AN OUTCOME EVALUATION OF A PRISON WORK RELEASE PROGRAM: ESTIMATING ITS EFFECTS ON RECIDIVISM, EMPLOYMENT AND COST AVOIDANCE

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ABSTRACT

This study adds to the relatively limited and mostly outdated work release literature by evaluating the effectiveness of a Minnesota prison work release program. A retrospective quasi-experimental design was used to assess the impact of work release on recidivism, employment and cost avoidance among 3,570 offenders released from Minnesota prisons between 2007 and 2010. Propensity score matching was used to minimize observable selection bias. Work release significantly increased the hazard of returning to prison for a technical violation, although it significantly reduced, albeit modestly, the risk of reoffending with a new crime. It did not have an impact on hourly wage, but it significantly increased the odds that participants found a job, the total hours they worked, and the total wages they earned. Work release produced an estimated cost avoidance benefit of $1.25 million overall, which amounts to nearly $700 per participant.

INTRODUCTION

Major criminological theories have long recognized the potential importance of employment as a protective factor against crime. Strain theory suggests, for example, that employment mitigates strain by reducing economic need (Agnew, 1986), while social control theory argues that work expands informal social control by giving individuals a greater stake in conformity and involvement in conventional activities (Sampson and Laub, 1993). Social learning theory holds that associating with others who are employed increases the likelihood that individuals will develop or maintain pro-social values, beliefs, and attitudes (Akers, 1998), whereas rational choice theory suggests that work curbs crime by increasing the perceived benefits of conventional behavior (Freeman, 1996). Consistent with these theoretical perspectives, existing research indicates individuals are less likely to commit crime when they work more often (Uggen, 1999) and have employment that is stable (Crutchfield and Pitchford, 1997), is considered satisfying (Uggen, 1999), and is perceived as having career potential (Huiras, Uggen, and McMorris, 2000).

Employment has also been identified as a recidivism risk factor (or criminogenic need) among individuals who have been convicted of criminal offenses (Andrews, Bonta, and Wormith, 2006). The principles of effective correctional intervention suggest that providing educational and vocational programming to undereducated, higher-risk offenders who lack legitimate work histories will lower recidivism by increasing their odds of finding and maintaining employment. Nevertheless, the results from the surprisingly small number of studies examining the efficacy of offender employment programming have not been overly promising. In their meta-analysis of correctional programming, Wilson, Gallagher, and MacKenzie (2000) reported a negative association between correctional work/industry

programs and recidivism but the effect was not statistically significant due to the small number of treatment/comparison group contrasts (four) they analyzed for this type of programming. In their meta-analysis of eight community-based employment program evaluations, Visher, Winterfield and Coggeshall (2005) concluded that community employment programs do not have a significant effect on recidivism. But Visher et al. (2005) cautioned against generalizing these findings to all employment programs for former prisoners due to the lack of contemporary evaluations combined with wide differences among the offenders who participated in these programs.

As evidenced by the recent evaluation of Minnesota's EMPLOY program (Duwe, 2012), prisoner employment programming can be effective in increasing employment and reducing recidivism. In contrast to programs that provide services only in prison or the community, EMPLOY offers a continuum of employment programming by delivering services in both the institution and the community. For example, EMPLOY staff helps participants during the final 60-90 days prior to their release from prison by searching for job leads based on their vocational skills, making phone calls to "felon-friendly" employers, and addressing issues such as skills assessments, resumes, job searching techniques, and interviewing skills. Upon their release from prison, EMPLOY participants receive a portfolio that includes copies of their resume, certifications, and job leads. EMPLOY staff continues to provide participants with employment assistance for up to one year following their release from prison by maintaining regular contact and helping with job leads and resume maintenance. The findings indicated that EMPLOY significantly reduced the risk of recidivism, elevated the odds that participants found post-release employment, and increased the number of hours they worked, resulting in more total wages (Duwe, 2012).

PRIOR EVALUATIONS OF WORK RELEASE

Similar to the aforementioned offender employment programs, prison work release programs generally focus on improving employment outcomes for offenders so as to increase their chances of making a successful transition from prison to the community. Work release programs allow participants, who are usually near the end of their prison terms, to work in the community and then return to a correctional or community residential facility during non-working hours. In doing so, work release provides offenders with a stable residence in a controlled environment, and it gives them opportunities to earn income and accumulate savings for their eventual release (Turner and Petersilia, 1996). Moreover, because participants are granted early release from prison and are typically required to reimburse the state for part of their confinement costs, work release can help reduce prison overcrowding and decrease correctional costs (Turner and Petersilia, 1996).

Work release programs have operated in the United States since the 1920s (Turner and Petersilia, 1996) and, according to the most recent census of state and federal correctional facilities, all but one of the 50 states runs a prison work release program (Stephan, 2008). Nevertheless, there have been only eight published evaluations of work release programs, and all but two of these were published more than twenty years ago. Among the eight evaluations, two used random assignment while the remaining six employed quasi-experimental designs.

The findings from the existing evaluations suggest work release has no effect on recidivism or, at most, a modest impact. Most notably, the two studies that used a randomized experimental design did not find that work release reduced recidivism. For example, in their evaluation of a jail work release program in California, Lamb and Goertzel

(1974) reported no difference in reincarceration rates among program participants and offenders assigned to the control group. Similarly, in their evaluation of a Florida work release program, Waldo and Chiricos (1977) found that reoffending was not significantly less among 188 work release participants in comparison to 93 offenders from the control group.

Of the six evaluations using a quasi-experimental design, three found that work release significantly reduced recidivism (Drake, 2007; Rudoff and Esselstyn, 1973; LeClair and Guarino-Ghezzi, 1991). The study by Drake (2007) is especially noteworthy given it is the largest and most recent evaluation of a work release program. After matching 3,913 offenders who did not participate in Washington's work release program with 11,413 program participants, Drake (2007) reported the program produced a statistically significant, albeit modest, reduction in recidivism.

