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The Impact of a Reentry and Aftercare Program on Recidivism

Colin Cannonier*, Monica Galloway Burke[§] and Ed Mitchell^{§§}

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Abstract

In this paper, we explore the impact of a reentry and aftercare service program on the likelihood of returning to prison by ex-offenders. Using administrative data within a difference-in-differences design, we find that this social program is associated with a reduction in recidivism rates. Benchmark estimates show that the program was associated with estimated reductions in the probability of recidivating of 6.0 to 8.7 percentage points. The estimate appears to be economically significant as it implies an estimated treated effect in the 15.8 to 19.2 percent range. We consider the heterogeneous effects of the program on reducing recidivism according to race, age group and program type. The program helped to reduce recidivism among Whites but not Blacks; older participants were the main beneficiaries while the effectiveness of the program was observed amongst older participants. Back-of-the-envelope cost-savings analysis is incorporated to estimate the potential savings to the state arising from the reduction in recidivism rates likely attributable to the program. The findings are robust to sample selection bias, alternative specifications and estimation techniques. Our results offer some implications for the role of faith-based social programs within the context of criminal justice reform to combat reentry of former inmates. They also provide a cautionary tale about the need to evaluate programs not just based on their overall effect.

Keywords: Difference-in-differences, prison, propensity score matching, recidivism, reentry and aftercare programs

JEL Classification: H73, L31,

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1. Introduction

The number of offenders that passed through the nation's adult correctional facilities at the end of 2016 was an estimated 6,613,500 persons, with 4,537,100 under community supervision (Bureau of Justice Statistics, 2018). According to data from the U.S. Department of Justice, correctional authorities released 15,000 fewer prisoners from state and federal prisons in 2016 than in 2015, with the total number of prisoners released decreasing by 2%, accounting for more than half (54%) of the total change between years (Carson, 2018). The offenders released include unconditional releases (e.g., expirations of sentence or commutations), conditional releases (e.g., probations, supervised mandatory releases, or discretionary paroles), deaths, releases to appeal or bond, and other releases. In addition, according to the Bureau of Justice Statistics (Carson, 2020), the most recent racial and ethnic composition of U.S. prisons continues to look considerably different from the demographics of the country in total, with Black men most likely to be imprisoned in spite of the fact that their rate of imprisonment has decreased the most in recent years. In 2018, Blacks represented 33% of the sentenced prison population, nearly three times the 12% share of the U.S. adult population, and had an incarceration rate nearly twice the rate among Hispanics (797 per 100,000) and more than five times the rate among whites (268 per 100,000). However, the rate of imprisonment for Blacks has decreased by 28% from 2008 to 2018, the lowest since 1989.

As most incarcerated offenders in the prison system will eventually be released, recidivism becomes a reality. In Tennessee, recidivism is defined as the percentage of felony inmates who are re-incarcerated within three years of their release (Tennessee

Department of Corrections, 2017). There was an average of 30,453 incarcerated felons, with 5,188 released from July 2018 to June 2019 in Tennessee (Tennessee Department of Correction, 2019). Tennessee's felony offender recidivism rate ranged from 45-51% between 2002 and 2017 (data on five of those years was not publicly available) with state prisoners released from local jails possessing higher recidivism rates than offenders released from TDOC facilities and highest recidivism rates for individuals in the Community Corrections program as opposed to those prisoners released when their sentences expired (The Sycamore Institute, 2019). As such, Tennessee Governor's Task Force on Sentencing and Recidivism was established in 2014 with one of its charges to identify strategies to reduce recidivism among individuals leaving prisons to improve public safety (Tennessee State Government, 2015).

Recidivism rates are relied upon by the criminal justice system, constituents, legislators, policymakers, grant funders, and media outlets as a measure of success and an identifier of whether specific criminal justice interventions have succeeded or failed (Klinge, 2019). There are evident costs to recidivism. In particular, "high rates of recidivism mean more crime, more victims, and more pressure on an already overburdened criminal justice system" (Caporizzo, 2011, para. 1) since many ex-offenders recidivate and return to incarceration within the first few years of their release (Braga et al., 2009). Furthermore, the high probability of inmates returning to detainment multiple times creates issues for the US prison system, specifically tax pressures (The Council of Economic Advisors, 2018). To address recidivism, reentry programs have been developed nationwide to attend to inmates' needs and create a process to assist in their transition from prison into the community after their release (Johnson & Cullen, 2015; Petersilia, 2003;

Roman & Travis, 2006; Roman, Wolff, Correa, & Buck, 2007; Seiter & Kadela, 2003; Wilson & Davis, 2006). Observably, if a behavioral change has not occurred during incarceration, inmates are more likely to return to previous negative actions and criminal behavior (O'Brien, 2009; Petersilia, 2004; Seiter & Kadela, 2003). Released inmates also often do not have substantial support networks or adequate living arrangements upon their return to society, which can lead to barriers for their successful reintegration to society (Petersilia, 2004). According to Travis (2000), the traditional mechanisms for managing reentry have been significantly weakened and thus, the processes and goals of prisoner reentry should be re-examined as the social goals are difficult to pursue within the existing legal constructs and operational realities of the current criminal justice policies. In the end, reentry is not a legal status or a singular program, but must include transitional and supportive services and targeted, community-based strategies to meet the multiple needs of exiting prisoners (Travis & Visher, 2005; Visher & Travis, 2011). The efforts within aftercare and reentry programs should attempt to balance public safety and offender rehabilitation objectives while also reducing the prison population (Pogorzelski, Wolff, Pan, & Blitz, 2005; Miller, 2012). Most relevant, reentry programs should slow the rate of paroled inmates recidivating (Wheeler & Patterson, 2008) and would be considered cost-effective, paying for themselves by reducing future criminal justice and corrections costs (Visher & Travis, 2011). This paper examines a reentry and aftercare program in the state of Tennessee: The “Men of Valor” (MOV) program.

The single most important factor in assuring the success of inmates reentering society is placement upon release (Hughes & Wilson, 2004). Visher and Travis (2003) concluded that the time immediately before and after an inmate’s release is critically

important. Programs such as MOV offer such support services during prerelease and post-release through faith-based and educational initiatives.

This paper evaluates the efforts of MOV, a faith-based aftercare program operating in the state of Tennessee to reduce recidivism of former inmates. Specifically, we examine the extent to which the program was able to accomplish this goal by having inmates complete prison prerelease and residential aftercare programs. We take advantage of a dataset that allows us to investigate the impact of this reentry and aftercare program beginning in 2009. Our findings indicate the program has an overall positive impact in reducing recidivism rates and the effects are heterogeneous across race and age groups. The findings are robust to sample selection bias, alternative specifications and estimation techniques.

Our article builds on the literature in economics and more broadly criminal justice reform. While various studies have examined the effect of reentry and aftercare programs, few studies have assessed how faith-based programs influence the likelihood of returning to prison by ex-offenders. We use comparable control groups, standard empirical techniques, specifically difference-in-differences, propensity score matching and hazard models.

We organize the remainder of the paper as follows. Section 2 provides some background information. Section 3 describes the data. In Section 4, we present the empirical strategy. Section 5 discusses the main findings including heterogeneity in the results, robustness checks and addresses some sample selection issues. Finally, Section 6 summarizes and concludes.

2. Background Information

2.1. Program Overview

The MOV program opened its doors in 1997 in a large, urban city in Tennessee with the primary goal of reducing recidivism among incarcerated men using Biblical principles of manhood to help them re-enter society after being released from prison. Toward the goal of effecting change and reintegration, the voluntary program offers three options to inmates (incarcerated and recently released) that includes faith-based training and educational programs with residential support to a limited number of men. The first program, a prison program, allows inmates to apply and interview for selection to participate based on two main requirements: they have enough time to complete the entire six months and they exhibit a sincere desire to change. This requirement aligns with the contention of Dodson, Cabage, and Klenowski (2011) that faith-based programs are considered intentional education which serve a rehabilitative purpose, but the inmate must possess a dedication to succeed in the program. Selected participants, who are only enrolled in this particular program, are expected to attend and participate in class consistently, regularly meet with MOV staff, volunteer for counseling and training, engage in Scripture memory and daily Biblical journaling, commit to live by the program's Covenant, and consistently display integrity and good behavior within the prison system. Graduates from the prison program are provided with an opportunity to participate in the other two programs, a residential discipleship academy for six months or one year after their release. However, even after meeting the required objectives of the prison program, each inmate must be individually interviewed again to participate in residential aftercare. Prior to being accepted into the residential aftercare discipleship academy, the applicant

must also commit to the contractual requirements of living for six months or one year under MOV's guidance after his release from prison.

With admittance into the Aftercare and Reentry program of MOV, participants are released into the discipleship academy upon their release and they move into a home where their basic needs are provided to them— clothing, groceries, transportation, assistance in securing identification, healthcare, and part-time employment during their first six months. Without access to such necessities (i.e., food, clothing, shelter, transportation, and personal identification), ex-offenders may see no other option than to return to illegal activities to meet their needs (La Vigne, Davies, Palmer, & Halberstadt, 2008).

MOV's services are provided 24 hours a day, seven days per week with residential support. The aftercare program's aim is to provide support, skills, and accountability to help participants live independently and succeed in the community. Specifically, the aftercare and reentry program includes one-on-one mentoring; discipleship classes; training in biblical values and morality; job readiness training; boundaries setting and maintenance; attitude and character study; programming for personal and interpersonal development and fellowship; marriage and parent training; addiction counseling (both individual and group) if needed; provision of food, clothing, transportation, legal and housing assistance; money management (e.g., budgeting, saving, goal setting, etc.); community service activities; and connection to local church congregations.

A part of the aftercare involves job training and job placement, which is considered an integral part of the participant's reintegration, focuses on the development of employment skills and helps participants build an employment history. Sabol (2007) has noted that ex-offender's lack of attachment to the labor market, which presents low

employment and earnings opportunities, is deemed as a potential reason for high recidivism rates; and other scholars find that many ex-offenders possess a low level of human capital, work experience, and may suffer from other issues such as mental health issues or illnesses and substance abuse (Petersilia 2003; Visser, Debus, & Yahner, 2008) as well as the stigma of being formerly incarcerated (Pager, 2003), which potentially impede their ability to obtain employment. In a research study of a Tennessee reentry program by Miller and Miller (2016), employment played an important role in reducing recidivism among reentering offenders and employment before and after incarceration; specifically it reduced the likelihood of re-arrest by about 44% in Tennessee. Accordingly, in MOV, various classes are required to provide a foundation for the men to seek and secure employment. MOV also establishes employment partnerships in the area for the men involved in the discipleship academy to be hired, allowing them to only work two full days a week during their first six months out of prison. This program provides some immediate income to the participant as well as an opportunity for them to learn and implement job readiness skills. The men also participate in reentry programming during the week in addition to their employment. After each man completes his first six months in the discipleship academy and proves himself in his part-time employment, MOV assists him in transitioning to full-time employment. The program reports a recidivism rate of below 15% for those who complete the year-long Aftercare and Reentry program.

2.2. Literature Review

2.2.1. Predictive Risk Factors for Recidivism

Meta - analytic techniques have been used in research studies to identify risk factors that best predict recidivism. Several risk factors are considered to be common predictors of recidivism: employment, substance abuse, drug abuse, mental health, education, age, race, gender and social support after release.

Specifically, Gendreau, Little, and Goggin (1996) used meta-analytic techniques to determine the best predictors of adult offender recidivism. The strongest predictor domains were criminogenic needs, criminal history/history of antisocial behavior, social achievement, age/gender/race, and family factors. