated men to construct retrospectively their month-to-month variation in offending and local life circumstances including employment. They found that employment was weakly negatively associated with offending.

When interpreting observational studies, it is important to keep in mind that the prison population comprises subjects with different ties to the labor market. Those who were employed at the time of their imprisonment or release are likely to be more integrated into the labor market than other prisoners, and such integration is likely to be correlated with lower (unobservable) 'criminal propensity'; it might simply be that they are more motivated both to refrain from crime and to get a job. It should therefore not be surprising that such individuals tend to reoffend less. Prisoners who were *not* employed at imprisonment or at release, however, largely have weaker ties to the labor market and a host of other related problems (Entorf 2009; Raphael 2011; Skardhamar 2003). In other words, any observed association between employment and recidivism is at least to some extent likely to be due to systematic selection.

A few studies have estimated the causal effect of employment programs using random assignment. The results point largely toward no effect of employment programs on recidivism (Bloom 2006; Visher et al. 2005; Wilson et al. 2000). Although experimental studies speak directly to causal effects, the results depend on specific characteristics like institutional settings, the sampled population and the program in question (including, e.g., the program's implementation and the local labor market). It is not always clear whether the null-effect is because the program does not increase employment or whether employment does not reduce recidivism. In our context, we are interested in explaining differences in recidivism rates in general, and particular employment *programs* are not necessarily directly informative for this purpose.[1] Nevertheless, these experimental studies suggest that our expectations about the importance of employment should be modest and that much of the observed differences might be due to selection effects. In sum, empirical evidence on post-release employment and recidivism is scarce.

Research Questions

The theoretical arguments discussed above suggest that we should expect a reduction in the probability of recidivism when former inmates are employed. Thus, the theories are not strictly competing and cannot be tested against each other. However, as our data include a rich array of background characteristics, we can test whether the association remains conditional on things such as educational level, previous work experience and previous criminal history. Thus, we will describe the inmates' post-release employment rates and estimate recidivism rates. We will estimate the association between post-release employment and recidivism, controlling for a range of potentially important confounders.

Our study is one of the very few that include longitudinal data on post-release employment and, to our knowledge, the only one that has fine-grained information over time for a large and representative sample. We also control for post-release participation in employment programs, social security recipiency and enrollment in education.

Data and Sample

The system of administrative registers, as provided by Statistics Norway, enables us to combine information on imprisonment with a range of data that are not included in the criminal registers. Every resident in Norway has a unique identity number, which enables

[1] Importantly, such programs might have an effect regardless of whether they improve employability.

linking of an individual's data from different registers and over time. The registers cover the total resident population of Norway and contain a wide range of information organized as either time series or event histories (depending on the type of variable) at the individual level. Missing information is typically a marginal problem. Therefore, many of the limitations associated with survey data, such as low response rates or attrition, limitation of the data to a particular geographical area or having a small number of observations, do not apply to our study. Furthermore, the only attrition from the data is "natural"—that is, due to death and emigration—and the provided information is generally highly reliable (Lyngstad and Skardhamar 2011; Røed and Raaum 2003).

The sample consists of all inmates released from prison sentences (excluding custody) during 2003 (excluding those without a residence permit), 7,476 individuals. If someone was released several times in 2003, we use the first release. We follow each individual until the end of 2006. All time-varying variables after release are measured in monthly intervals.

Our survival analysis relies on the amount of time from the month of release to the month in which the first post-release crime is *committed*. These data are gathered from the police records containing all solved offences through 2009. Thus, we allow for a time lag between the respective dates when the offence was *committed* and *solved* of up to 3 years (2006–2009). This criterion would include the vast majority of cases that were ever solved. Using the date on when a new offence is *committed* gives us two major advantages. First, our measure of recidivism is virtually unaffected by the time taken for investigation and prosecution. Second, investigation, prosecution and sentencing may affect employment status – or even be affected by employment status – so being unemployed at the date of conviction might be a case of reverse causality. By using the date when a new offence is committed, we circumvent such confusion of causal order.

The observations are censored at the end of 2006, but we also censor the observations at the date of death. There are two additional main sources of interval censoring: emigration and re-immigration and imprisonment spells served for offences committed before the release in 2003. We construct the accurate "exposure time" variable as the proportion of each month that the individual was alive and resident in Norway and not in prison. Thus, if a person is resident and not imprisoned only two out of 30 days in a given month, then this observation is weighted by the exposure time value ($2/30 = 0.063$) this month, whereas previous months when the individual was not in prison are weighted 1. If the person was imprisoned for all of a given month, then the weight is zero and the observation is entirely dropped from the analysis.[2]

Our measure of post-release employment is based on being registered in the central employee register. Although, this register does not capture qualitative aspects of the employment contract, it does indicate a formal relationship with an employer. We use a measure of employment status on the first day of each month. From the employment services, we gather data on participation in labor market programs by the first day of each month. A few individuals are registered as both employed and attending a labor market program simultaneously, and some particular labor market programs would even imply an entry in the employment register. Our measure of employment excludes those who also attended labor market programs during the same month. Thus, employment and attending labor market programs are mutually exclusive. Our measure of employment captures being employed in the formal labor market.

[2] Alternative ways of dealing with such censoring is to (1) only include months without imprisonment in the analysis, or (2) include the exposure time as a covariate in the model. We have tested each of these approaches, and the results are virtually identical across models.

The other post-release time-varying covariates are recipiency of social assistance and in education. Recipiency of social assistance is registered on a monthly basis, capturing whether the person received such benefits during that particular month. Importantly, social assistance benefits are means-tested and serve as an income source of "last resort", making them a good proxy for insufficient income of any kind (including other non-means-tested welfare). Educational data are taken from the National Educational Database (NUDB), measuring any formal attachment to courses at an educational institution at all levels. Educational participation is initially measured at exact dates, but we simplify the data using the status on the first day of each month.

While recidivism, employment, social security and enrollment in education capture the post-release situation, we also control for a host of background characteristics. Some relate to current sentence and type of offence, whereas others are particularly relevant for employment chances. There are also additional variables capturing age, sex, family type, and social class.

From the prison records, we know the exact length of time served upon release. In addition, we include the proportion of the year 2002 that the individual spent in prison. Although most serve relatively short sentences, some have served other sentences or spent time in custody. The current sentence will often be for several different offences, but we only have information on the type of the principal offence. Drug use is of particular importance for both recidivism and employment chances, but we do not have a direct measure of that. However, we include a measure of being charged with at least one drug offence related to use and possession in the 5-year period before release (1998–2002). These drug offences are closely associated with substance abuse and can be interpreted as a crude measure of abuse of illegal drugs.

Educational level completed by the end of 2002 is gathered from the NUDB. We include a crude measure of five categories: higher education (university level), secondary school (completed or not completed), only compulsory education, and unknown. The last category will largely consist of individuals with no completed education, but it might also include a minority of individuals who finished their education abroad and whose educational attainment was not recorded at their return to Norway, in which case it is not recorded in the Norwegian register. These are coded as "unknown" in Table 1, and we include a separate dummy variable for those with unknown level of education. From NUDB we also apply a standard measure of the parents' educational level when the individual was 16 years old.

Prior work experience is approximated by a measure of earnings from work taken from the tax registers, excluding all other sources of income. We use earnings from work in 2002, i.e., the year before release.[3] Note that this is all legal taxable labor-related income in Norway, so lack of information on this income variable in the tax registers implies no such income in that year and is treated as such in the analysis. We create some categories based on a standard measure of low incomes in Norway. Earning less than the minimum pension for single individuals (NOK 95,460 in 2002) is to be considered very low income and represents being practically outside the labor market. An income of three times this level represents an individual who is somewhat attached to the labor market, and individuals who earn more than this amount can be said to be doing well.

We also include some basic demographic variables. From the population database, we extract sex, age, immigrant background, and family type in 2003. Family type is defined by

[3] Some individuals have no income because they are imprisoned, but note that we include a measure of the time spent in prison during the year. Thus, we control for imprisonment in the regression analysis.

Table 1 Distribution of covariates and bi-variate association with recidivism and post-release employment

	N	Percent	Any recidivism	Any post-release job
Total	7,476	100.0	54.2	43.7
Any post-release job				
No job	4,211	56.3	70.9	–
Job	3,265	43.7	32.6	100.0
Number of job spells				
No job	4,211	56.3	70.9	–
One job	2,383	31.9	37.5	100.0
2–3 jobs	811	10.8	20.2	100.0
4+ jobs	71	0.9	9.9	100.0
Job at last observation				
No	5,155	69.0	64.4	18.3
Yes	2,321	31.0	31.3	100.0
Any post-release labor market programs				
No ALMP	5,526	73.9	56.5	45.5
ALMP	1,950	26.1	47.4	38.4
Any post-release education				
No education	6,027	80.6	57.3	40.2
Education	1,449	19.4	41.1	58.0
Any post-release social benefits				
No social benefits	4,441	59.4	44.4	58.7
Social benefits	3,035	40.6	68.4	21.6
Principal offence				
Economic offences	446	6.0	33.6	47.5
Other offences for profit	1,698	22.7	78.0	22.1
Violent offences	1,446	19.3	57.1	47.9
Sexual offences	209	2.8	26.3	46.9
Offences of narcotics	992	13.3	64.9	31.5
Traffic offences	2,323	31.1	36.9	61.7
Other offences	362	4.8	53.6	39.0
Drug-use/possession past 5 years				
Yes	4,467	59.8	37.9	58.3
No	3,009	40.2	78.2	21.9
Time served (mean = 98.3)				
<14 days	326	4.4	42.3	59.8
15–30 days	3,044	40.7	41.6	58.6
1–2 months	1,753	23.4	55.8	41.8
2–3 months	543	7.3	65.6	28.9
3–6 months	852	11.4	74.5	20.2
1/2–1 year	583	7.8	76.2	20.2
1–2 years	265	3.5	65.7	27.5
More than 2 years	110	1.5	51.8	29.1
Time in prison in 2002				
None	5,365	71.8	47	51.7

Table 1 continued

	N	Percent	Any recidivism	Any post-release job
Up to 25%	1,021	13.7	68.6	28.7
25–50%	411	5.5	76.9	16.5
More than 50%	679	9.1	75.3	19.3
Sex				
Men	6,902	92.3	55.2	44.0
Women	574	7.7	41.1	39.7
Age (mean = 33.4)				
15–19 years	247	3.3	70.4	50.2
20–24 years	1,698	22.7	59.5	57.1
25–34 years	2,538	33.9	58.9	44.1
35–44 years	1,744	23.3	54.9	36.1
45+ years	1,249	16.7	33.0	33.8
Immigrant background				
Other	6,649	88.9	54.5	43.6
Immigrants	731	9.8	48.7	42.8
Two immigrant parents	96	1.3	70.8	54.2
Family type				
Other/unknown	5,260	70.4	57.7	37.5
Married with children	233	3.1	33.5	43.8
Married without children	1,622	21.7	48.6	59.5
Cohabiting with common children	361	4.8	40.4	62.0
Completed education				
Compulsory or less	1,864	24.9	63.6	32.2
High school not completed	3,253	43.5	58.4	42.0
High school completed	1,613	21.6	39.8	61.3
University level	343	4.6	31.5	58.0
Unknown	403	5.4	53.3	27.0
Parents' educational level at age 16				
University level	842	11.3	50.6	55.2
High school level	3,559	47.6	56.1	46.1
Compulsory or less	2,250	30.1	57.7	38.0
Unknown	825	11.0	39.6	36.8
Earnings from work 2002 (mean = 132.000 NOK)				
No income	1,982	26.5	70.4	9.4
Less than minimum pension[a] 2,002	1,820	24.3	61.6	37.7
Min pension to 3 times min. pension	2,623	35.1	45.6	58.6
Above 3 times min pension	1,051	14.1	31.9	81.4
New imprisonment of any kind				
Not reincarcerated	6,729	90.0	51.0	46.5
Reincarcerated	747	10.0	82.2	18.2

[a] Earning less than the minimum pension for single persons was NOK 95,460 in 2002

the individuals with whom one shares a household, although cohabitants without common children are not detectable in the administrative registers and are treated as "unmarried". We also include a variable on time of year of release because there is seasonal variation in the labor market, which potentially affects employment chances upon release.

Methods

We use survival analysis to study the relationships between released inmates' labor market attachment and recidivism. The covariates are measured in months, making the logit model for discrete time a natural choice. This approach also allows us to handle multiple time-varying covariates effectively (Allison 1995; Hosmer and Lemeshow 1999), and we report the regression coefficients (log odds ratios). Such models allow us to handle the *timing* of recidivism explicitly while at the same time controlling for a host of observable characteristics and taking right censoring (from deaths, emigration, further imprisonments or the end of the observation period) into account. We follow individuals from the month of their release from prison to the month when their first subsequent offence was committed. Because our main interest is in the effect of employment on recidivism, we control for three other job-related post-release states: educational participation, social assistance recipiency and participation in a labor market program.

We estimate the association between post-release employment and recidivism and use a step-wise procedure to assess whether conditioning on relevant characteristics affects the estimated association for employment. Model 1 only adjusts for age and sex, and a number of background characteristics are included in model 2 (see Table 2). We then proceed to check if the estimated association between post-release employment and recidivism remains after controlling for post-release confounders (social assistance recipiency, employment programs, and enrollment in education) in model 3.

Results

Descriptive Statistics and Bivariate Associations

Table 1 provides an overview of the sample and the distribution of each variable. The table also shows, for each variable, the proportion of former inmates who recidivated by the end of 2006 and the proportion that obtained a job after their release from prison and before recidivating (or right-censoring).

The first line of Table 1 shows that, of the 7,476 individuals in the sample, 54% recidivated by the end of 2006, and 44% obtained a job at some point before recidivating (or censoring). As mentioned previously, we include new imprisonments (either sentence or custody, but not for any offence committed after release) as interval censoring in the regressions to follow.[4]

Of those who obtained a job (before recidivism or censoring), the recidivism rate is 33%, compared to 71% for those who did not obtain a job. Some of the individuals who obtained a job lost it, and approximately 12% had more than 1 month of employment.

[4] The reincarceration rate is far lower than our main measure of recidivism (the date a new offence is *committed*). Ignoring censoring at recidivism would have yielded approximately 24% of the sample reincarcerated (not reported in tables) by the end of 2006.

Table 2 Regression parameters from discrete time hazard model

	Model 1	Model 2	Model 3
Post-release job	−2.084***	−0.753***	−0.702***
Post-release labor market programs			−0.124***
Post-release education			−0.195***
Post-release social benefits			0.444***
Women	−0.307***	−0.307***	−0.328***
Age (ref = 25–34 years)			
45 + years	−1.507***	−0.648***	−0.608***
35–44 years	−0.195***	−0.098***	−0.106***
20–24 years	−0.189***	0.009	0.018
Time	−0.304***	−0.233***	−0.226***
Time squared	0.005***	0.003***	0.003***
Time served this sentence (ref = less than 15 days)			
More than 2 years		−1.632***	−1.538***
1–2 years		−0.644***	−0.601***
½–1 year		−0.117	−0.119^
3–6 months		0.236***	0.192**
2–3 months		0.118^	0.088
1–2 months		−0.353***	−0.386***
15–30 days		−0.431***	−0.445***
Total time served in 2002 (ref = 0.1–14%)			
More than 50%		0.525***	0.539***
25–50%		0.222***	0.218***
None		−0.508***	−0.516***
Released time of year (ref = 1th quarter)			
4th quarter		0.099**	0.082*
3th quarter		0.254***	0.279***
2th quarter		0.106**	0.116***
Principal offence (ref = other)			
Economic		−0.146*	−0.105
Property		0.469***	0.463***
Violence		−0.047	−0.049
Drugs		−0.566***	−0.534***
Sex		−0.919***	−0.919***
Traffic		−0.441***	−0.429***
Use/possession past 5 years		1.349***	1.279***
Social origin (ref = secondary school or less)			
Unknown		−0.112^	−0.130*
University level		0.054	0.074^
High school level		−0.012	−0.017
Immigrant background (ref = remaining population)			
Immigrants		−0.213***	−0.231***
Immigrant parents (both)		−0.195^	−0.119

Table 2 continued

	Model 1	Model 2	Model 3
Income from work in 2002 (ref = none)			
Above 3 times min pension		−0.710***	−0.596***
Min pension to 3 times min. pension		−0.668***	−0.553***
Less than minimum pension 2002		−0.414***	−0.370***
Family type by January 2003 (ref = other/unknown)			
Married without children		−0.291***	−0.238***
Married with children		−0.311***	−0.294***
Cohabiting with common children		−0.494***	−0.424***
Completed education by January 2003 (ref = secondary school or less)			
Unknown		−0.197***	−0.171**
University level		−0.330***	−0.285***
High school not completed		−0.121***	−0.102***
High school completed		−0.448***	−0.397***
Post-release Employment × social security			
Intercept	0.523***	−0.062	−0.256**
−2 Log L	68,290.1	53,778.6	53,426.8

^ $p < .10$, * $p < .05$, **$p < .01$,*** $p < .001$

The outcome is time to new offence committed. The table shows regression coefficients

There is a tendency of lower recidivism by number of job spells, but the number of persons with multiple spells is small, making the figures uncertain. In the last month of the observation period before recidivating or censoring, 31% were employed. This suggests that, although a substantial proportion of the sample obtained a job at some point, many had trouble keeping one. About 26% were at some point enrolled in a labor market program, and their recidivism rate was slightly lower (47%) than the rate for those never enrolled (56%). Of course, some of those not on a labor market program were employed, and it is thus more interesting to note that the recidivism rate of those not employed was higher (71%). Some are be enrolled in education, and this might be a reason for not getting a job in this period. This applies to 19% of our sample, and these have a recidivism rate of about 41%. Thus, it seems like all these routine activities (job, employment programs or education) are associated with lower recidivism. The last post-release variable included in our analysis is recipiency of social benefits. About 41% received social benefits in at least 1 month, and they had almost as high a recidivism rate (68%) as those not employed (71%).

Norwegian prison sentences are relatively short compared to many other countries. The average time served is about 3 months, and only 5% of inmates serve more than 1 year in prison. This distribution reflects the fact that many offences are not very grave (e.g., the murder rate in Norway is low compared to, e.g., the US and the UK). The recidivism rates are highest for former inmates who served a mid-length sentence of 3 months to 3 years and lower at each end of the distribution. The post-release employment rates are the lowest for the mid-length sentences and the highest for the short sentences (<30 days).

Almost a third of the prisoners served sentences for traffic violations as their principal offence (not including speeding tickets, but typically drunk driving and rather extreme reckless driving) and almost a quarter for property offences. One-fifth served sentences for

violence and about 13% for drug offences (mostly smuggling, but also possession or dealing). White-collar crime (6%) and sexual offences (3%) are less common. It is notable that traffic offenders and economic offenders have the lowest recidivism rates and the highest post-release employment rates. Those individuals who served sentences for property offences have a high recidivism rate and a very low rate of post-release employment. Violent offenders and sexual offenders have a fairly high post-release employment rate. Violent offenders have average recidivism, whereas sexual offenders have a lower recidivism rate.

The vast majority of former inmates are men (92%), and most are adults, with a mean age of about 33 years at the time of release. Very few (3%) were younger than 20 years at the beginning of 2003, but many were between 20 and 24 years old (23%). As is well known from previous studies, the prison population is characterized by low educational levels. About one quarter of the study population has compulsory schooling or less, and only 5% are educated beyond high school. Most originate from middle or lower social classes (30% of parents with less than high school education and 48% with only high school). The majority are non-immigrants (89%), but 11% are immigrants or children of two immigrants. Recidivism rates are the highest for the youngest individuals, which may explain why second-generation immigrants have higher recidivism rates.[5] The recidivism rates are lowest among married and cohabitating individuals with common children, and the recidivism rates decrease with increasing education. There is no clear correlation, however, between parents' educational level and recidivism.

Earnings reported to the tax authorities may be regarded as a proxy for integration into the formal labor market. Approximately 27% of our subjects have no earnings in 2002, and 24% earned so little that they should be regarded as being on the fringes of the labor market. Thus, approximately 51% of the sample is practically outside of the labor force in the year before their release from prison. As expected, earnings in 2002 are negatively correlated with recidivism and positively correlated with post-release employment. Some might have had low earnings because they were imprisoned, although their current sentences were short. Of those with no earnings, approximately 40% had spent some time in prison (not shown), although only half of these had spent more than half of the year in prison.

These figures describe the sample as such and give some hints that warrant further investigation. As expected, the majority of the prison population lacks substantial formal education and previous work experience, which are expected to be obstacles to reintegration after release. However, there is substantial variation as well, with almost half of the sample being employed the last year and at least 14% reporting good levels of earnings. It is also notable that the majority of the inmates find a job after release and that those who do have a much lower recidivism rate. It remains to be seen, however, whether the negative association between employment and recidivism holds when controlling for other variables.

Post-release Outcomes

Our main interest is in what happens with respect to employment and recidivism *after* release from prison. By the end of 2006 (3–4 years after release), 54% of our sample had

[5] The first major wave of immigration to Norway began in the 1970s. For this reason, the second generation of immigrants (two immigrant parents) is very young, predominantly below the age of 30 (Statistics Norway, 2010).

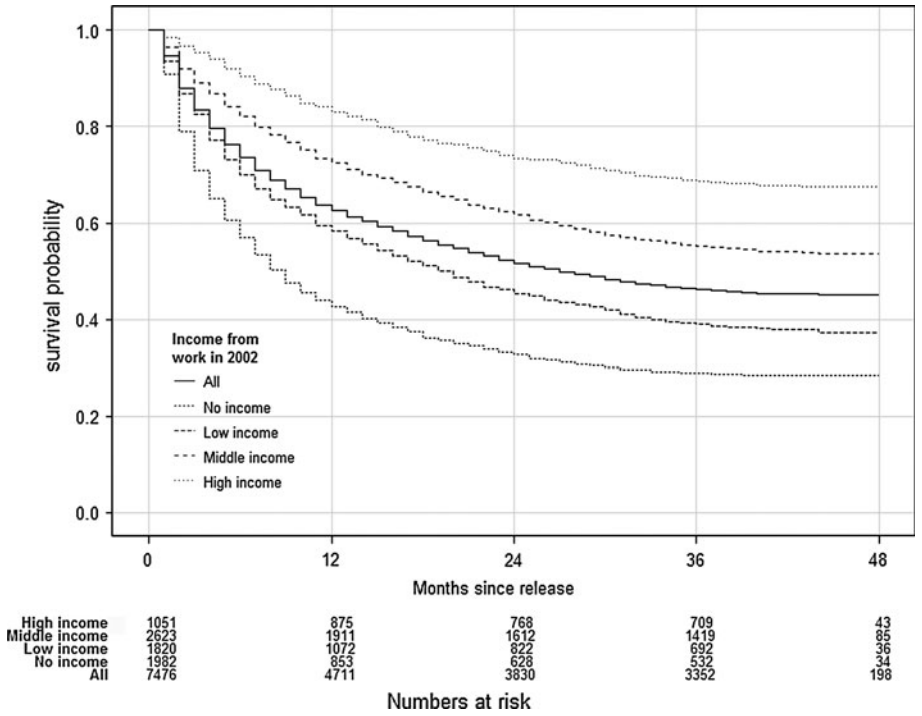

Fig. 1 Survival function of time from release to new offence committed. By income from work the year before release (2002)

recidivated (see Table 1), but this ratio does not take censoring into account. We handle censoring by estimating the survival function, as reported in Fig. 1.

The survivor function in Fig. 1 shows the time to recidivism in terms of both the average survival function (the solid line) and level of earnings from work in 2002. The small table below the figure displays the number of individuals at risk during each 12-month interval. On average, 30% have recidivated by 12 months and 47% by 3 years. Note that the curve is almost flat toward the end, suggesting that most of those who recidivate do so during the first 2–3 years after release.

The recidivism rates are strongly correlated with prior attachment to the labor market, as shown by the plot of the survivor function by earnings in 2002. Among those with no income, the recidivism rate is as high as 63% by 3 years, and the recidivism rates decrease markedly with increasing income from work in 2002.

The other post-release outcome of major interest is employment. Although one could have estimated the survival function for employment, it is important to note that employment is a repeatable event in our setting. From Table 1, we know that some individuals have multiple job spells. We plot the monthly employment rates in Fig. 2, including a smoothed average trend (Cleveland et al. 1993). As explained above, the observations are censored so that time at risk is taken into account. Clearly there are variations, but the employment rate increases with time. Some of this increase is of course because the observations are right-censored, leaving fewer individuals in the sample as time passes, and those who remain at the end of the period may be more likely to be

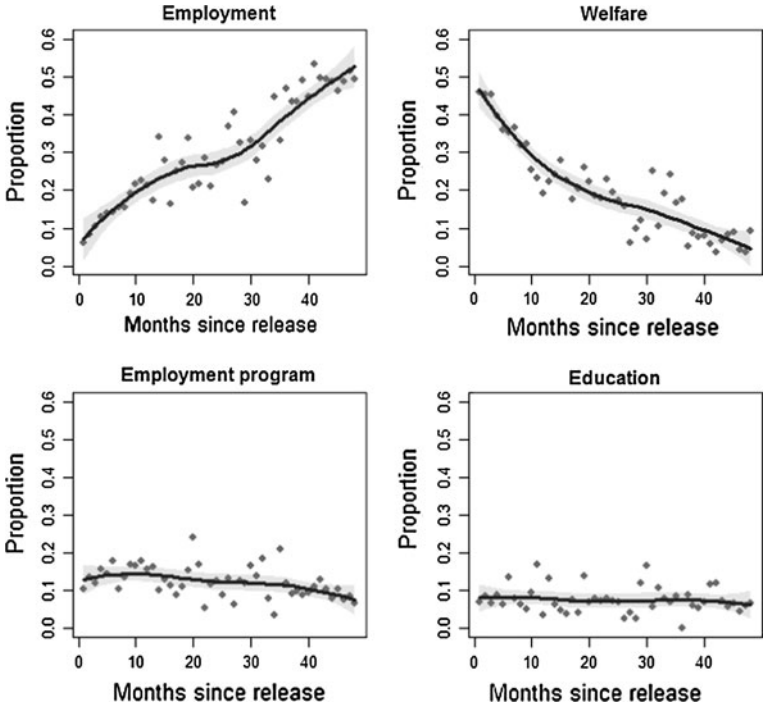

Fig. 2 Proportion employed, participating in employment programs or embedded in education, and receiving social assistance by month since release. Smoothed trends. *Note*: the observations are right-censored at the month of recidivism, or at emigration/deaths. The smooth is estimated using *loess* as implemented in *R*. The gray area indicates 95%CI around the smoothed trend

employed. It is notable that although 44% of the sample obtained a job at some point in this interval (see Table 1), the maximum employment rate in any month is 50%.

The other time-varying variables (social assistance recipiency, enrollment in education and participation in labor market programs) are plotted in a similar way. The average rate of social assistance shows the opposite trend, with decreasing rates of social assistance benefits with time since release. This result is as expected because increased employment should reduce social assistance. Thus, social integration in terms of both employment and reduced dependence on social assistance improves steadily with time since release. However, the alternative interpretation is that the most "frail" individuals recidivate early so that there is an increasing proportion of well-adapted individuals left in the population as time passes.

The next two graphs show monthly rates of two alternative activities: employment program participation and educational enrollment. Both of these activities occur at a fairly low rate throughout, and the average trend seems to be roughly linear.

Regression Results on Recidivism

Table 2 provides the results from a regression relying on the discrete hazard model (Allison 1995; Hosmer and Lemeshow 1999). The dependent variable is time from the

individual's calendar month of release to the calendar month when he or she committed a new crime, and we report estimated coefficients (log odds ratios).

The first model estimates the risk of recidivism conditioning only on age and sex, assuming a quadratic function of time.[6] An individual's estimated odds ratio of recidivism (conditional on not having recidivated yet) in a month when he is employed is $\exp(-2.08) = .12$, that is, almost one tenth of those individuals in the sample who are not employed. This result confirms that those individuals who are employed have lower recidivism rates compared with those who do not have a job.

However, this result is clearly, at least to some extent, due to systematic selection into jobs. Model 2 controls for a range of observables, including work-related covariates such as prior work experience and educational level, but also principal offence, sentence length, and other relevant characteristics.[7] This model raises the odds ratio of recidivism when one is employed to $\exp(-.75) = .47$ or about half of those who are not employed. From a comparison of model 1 and model 2, we may conclude that employment and recidivism are related largely because of systematic selection effects on background characteristics, although substantial differences remain after conditioning on these variables.

We now shift our focus to what happens *after* release. First, we would like to know whether the importance of employment is affected by other post-release situations. As mentioned above, those individuals in the sample who are not employed might be participating in labor market programs or studying, and it should be of major importance if the individual earns enough to remain independent of social assistance. Thus, we need to adjust the estimate for these confounders, which we do in model 3.

As expected, those individuals participating in employment programs or enrolled in education have lower recidivism, although the coefficient is not as large as the coefficient for employment. To the contrary, the individuals on social assistance have higher recidivism. The latter result is reasonable, as social assistance is means-tested and thus indicates major financial difficulties, which are to some extent correlated with other social problems. Interestingly, including these time-varying covariates does not significantly affect the coefficient for employment. Thus, we might conclude that the association between employment and recidivism is not confounded by these variables.[8]

Varying Employment Effects Across Principal Offences?

We have already seen that there are marked differences in both employment rates and recidivism rates by principal offence (see Table 1). It could be that employment affects recidivism differently for different offender types. For example, the employment effect

[6] The results might be affected by how the function of time is specified, so we compared models with linear, quadratic and cubic polynomials of time as well as a model with separate dummies for each month. The quadratic model gave the best relative fit, and the estimate for post-release employment did not change notably across these models. Thus, we apply models with a quadratic function of time throughout.

[7] The estimates from the background characteristics are all as expected based on the general notion that more resources and social integration are associated with decreasing recidivism. For example, educational level, parents' educational level, and income are negatively associated with recidivism. Because these variables are not of primary interest for this analysis (we only want to control for these characteristics), we do not discuss them further.

[8] One might argue that a job could be associated with less recidivism only if one's earnings are enough to cover basic needs; otherwise, social assistance is still needed. We included an interaction term to check this assumption. For those receiving social benefits, post-release employment gives an odds ratio of recidivism of $\exp(-.722 + .311) = 0.66$, whereas post-release employment gives an odds ratio of $\exp(-.722) = 0.48$ for those not receiving social assistance.

Table 3 Tests of interaction terms with post-release employment

	Model 4	Model 5	Model 6	Model 7	Model 8
Post-release job	−0.852***	−0.546***	−0.76***	−0.662***	−0.511***
Principal offence (ref = other)					
Economic crimes	−0.105	−0.108	−0.104	−0.033	−0.108
Property offences	0.458***	0.499***	0.46***	0.465***	0.459***
Violence	−0.044	−0.052	−0.08	−0.05	−0.051
Drug crimes	−0.536***	−0.533***	−0.536***	−0.532***	−0.532***
Sexual offences	−0.918***	−0.924***	−0.918***	−0.921***	−0.915***
Traffic offences	−0.554***	−0.447***	−0.421***	−0.436***	−0.435***
Use/possession past 5 years	1.278***	1.279***	1.282***	1.275***	1.329***
Job × traffic offence	0.584***				
Job × property offences		−0.617***			
Job × violent offences			0.255**		
Job × economic offences				−0.975***	
Job × Use/possession past 5 years					−0.394***
−2 Log L	53,385.0	53,383.8	53,419.4	53,405.6	53,403.1
Diff −2LL compared to model 3	41.8	43.0	7.4	21.2	23.7
P	<0.001	< 0.001	0.006	< 0.001	< 0.001
Implied log odds Post-release job given principal offence	−0.268	−1.163	−0.505	−1.637	−0.905

^ $p < .10$, * $p < .05$, ** $p < .01$,*** $p < .001$

All models include all main effects of confounding covariates. The models are compared by −2LL with model 3 in Table 2

Interaction terms with violence. Drug crimes and sexual offences results are not reported as they were not statistically significant ($p > 0.10$)

could be driven mainly by certain offender groups that have both high post-release employment rates and low recidivism. Two such groups are traffic offenders and economic offenders. Therefore, we check whether the post-release employment estimate only holds for certain offender groups by testing interaction terms between employment and principal offence. We enter each of the interaction terms separately into the regression model, which also includes all of the main effects reported in model 3 above. We report only the parameters that are statistically significant (using the likelihood ratio statistic) in Table 3. The bottom section of the table shows the implied log odds ratio of post-release employment conditional upon the interaction with the relevant principal offence in each model.

The results show that post-release employment is negatively correlated with recidivism for all principal offences. It is not the case, then, that certain offender types drive the results, as the estimated main effect does not change substantively between these models. There are four interaction terms that are statistically significant (at $\alpha = .05$), suggesting that post-release employment is less strongly related to lower recidivism rates for traffic offenders and violent offenders and more strongly related to lower recidivism rates for property offenders and drug offenders. In addition, for those previously charged with drug-use-related narcotic offences, post-release employment is more strongly related to lower recidivism rates.

Discussion

It is well known that prisoners face major obstacles to reintegration upon their release, and employment is seen as a main opportunity to establish a lifestyle in which one earns a licit income without engaging in criminal activity. One implication is that employment might be a fruitful approach to reducing recidivism, which fits well with several criminological theories (Ehrlich 1973; Laub and Sampson 2003; Uggen 2000). However, there are two interrelated gaps in the empirical literature. First, little is known about inmates' post-release situation on the labor market, including whether they obtain a job at all after release from prison and to what extent those who find a job obtain sufficient earnings. Second, little is known about whether post-release employment is negatively correlated with recidivism (as follows from theory). We might add that whether employment decreases recidivism is even more uncertain, and at best, we have inconclusive evidence from evaluations of specific labor market programs (Bloom 2006; Sedgley et al. 2008; Visher et al. 2005).

With good quality data, such as those provided by Norwegian administrative records, it is easy to contribute to the description of post-release employment rates. We followed a population of individuals who were released from prison in 2003 until 2006 and described their attachment to the labor market both before and after release. There is a gradual increase in employment rates with time since release. Although this finding is encouraging, the results show that some former inmates take a long time to find a job. Importantly, some might also receive social assistance while working, suggesting that their earnings are below the level needed to sustain a basic standard of living.

It is harder to establish whether employment per se reduces recidivism, as we do not have any random allocation to employment, which would be necessary to estimate reliable causal effects. Clearly, there are systematic selections into employment, and we cannot control for likely confounders such as motivation or readiness for change. However, we have estimated a negative association between post-release employment and recidivism, controlling for a range of background characteristics. The association is not explained by our measures of, e.g., educational level or pre-prison employment, which we expected to be strongly related to post-release employment. Neither is the association explained by post-release enrollment in education or labor market programs. However, we established that post-release jobs are not as strongly related to recidivism among individuals receiving social security benefits. Thus, the relation between jobs and recidivism may depend on earnings.

Although post-release employment periods are associated with a lower risk of recidivism for all categories of principal offence, the magnitude of the association varies. The negative association between employment and recidivism is strongest for those who were

sentenced for property and economic offences and least strong for those who were sentenced for violent and traffic offences. Nevertheless, these associations are all in the same direction, and we therefore conclude that employment is associated with avoiding recidivism for *all* of these offender groups.

There are some additional limitations to our study that may be addressed in future work. We only use data on formal employment, but many of those individuals who were recorded as unemployed may have had informal jobs. Even though illicit work could be prevalent, it seems reasonable that formal employment would be more effective than illicit work at preventing crime. Others have noted that qualitative aspects of the job would be of importance for desistance from crime (Laub and Sampson 2003). This would include aspects such as job stability, kind of work, working conditions and kind of work contract (e.g. part time or by the hour). The importance of such job characteristics should be given more attention in future studies.

A more serious limitation is whether differences in recidivism rates should be interpreted as differences in actual criminal behavior. There is a difference between *detected* crimes and actually *committed* crimes. Our data on recidivism only capture crimes that the police detected and solved. It seems obvious that some individuals in the sample recidivated in the study period without being caught. It is not clear to us, though, whether any such "dark figures" would be systematic in such a way as to alter our results. It should also be noted that our measure of recidivism is more finely grained than those used in many other studies, as we do not rely on a conviction or reincarceration but use the date when the offence was *committed* as the outcome variable.

One possible limitation of this study regards whether findings from a small country like Norway are informative for others outside of Scandinavia. The findings might be context-specific. There are a number of key characteristics specific to the Norway context. The crime rates are not very high compared to many other western countries[9]; the prison population is relatively small and serves relatively short sentences; and in general, Norwegian prison conditions are also considered to be particularly humane (Pratt 2008). Perhaps more important is the structure of the welfare state, with relatively generous social security benefits and unusually low unemployment rates. Clearly, these characteristics influence the expected rates of post-release employment and recidivism. However, we estimate the *relative* change in recidivism for those employed and not, and it is less clear whether this would be affected by the institutional setting in Norway and in which direction. These topics are left for possible future cross-national comparisons.

Of relevance to policy, it is clear that the majority of the prison population is outside of or weakly associated with the labor market. Given that employment is the main legal income source in our society and a key to social integration, the effects of initiatives to reduce recidivism are likely to depend on the success of entry into the labor market. Our study does not, however, indicate *how* this should be done. Our findings are consistent with theories suggesting that access to employment facilitates former inmates' return to society after their release from prison. This relation may exist because a job provides the individual not only with a legal source of income but also with structured routine activities, increased social control, and a changed identity as a law-abiding citizen (Laub and Sampson 2003; Farrall and Calverley 2006; Ehrlich 1973; Giordano et al. 2002). Despite

[9] According to OECD statistics (URL: http://www.unodc.org/unodc/en/data-and-analysis/crimedata.html), the rates for e.g. murder, assault and burglary are low, while the rate for theft is high. It should be acknowledged that comparisons of crime rates across countries are highly problematic, so this is at best a rough indication.

the uncertainty about whether the association is causal, individuals who are motivated to establish a life without crime need an opportunity to make that transition. It is likely that work can provide such an opportunity.

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