Although the other three quasi-experimental evaluations found that work release did not have a significant overall effect on recidivism, two identified specific areas in which the programs appeared to produce better recidivism outcomes. For example, in their study of a jail work release program in California, Jeffrey and Woolpert (1974) reported the program reduced recidivism among offenders with more extensive criminal histories but did not have an impact on those sentenced for a first or second offense. In Witte's (1977) evaluation of North Carolina's work release program, she found that work release participants were arrested for less serious offenses.

While recidivism has been the main outcome measure assessed in prior work release evaluations, the two studies that also examined employment have yielded promising findings. Lamb and Goertzel (1974) reported that work release participants had higher employment rates than offenders in the control group. Using self-report data, Witte (1977) found that

work release participants reported higher employment rates and greater overall earnings than offenders in the comparison group.

The two evaluations of Washington's work release program are also the only ones that have attempted to assess the effects on correctional costs (Drake, 2007; Turner and Petersilia, 1996). Although Turner and Petersilia (1996) noted that work release beds are less expensive than prison beds, they reported the program did not reduce costs, primarily due to the finding that about one-third of the participants failed on work release and were returned to prison. In addition to assessing work release and prison per diem costs that Turner and Petersilia (1996) examined in their study, Drake (2007) conducted a more thorough cost-benefit analysis by accounting for costs associated with reoffending. Drake (2007) indicated Washington's work release program generated a cost avoidance benefit of nearly $1,700 per participant, which amounted to $3.82 of benefits per dollar of cost.

PRESENT STUDY

This study examines the effects of a Minnesota prison work release program on recidivism, post-release employment, and cost avoidance. In doing so, it contributes to the relatively limited work release literature in several ways. First, because most of the existing evaluations are more than 20 years old, this study provides a much-needed contemporary evaluation by examining offenders released from Minnesota prisons between 2007 and 2010. Second, given that prior evaluations have examined only one or, at most, two outcomes (e.g., recidivism and employment), this study is the first to collectively examine the effects of work release on recidivism, employment, and cost avoidance. Finally, this study extends previous cost-benefit analyses of work release programs by also considering the contributions that employed offenders make to state income taxes.

In the ensuing section, this study describes the work release program that has operated in Minnesota since the late 1960s. Next, it delineates the data and methods used to assess the program's impact on recidivism, employment, and cost avoidance. After this study presents the results from the statistical analyses, it concludes by discussing the implications of the results for correctional policy and practice.

MINNESOTA'S WORK RELEASE PROGRAM

Statutorily established in 1967, Minnesota's work release program is operated by the Minnesota Department of Corrections (MnDOC). The program offers early release to prisoners, who are expected to work at paid employment or participate in approved vocational programming while they are housed in a county jail, jail annex, or community corrections residential facility. As such, work release is designed to help offenders make a successful transition from prison to the community by providing them with stable housing and opportunities to secure employment (Minnesota Department of Corrections, 2012).

The State of Minnesota has a determinate sentencing system in which prison sentences consist of two parts: a minimum prison term equal to two-thirds of the total executed sentence, and a supervised release term equal to the remaining one-third. Offenders are eligible for work release if they are within eight months of their supervised release date and have served at least half of their term of imprisonment. Therefore, the amount of time work release participants get released early from prison typically ranges from a minimum of two months to a maximum of eight months (Minnesota Department of Corrections, 2012).

Because work release provides participants with early release from prison, the program is geared more towards lower-risk offenders due to public safety considerations. Indeed, offenders are excluded from participating if they have a prior sex offense history or

have a high recidivism risk based on their criminal history, behavior within prison, or score on the Level of Service Inventory-Revised (LSI-R)—a risk and needs assessment instrument. Moreover, prisoners who are required to register as predatory offenders are prohibited from participating in the program (Minnesota Department of Corrections, 2012).

When offenders enter Minnesota's prison system, they are advised about programming opportunities, including work release, during orientation sessions that occur at the time of intake. The MnDOC also regularly holds transition fairs, which provide offenders with information about the availability of community services and programs such as work release. When offenders are within at least one year of their supervised release date, they may submit applications to enter the work release program, which are then screened by MnDOC staff from the Work Release Unit, the Hearings and Release Unit, and MnDOC facilities (Minnesota Department of Corrections, 2012).

After offenders have been approved for work release, they are transferred from a MnDOC facility to a county jail or community corrections residential facility. While on work release, participants must obtain steady employment, they are subject to random alcohol and drug testing, and those assessed as chemically dependent are required to participate in Alcoholics Anonymous, Narcotics Anonymous, or relapse prevention programs. Participants who have difficulty in finding employment are referred to community programs that assist offenders in developing job-seeking skills. Participants must use a portion of their income (an average of $7/day) to help pay for their work release housing costs, "gate money", and court-ordered restitution (Minnesota Department of Corrections, 2012).

During the most recent fiscal year for which data are available (2012), the average daily work release population of male and female offenders was 183 (Minnesota Department

of Corrections, 2012). As shown later, given that the average length of stay on work release is a little more than four months, there were roughly 450 offenders, on average, placed on work release each year during the four-year period analyzed in this study (2007-2010). Work release thus accounts for roughly two percent of all Minnesota prisoners on any given day and approximately seven percent of all offenders released within a given year.

Offenders complete work release when they reach their original supervised release date. Offenders can fail work release, however, by violating program rules, failing to follow the conditions of furloughs/passes, and/or failing to remain law-abiding. Violating the rules and conditions of work release can result in sanctions ranging from loss of privileges to a revocation and return to prison (Minnesota Department of Corrections, 2012). When offenders complete work release, they typically transition to regular supervised release rather than intensive supervised release, which tends to be reserved for higher-risk offenders who would have been determined ineligible for work release. Prior to completion of work release, offenders are expected to not only obtain a suitable residence, but also to maintain the employment they secured while on work release.

DATA AND METHODOLOGY

This study used a quasi-experimental design to determine whether work release has had an impact on recidivism, post-release employment, and cost avoidance outcomes. The effectiveness of work release was evaluated by comparing outcomes between work release participants and a matched comparison group of non-participants released from Minnesota prisons between January 2007 and December 2010. This four-year period was selected because individual-level employment data on prisoners did not first become available until 2007. To allow for a sufficient follow-up period for the recidivism, employment and cost

avoidance analyses, this study includes offenders released through 2010.

Between 2007 and 2010, there were 1,785 offenders who were placed on work release. During this same four-year period, there were 6,841 additional offenders released from prison to regular supervised release who met the basic eligibility requirements (e.g., sufficient length of stay, no prior sex offense history, etc.) for work release but did not participate in the program. Therefore, the overall sample for this study consisted of 8,626 offenders, of whom 21 percent entered work release. As discussed later, propensity score matching (PSM) was used to individually match the 1,785 work release participants with a comparison group of 1,785 offenders from the larger pool of non-participants (N = 6,841).

Dependent Variables

As noted above, two main outcome measures—recidivism and post-release employment—were used to assess the effectiveness of work release programming. The outcome data for these measures are also used to conduct the cost avoidance analyses. The following section discusses how each outcome measure was operationalized.

Recidivism

Recidivism was defined here as a 1) rearrest, 2) reconviction, 3) reincarceration for a new sentence, or 4) supervision revocation for a technical violation. It is important to emphasize that the first three recidivism variables strictly measure new criminal offenses. In contrast, technical violation revocations (the fourth measure) represent a broader measure of rule-breaking behavior. Offenders can have their supervision revoked for violating the conditions of their supervised release. Because these violations can include activity that may not be criminal in nature (e.g., use of alcohol, failing a community-based treatment program,

failure to maintain agent contact, failure to follow curfew, etc.), technical violation revocations do not necessarily measure reoffending.

Recidivism data were collected on offenders through December 31, 2012. Considering that offenders in this study were released between 2007 and 2010, the follow-up time for the offenders examined in this study ranged from 24-72 months. Data on arrests and convictions were obtained electronically from the Minnesota Bureau of Criminal Apprehension. Reincarceration and revocation data were derived from the Correctional Operations Management System (COMS) database maintained by the MNDOC. The main limitation with using these data is that they measure only arrests, convictions or incarcerations that took place in Minnesota. As a result, the findings presented later likely underestimate the true recidivism rates for the offenders examined here.

To accurately measure the total amount of time offenders were actually at risk to reoffend (i.e., "street time"), it was necessary to account for supervised release revocations in the recidivism analyses. More specifically, for the three recidivism variables that strictly measure new criminal offenses (rearrest, reconviction, and new offense reincarceration), it was necessary to deduct the amount of time they spent in prison for technical violation revocations from their total at-risk period. Failure to deduct time spent in prison as a supervised release violator would artificially increase the length of the at-risk periods for these offenders. Therefore, to achieve a more accurate measure of "street time", the time that an offender spent in prison as a supervised release violator was subtracted from his/her at-risk period, but only if it preceded a rearrest, a reconviction, a reincarceration for a new offense, or if the offender did not recidivate prior to January 1, 2013.

Post-Release Employment

Data on post-release employment were obtained from the Minnesota Department of Employee and Economic Development (DEED). The main caveat with using these data is that it does not capture any labor (or compensation for that labor) not reported to DEED, which can occur in situations where employees are paid "under the table" for their labor. Still, the DEED data provide important information not only on whether offenders obtained employment, but also on how much they worked and the extent to which they were compensated. Because the employment data are compiled on a quarterly basis, information was not available on the specific date(s) when offenders entered and/or exited a job. As a result, the post-release employment measures included: 1) any employment (dichotomized as "1" for employment and "0" for no employment), 2) total number of hours worked, 3) total wages earned, and 4) hourly wage.

Independent Variables

Work Release

To determine whether participation in work release has had an impact on recidivism and post-release employment, offenders who entered work release were assigned a value of "1". Offenders in the comparison group, on the other hand, were given a value of "0".

Control Variables

As described in Table 1, the control variables included in the statistical models were those that were not only available in the COMS database but have also been shown to have an impact on recidivism and/or post-release employment for Minnesota prisoners. For example, the covariates include factors associated with increased recidivism risk such as demographic characteristics (gender, age, and race), criminal history (prior supervision failures and convictions), LSI-R score, prison commit from the Twin Cities (Minneapolis/St.

Paul) metropolitan area, length of stay in prison, institutional discipline convictions, suicidal tendencies, and active membership in a security threat group (i.e., gang affiliation) (Duwe, 2012; Duwe, 2013; Duwe and Clark, 2013). In addition to including factors that increase the likelihood of recidivism, this study contains covariates that have been shown to lower recidivism such as having at least a secondary degree (Duwe and Clark, forthcoming), prison visitation (Duwe and Clark, 2013), and participation in chemical dependency treatment (Duwe, 2010), the EMPLOY program (Duwe, 2012), and the InnerChange Freedom Initiative (IFI)—a faith-based reentry program (Duwe and King, 2013). Meanwhile, covariates such as age, race, and educational degree have been found to have an impact on employment outcomes (Duwe and Clark, forthcoming; Northcutt Bohmert and Duwe, 2012).

PROPENSITY SCORE MATCHING

PSM is a method that estimates the conditional probability of selection to a particular treatment or group given a vector of observed covariates (Rosenbaum & Rubin, 1985). The predicted probability of selection is typically generated by estimating a logistic regression model in which selection (0 = no selection; 1 = selection) is the dependent variable while the predictor variables consist of those that theoretically have an impact on the selection process. Once estimated, the propensity scores are then used to match offenders who entered work release with those who did not. An advantage with using PSM, then, is that it can simultaneously "balance" multiple covariates on the basis of a single composite score. PSM reduces selection bias by creating a counterfactual estimate of what would have happened to offenders had they not participated in work release. PSM has several limitations, however, that are worth noting. First, and foremost, because propensity scores are based on observed covariates, PSM is not robust against "hidden bias" from unmeasured variables that

Table 1. Logistic Regression Model for Work Release Selection

Predictors	*Predictor Description*	*B*	*SE*
Male	Male = 1; female = 0	-1.160**	0.099
Minority	Minority = 1; White = 0	0.116	0.066
Age at Release (years)	Offender age in years at time of release from prison	-0.010**	0.003
Prior Supervision Failures	Number of prior revocations while under correctional supervision	-0.095**	0.026
Prior Convictions	Number of prior felony convictions, excluding index conviction(s)	-0.028**	0.009
LSI-R Score	Score on the Level of Service Inventory-Revised	-0.011*	0.004
Metro Commit	Prison commit from Twin Cities metropolitan area = 1; Greater Minnesota = 0	0.620**	0.063
New Court Commitment	New court commitment = 1; probation or release violator = 0	0.130	0.068
Offense Type	Person offense serves as the reference		
Property	Property offense = 1; non-property offense = 0	0.951**	0.111
Drugs	Drug offense = 1; non-drug offense = 0	1.147**	0.100
Felony DWI	Felony DWI offense = 1; non-Felony DWI offense = 0	0.586**	0.133
Other	Other offense = 1; non-other offense = 0	0.281*	0.121
Length of Stay (months)	Number of months between prison admission and release dates	0.018**	0.002
Discipline	Number of discipline convictions received during imprisonment prior to release	-0.322**	0.017
Suicidal Tendencies	History of suicidal tendencies = 1; no history of suicidal tendencies = 0	-0.344**	0.098
STG Affiliation	Security threat group (STG) or gang affiliation = 1; no affiliation = 0	-0.094	0.106
Secondary Degree	Secondary degree at release from prison = 1; less than secondary degree = 0	0.261**	0.074
Prison Visitation	Visited at least once during current confinement = 1; no visits = 0	0.223**	0.065
CD Treatment	Entered chemical dependency treatment during current prison sentence	0.888**	0.078
EMPLOY	Entered EMPLOY program during current prison sentence	0.113	0.216
IFI	Entered InnerChange Freedom Initiative (IFI) during current prison sentence	0.337*	0.149
Release Year	Year in which first released from prison for instant offense	-0.037	0.026
Constant		72.262	52.732
N		8,626	
Log-likelihood		7512.998	
Nagelkerke R^2		0.216	

** $p < .01$

* $p < .05$

are associated with both the assignment to work release and the outcome variable. Second, there must be substantial overlap among propensity scores between the two groups in order for PSM to be effective (Shadish, Cook & Campbell, 2002); otherwise, the matching process will yield incomplete or inexact matches. Finally, as Rubin (1997) points out, PSM tends to work best with large samples.

Although somewhat limited by the data available, an attempt was made to address potential concerns over unobserved bias by including as many theoretically-relevant covariates (22) as possible in the propensity score model. In addition, this study later demonstrates there was substantial overlap in propensity scores between work release participants and non-participants. Further, the sample size limitation was addressed by assembling a large number of cases on which to conduct the propensity score analyses.

Matching for Work Release

Propensity scores were calculated for the 1,785 offenders who entered work release and the 6,841 prisoners in the comparison group pool by estimating a logistic regression model in which the dependent variable was participation in work release. The predictors were the 22 control variables used in the statistical analyses (see Table 1). Even though the difference in mean propensity score between both groups was statistically significant at the .01 level, there was substantial overlap in propensity scores. Indeed, the vast majority of offenders (87 percent) had propensity scores less than 0.80.

After obtaining propensity scores for the 8,626 offenders, a greedy matching procedure was used to match the offenders who entered work release with those who did not. Using a caliper of 0.05, matches were found for all 1,785 offenders who entered work release. In addition to estimating tests of statistical significance (t test), this study calculated a

measure developed by Rosenbaum and Rubin (1985) that quantifies the amount of bias between the treatment and comparison samples (i.e., standardized mean difference between

$$\text{Bias} = \frac{100(\overline{X}_t - \overline{X}_c)}{\sqrt{\frac{(S_t^2 + S_c^2)}{2}}}$$

samples), where $\overline{X}_t$ and S_t^2 represent the sample mean and variance for the treated offenders and $\overline{X}_c$ and S_c^2 represent the sample mean and variance for the untreated offenders. If the value of this statistic exceeds 20, the covariate is considered to be unbalanced (Rosenbaum & Rubin, 1985).

The matching procedure reduced the bias in propensity scores between both groups by 96 percent. Whereas the p value was 0.00 in the unmatched sample, it was 0.29 in the matched sample. In the unmatched sample, there were nine covariates that were significantly imbalanced (i.e., the bias values exceeded 20). But in the matched sample, covariate balance was achieved given that no covariates had bias values greater than 20.

ANALYTICAL PROCEDURES

Recidivism

In analyzing recidivism, survival analysis models are preferable in that they utilize time-dependent data, which are important in determining not only whether offenders recidivate but also when they recidivate. As a result, this study uses a Cox regression model, which contains both “time” and “status” variables in estimating the impact of the covariates on recidivism. For the analyses presented here, the “time” variable measures the amount of time from the date of release until the date of first rearrest, reconviction, reincarceration, technical violation revocation, or December 31, 2012, for those who did not recidivate. The “status” variable, meanwhile, measures whether an offender recidivated (rearrest,

reconviction, reincarceration for a new crime, and technical violation revocation) during the period in which s/he was at risk to recidivate. In the analyses presented below, Cox regression models were estimated for each of the four recidivism measures.

Post-Release Employment

As noted above, the DEED data are compiled on a quarterly basis and, thus, do not provide information on the specific date(s) when offenders entered and/or exited employment. Because employment start date information would be needed to use Cox regression, multiple logistic regression was used to assess the impact of educational programming on obtaining employment. Considering that logistic regression assumes the lengths of follow-up periods do not vary among offenders, the follow-up period was capped at 24 months, or eight quarters, for all offenders (i.e., for the most recently released offenders, eight was the maximum number of quarters for which DEED data were available). Because the remaining employment variables (total numbers of hours worked, total wages earned, and hourly wage) were ratio-level measures, ordinary least squares (OLS) regression was used to estimate the impact of work release on these three outcomes.

Cost-Benefit

There are three main areas in which work release can produce a cost avoidance: early release, income taxes paid from employment, and recidivism. In assessing the benefits resulting from early release, it was first necessary to determine the number of days the 1,785 offenders were on work release. The difference in the marginal per diem between work release and prison in general was then multiplied by the number of work release days.

In examining income taxes paid from employment, it was beyond the scope of this study to obtain actual tax records to determine the percentage of these funds that were

contributed to municipal and state tax bases each year. Instead, an estimate was calculated using the State of Minnesota's Individual Income Tax Tables for the years 2007-2010. Average annual salaries were obtained for offenders in the work release and comparison groups to determine the appropriate tax rate. The difference in yearly earnings between the two groups was then multiplied by the tax rate to estimate the contribution. A few limitations should be noted, however, with this approach. First, it is likely that offenders claimed deductions and, as a result, paid less than the estimate provided in this study. Second, actual incomes may have varied from year to year, placing offenders into a higher or lower tax bracket within a given year (Northcutt Bohmert and Duwe, 2012).

The recidivism data collected for this study were analyzed to determine whether work release produced a benefit resulting from reduced recidivism. The costs of recidivism were monetized in two ways. First, the costs of new criminal offenses committed by offenders in the work release and comparison groups following their release from prison were calculated. The costs of individual offenses were monetized based on cost of crime estimates developed in several recent studies. Second, because the cost of crime literature has not developed estimates for technical violation revocations, per diem data from the MnDOC were used to calculate the costs for this type of recidivism event.

Research on the cost of crime has estimated costs of individual offenses to society based on victim costs, criminal justice costs (including police, courts, and prisons), and lost productivity of incarcerated offenders. The studies by Cohen and Piquero (2009), McCollister et al., (2010), and DeLisi et al. (2010) are three recent efforts to monetize the costs of specific types of offenses to society. All three studies have developed estimates for murder, rape/sex offenses, aggravated assault, armed robbery and burglary. The Cohen and

Piquero (2009) and McCollister et al. (2010) studies each developed estimates for simple robbery, arson, motor vehicle theft, fraud and theft. The average cost for offenses, adjusted for inflation to 2010 dollars, was used where more than one estimate has been developed. For offenses, however, where only one estimate has been reported, the cost information from a single study was used. For example, for cost estimates associated with stolen property, embezzlement, and forgery, this study relied on the estimates developed by McCollister et al. (2010). Similarly, for "other" offenses, such as drugs, which do not fall into any of these categories, the estimate reported by Cohen and Piquero (2009) was used.

To determine the extent to which offenders in the work release and comparison groups reoffended through the end of 2012, this study counted the total number of criminal offenses for which they were convicted. Reconviction was used to quantify reoffending because it provides a middle-of-the-road measure that is neither too generous nor overly conservative in estimating reoffending costs. Although rearrest is the most sensitive official measure for reoffending, it will include instances where the offender was not convicted because charges were dropped due to insufficient or exculpatory evidence. On the other hand, reincarceration for a new felony-level offense provides what is, for purposes of the cost-benefit analysis, an overly conservative measure of reoffending. For example, this measure does not include felony-level convictions in which the offender was not sentenced to prison or lower-level convictions (misdemeanor or gross misdemeanor).

To estimate the costs associated with reincarcerations resulting from technical violation revocations, COMS data were analyzed. More specifically, work release participants were compared with offenders in the comparison group on the basis of how many days they were incarcerated for a technical violation revocation following their release

from prison. The overall difference (in days) between the two groups was then monetized based on the MnDOC's marginal per diem. Due to the size of the program, the number of bed days saved from a reincarceration reduction would not likely be large enough to prevent the construction of a new correctional facility. As such, marginal costs, which include only the costs to clothe and feed offenders, was used rather than fixed costs, which also include the cost of new prison construction (Duwe and Kerschner, 2008).

RESULTS

The data indicate that 423 of the 1,785 participants (24 percent) failed work release and returned to prison prior to completing the program. The average number of work release days for program completers was 145, or nearly five months. Among the 423 program failures, the average number of work release days was 73. Nearly half (45 percent) of the program failures returned to prison within 60 days of their initial placement on work release.

Table 2. Recidivism and Employment Outcomes

Outcomes	*Work Release*	*Comparison*
Recidivism		
Rearrest	60.7%	64.1%
Reconviction	45.2%	47.7%
Reincarceration	19.0%	22.4%
Revocation	42.5%	29.2%
Employment		
Employment	84.1%	44.5%
Total Hours	834.50	337.10
Total Wages	$9,436.57	$4,576.21
Hourly Wage*	$14.89	$14.63
N	1,785	1,785

***** Based on offenders who obtained employment (Work Release = 1,501; Comparison = 795)

In Table 2, the recidivism and post-release employment results are presented for work release participants and offenders in the comparison group. When focusing on the three

recidivism measures related strictly to criminal offending (rearrest, reconviction and new offense reincarceration), the findings indicate work release participants had slightly lower recidivism rates than their counterparts in the comparison group. When examining technical violation revocations, however, offenders participating in work release had a much higher rate of return to prison for technical violations than those in the comparison group.

Although there was a minimal difference in hourly wage between work release participants and offenders in the comparison group, there were differences among the other employment measures examined. In particular, 84 percent of offenders who entered work release found employment within the first two years compared to 45 percent in the comparison group. Work release participants worked more than twice the number of hours than those in the comparison group and earned roughly double the total wages.

The above findings suggest that work release participation may have an impact on the outcomes measured, particularly post-release employment. While PSM was used to balance the comparison group with the work release group on the covariates analyzed, multivariate statistical models were used to further control for any observed differences in assessing the impact on recidivism and post-release employment. In particular, Cox regression models were estimated for each of the four recidivism measures, while logistic and OLS regression models were used to assess the impact on post-release employment.

THE IMPACT OF WORK RELEASE ON RECIDIVISM

The results in Table 3 indicate that, controlling for the effects of the other independent variables in the statistical model, participation in work release had a statistically significant effect on all four recidivism measures. Work release significantly decreased the risk of reoffending, lowering the hazard by 16 percent for rearrest, 14 percent for

reconviction, and 17 percent for new offense reincarceration. Work release had the opposite effect, however, on technical violation revocations, increasing the risk by 78 percent.

Table 3. Impact of Work Release on Time to First Recidivism Event

	Rearrest		*Reconviction*		*Reincarceration*		*Revocation*	
	HR	SE	HR	SE	HR	SE	HR	SE
Work Release	0.843**	0.043	0.864**	0.050	0.834*	0.075	1.759**	0.057
Male	1.497**	0.075	1.613**	0.090	1.995**	0.154	1.622**	0.105
Minority	1.275**	0.049	1.246**	0.056	1.254*	0.084	1.263**	0.064
Age at Release (years)	0.966**	0.003	0.963**	0.003	0.965**	0.005	0.978**	0.004
Prior Supervision Failures	1.094**	0.018	1.087**	0.021	1.116**	0.026	1.144**	0.022
Prior Convictions	1.085**	0.006	1.098**	0.007	1.105**	0.009	1.029**	0.008
LSI-R Score	1.017**	0.003	1.015**	0.004	1.009	0.006	1.021**	0.004
Metro Commit	1.276**	0.048	1.145*	0.055	1.189*	0.084	1.100	0.062
New Commitment	1.068	0.050	1.080	0.058	1.477*	0.089	1.005	0.064
Offense Type								
Property	1.237*	0.093	1.176	0.108	1.479*	0.174	1.010	0.126
Drugs	1.170	0.087	1.101	0.101	1.342	0.165	0.948	0.115
Felony DWI	0.955	0.108	0.829	0.126	1.136	0.197	1.378*	0.137
Other	1.125	0.103	1.057	0.120	1.364	0.189	1.014	0.135
Length of Stay	0.990**	0.002	0.989**	0.002	0.991**	0.003	0.993**	0.002
Institutional Discipline	1.053**	0.014	1.047**	0.016	1.018	0.025	1.087**	0.017
Suicidal Tendencies	1.082	0.075	1.060	0.087	1.228	0.122	1.454**	0.090
STG Affiliation	1.361**	0.074	1.330**	0.084	1.488**	0.113	1.369**	0.092
Secondary Degree	1.101	0.056	1.145	0.066	1.049	0.098	0.905	0.072
Prison Visitation	0.842**	0.049	0.884*	0.056	0.851	0.083	0.868*	0.065
CD Treatment	1.145	0.059	1.237	0.069	1.303	0.102	1.106	0.078
EMPLOY	0.959	0.150	1.182	0.162	1.085	0.225	0.903	0.205
IFI	0.995	0.102	0.781*	0.127	0.622**	0.205	1.241	0.127
Release Year	0.961*	0.020	0.932**	0.024	0.965	0.038	0.914**	0.027
Supervised Release Revocations	1.003	0.039	1.047	0.037	1.158**	0.048		
N	3,570		3,570		3,570		3,570	

Notes: HR = hazard ratio; SE = Standard Error
** $p < .01$
* $p < .05$

The results further suggest the impact of work release on the three types of reoffending (rearrest, reconviction, new offense reincarceration) was not likely attributable to the increased risk of revocation for program participants. Each of the models that examined the three reoffending measures (rearrest, reconviction, and new offense reincarceration) included a covariate, supervised release revocations, which quantified the number of times offenders had their supervision revoked for technical violations as long as the revocation(s) preceded the recidivism event (for recidivists) or the end of the follow-up period (for non-

recidivists). Moreover, as noted earlier, the amount of time an offender spent in prison for these revocations was subtracted from his/her at-risk period so as to obtain a more accurate measure of "street time". The hazard ratio for supervised release revocations was not only in the positive direction in each of the three models that analyzed reoffending, but it was also statistically significant in the new offense reincarceration model.

The results in Table 3 also show that males, minorities, younger offenders, inmates with more prior supervision failures and convictions, gang-affiliated offenders and those with shorter lengths of stay in prison had a significantly greater risk of recidivism for all four measures. Higher LSI-R scores, a metro-area county of commit, release year, and institutional discipline convictions were associated with increased recidivism risk for three measures. Property offenders had a significantly higher recidivism risk for two measures, whereas suicidal tendencies and new commitments elevated the risk of recidivism for one measure. Prison visits and participation in IFI, on the other hand, reduced the risk of recidivism for at least one measure.

THE IMPACT OF WORK RELEASE ON POST-RELEASE EMPLOYMENT

The results from the logistic regression model, which are shown in Table 4, reveal that participating in work release significantly increased the chances of securing employment within the first two years after release from prison. Controlling for the effects of the other covariates in the model, work release participants were eight times more likely to find a job. The odds of finding a job were significantly greater for females, younger offenders, inmates with lower LSI-R scores, offenders with longer lengths of stay, offenders with a secondary degree at release, inmates who were visited in prison, CD treatment participants, and EMPLOY participants. The odds were significantly less, however, for minorities, those with

a metro-area county of commit, offenders with discipline convictions, inmates with a history of suicidal tendencies, and offenders with a more recent release year.

Table 4. Logistic Regression Model for Post-Release Employment

Predictors	*Work Release*	
	Odds Ratio	SE
Work Release	8.120**	0.087
Male	0.732*	0.136
Minority	0.626**	0.093
Age at Release (years)	0.977**	0.005
Prior Supervision Failures	0.963	0.037
Prior Convictions	1.005	0.013
LSI-R Score	0.979**	0.006
Metro Commit	0.691**	0.090
New Commitment	0.882	0.097
Offense Type		
Property	1.036	0.176
Drugs	0.922	0.159
Felony DWI	0.955	0.201
Other	1.086	0.194
Length of Stay	1.006*	0.002
Institutional Discipline	0.925**	0.026
Suicidal Tendencies	0.756*	0.142
STG Affiliation	0.873	0.149
Secondary Degree	1.717**	0.104
Prison Visitation	1.284**	0.093
CD Treatment	1.471**	0.109
EMPLOY	2.506**	0.336
IFI	1.138	0.196
Release Year	0.749**	0.038
Constant	1.221E+252**	75.369
N	3,570	
Log-likelihood	3684.833	
Nagelkerke R^2	0.326	

** $p < .01$
* $p < .05$

As shown in Table 5, work release did not have a significant effect on hourly wage, but it did increase the number of hours worked and total wages relative to the comparison group. Participants worked 497 more hours in the follow-up period, net of the effects of the

control variables in the model. Moreover, controlling for the other covariates, these offenders earned $4,869 more in wages during the follow-up period than comparison group offenders.

Table 5. Impact of Work Release on Post-Release Employment

Predictors	*Total Hours*		*Total Wages*		*Hourly Wage*	
	B	SE	B	SE	B	SE
Work Release	497.381**	21.967	4869.127**	449.698	0.683	3.403
Male	-86.957*	36.379	353.360	744.738	-3.516	5.212
Minority	-145.075**	25.321	-2902.540**	518.368	-3.708	3.669
Age at Release (years)	-2.790*	1.297	-14.738	26.547	0.130	0.196
Prior Supervision Failures	-26.609*	10.426	-426.977*	213.445	-0.212	1.642
Prior Convictions	-5.024	3.491	-36.311	71.474	-0.158	0.520
LSI-R Score	-9.555**	1.724	-150.347**	35.297	-0.372	0.251
Metro Commit	-140.346**	24.261	-1188.849*	496.664	5.796	3.463
New Commitment	-14.585	26.187	-756.719	536.081	6.534	3.853
Offense Type						
Property	44.219	47.651	40.299	975.484	-7.775	6.928
Drugs	105.712*	42.929	822.283	878.827	-2.864	6.267
Felony DWI	98.997	53.729	1991.142	1099.917	1.903	7.753
Other	55.682	51.888	-112.235	1062.230	-4.626	7.446
Length of Stay	2.870**	0.579	35.980**	11.856	-0.047	0.079
Institutional Discipline	-32.299**	6.862	-476.394**	140.472	-0.880	0.980
Suicidal Tendencies	-138.138**	39.170	-2047.519*	801.873	2.301	5.853
STG Affiliation	-50.945	41.266	-345.885	844.777	-1.373	6.260
Secondary Degree	99.767**	28.954	-443.054	592.724	-3.131	4.557
Prison Visitation	101.354**	25.697	2014.621**	526.060	0.231	3.870
CD Treatment	120.137**	29.128	1523.835*	596.289	1.375	4.176
EMPLOY	303.772**	77.252	4246.222**	1581.475	3.049	9.940
IFI	38.247	49.834	976.995	1020.172	-4.338	6.859
Release Year	-77.896**	10.119	-1130.655	207.146	-2.739	1.490
Constant	157113.593**	20322.187	2280011.095**	416027.626	5524.238	2992.800
N	3,570		3,570		2,296	
Adjusted R^2	0.224		0.095		0.009	

** $p < .01$
* $p < .05$

None of the covariates included in the model significantly predicted hourly wage. The results show, however, that prison visits, CD treatment, EMPLOY participation, and longer lengths of stay were significantly associated with more total wages and more hours worked. Drug offenders and those with a secondary degree at release worked significantly more hours during the follow-up period. In contrast, minority offenders, inmates with a history of suicidal tendencies, offenders with discipline convictions, offenders with a metro-area county of commit, more prior supervision failures and a higher LSI-R score were significantly

associated with fewer hours employed a lower total wages. Males, younger offenders, and those with a more recent release year were found to work significantly fewer hours.

COST-BENEFIT ANALYSES

In Table 6, the results from the cost-benefit analyses are presented. During the 2007-2010 period, the 1,785 work release participants spent 228,911 days on work release, which amounts to an average of 128 days per participant. The MnDOC's marginal per diem during the 2007-2010 period was $57 versus the $50.28 per diem for work release. As a result, the early release provision for work release produced $1.54 million in costs avoided to the state.

As shown earlier, work release participants earned about $8.7 million more than the comparison group during the follow-up period. The average annual income for the employed offenders was $10,894. According to Minnesota tax tables, individuals earning $10,894/year would have paid $577 each year to the State of Minnesota, or 5.3 percent of their annual income. Therefore, it is expected that work release participants paid an estimated $459,814 to the State of Minnesota in excess of what the comparison group was able to contribute (i.e., 5.3 percent of $8,675,743).

As shown in Table 6, work release did not produce a cost avoidance benefit when revocation costs were examined. The 1,785 work release participants spent 154,081 days in prison for a technical violation revocation between the time of their release from prison and the end of the follow-up period. The comparison group spent 93,320 days in prison, resulting in a difference of 60,761 days. Given the MnDOC's marginal per diem of $57, work release produced $3.5 million in revocation costs.

The crime cost estimate results from the reoffense comparison are also presented in Table 6. The findings indicate that work release participants were convicted of 1,411

Table 6. Work Release Cost-Benefit Analysis Results

Early Release	Costs
228,911 early release days at $6.72 less/day	$1.54 million
State Income Taxes	
Total Wages earned	
Work Release	$16.84 million
Comparison	$8.17 million
Difference	$8.68 million
State income taxes paid at rate of 5.3%	$459,814
Recidivism	
Technical violation revocations	
Work Release = 154,081 prison days	
Comparison = 93,320 prison days	
Difference = 60,761 prison days ($57/day)	-$3.50 million
Reoffending/Cost of Crime	
Work Release (1,411 convictions = $55.03 million)	
Comparison (1,599 convictions = $57.78 million)	
Difference	$2.75 million
Recidivism Total	-$750,000
Summary	
Early Release	$1,538,282
State Income Taxes	$459,814
Recidivism	-$750,000
Total Costs Avoided	**$1,248, 096**
Benefit Per Participant	$699.21

offenses during the follow-up period compared to 1,599 for offenders in the comparison group. The average cost estimate per conviction was roughly $39,000 for work release recidivists compared to nearly $36,130 for recidivists in the comparison group. Overall, the total reoffense costs for work release participants were $55.03 million compared to $57.78 million for the comparison group. For reoffending, then, work release produced an estimated $2.75 million in costs avoided. However, when the revocation and reoffending results are combined, work release still generated an estimated $750,000 in recidivism costs.

After subtracting the estimated recidivism cost of $750,000 from the nearly $2 million in early release and state income tax benefits, the results indicate work release produced an estimated $1.25 million in costs avoided during the 2007-2010 period. Dividing the total cost avoidance by the number of participants yields an estimated benefit of nearly $700 per participant. To place these results within a broader context, it is worth considering the study by Aos, Miller and Drake (2006) on the cost effectiveness of correctional programs. In their study, Aos et al. (2006) identified ten programs for adult offenders that produced a monetary benefit, which ranged from $870 to $13,738 per participant. With an estimated benefit of roughly $700 per participant, work release would rank below all ten cost-effective correctional programs identified by Aos et al. (2006).

DISCUSSION

LIMITATIONS

The present study has taken a modest step towards updating the relatively small, and mostly outdated, work release literature. Still, this evaluation was limited in several important ways. First, although propensity score matching was used to construct the comparison group, it is worth reiterating that this method cannot control for bias from unmeasured variables that are significantly associated with assignment to work release and/or the outcome measures analyzed here—recidivism and employment. Second, it is important to note that because work release participants are granted early release from prison, they tend to be offenders whose risk for recidivism is lower than that of prisoners in general. As such, the results from this evaluation may not be generalizable to offenders overall. Lastly, the limitations with the DEED employment data precluded a closer examination of the relationship between work release participation, employment, and recidivism. While the

recidivism data used in this study indicated the date on which offenders recidivated, the DEED employment data did not contain this level of detail since they are compiled on a quarterly basis. As a result, this study could not validly and consistently determine whether the procurement of post-release employment preceded a recidivism event.

IMPLICATIONS

These limitations notwithstanding, the findings presented here are consistent with prior evaluations of work release programs. The few studies that have examined the effects of work release on employment have yielded unambiguously positive findings. Likewise, the most positive outcomes observed in this study were those for employment. Work release significantly increased the odds that offenders found employment. Although the jobs they obtained did not necessarily offer higher pay, the findings suggest work release participants worked more often than offenders in the comparison group, resulting in greater overall wages.

Due perhaps as a consequence of more consistent employment, work release produced a modest decrease in reoffending. Yet, much like the work release literature in general, the recidivism outcomes were mixed. The results also showed that work release significantly increased the risk of revocation for a technical violation. In fact, the results from the cost-benefit analysis indicated that the costs associated with revocations outweighed those avoided from reduced reoffending, producing an estimated $750,000 in increased costs. Still, because work release generated a combined benefit of nearly $2 million for early release and state income taxes, the program produced roughly $1.25 million in costs avoided for the 2007-2010 period. At nearly $700, the benefit-per-participant estimate lies between the pair of cost avoidance results reported by Drake (2007) and Turner and Petersilia (1996).

Despite the generally positive findings from this evaluation, the cost avoidance estimates would have been greater had Minnesota's work release program produced better recidivism outcomes, especially for technical violation revocations. There may be a few reasons why the program did not yield more positive recidivism results. First, existing research suggests that employment is a moderate, rather than a major, recidivism risk factor for offenders (Andrews, Bonta, and Wormith, 2006). Based on the results presented here, it appears that Minnesota's work release program successfully addressed, for the most part, this criminogenic need. Nevertheless, it may be unreasonable to expect work release to produce a large reduction in recidivism given that employment is a moderate need.

Second, even though employment addresses a criminogenic need, offenders often have multiple need areas that contribute to their recidivism risk. When offenders are placed on work release, they seldom participate in any other interventions that mitigate recidivism risk such as cognitive-behavioral programming or chemical dependency treatment. Work release participants in Minnesota are typically housed in community residential facilities, which do not provide much more than surveillance and transitional housing for offenders due to limited resources, a lack of physical space, and the high amount of "churn" they have with clients whose time in the facilities is relatively brief. Moreover, when work release participants are employed or looking for work on a full-time basis, they rarely have the time available to participate in other programming.

In an effort to foster a more gradual transition from prison, improve recidivism outcomes, and increase the cost-effectiveness of work release, the MnDOC will be instituting a pilot program involving a limited number of work release participants. Building on the continuum of service delivery model used in the MnDOC's EMPLOY program, which has

been shown to be effective in reducing recidivism (Duwe, 2012), pilot program participants will be employed by MINNCOR, the MnDOC's industry program, and will participate in employment readiness training while housed in a county jail. After successful completion of the 90-day pilot program, participants will transition to regular work release. In addition, EMPLOY staff will provide pilot program participants with assistance in finding and maintaining employment for up to one year after their release from prison.

To be sure, the pilot program's replication of the EMPLOY model is designed to help work release improve its recidivism outcomes, especially for technical violation revocations. It may be unreasonable, however, to achieve a significantly lower revocation rate than a comparison group of non-participants. After all, work release participants are subject to greater surveillance than offenders placed on regular supervision. A more reasonable goal, however, would be to reduce the revocation rate to the same level as that for a comparison group of offenders on supervised release. For example, if the results presented here showed that work release had no effect on revocations, then the program would have produced $4 million in cost avoidance benefits (or about $2,200 per participant).

CONCLUSIONS

Future evaluation of Minnesota's work release program will be needed to determine whether the upcoming programmatic change will have an impact on recidivism and cost avoidance outcomes. Yet, given that nearly every state operates a work release program, more research is needed on these programs in general. Current evaluations of employment programming for offenders are also necessary due to the ebb and flow of the U.S. economy. Offenders often face a number of barriers to finding post-release employment, even during a

booming economy. But when the labor market constricts, as evidenced most recently by the Great Recession, offenders typically find it even more difficult to land a job.

Over the last several decades, the "what works" literature has generally focused on identifying what works best for whom under which circumstances. The findings from this literature and, more narrowly, this study suggest that work release programs may produce better outcomes if they not only provide a stronger continuum of care, or service delivery, from the institution to the community, but also successfully address multiple criminogenic needs (employment plus another need such as criminal thinking, anti-social peers, or substance abuse). In addition to assessing whether modifications such as these yield better outcomes, future research should include cost-benefit analyses given that work release programs were designed, in part, to lower correctional costs.

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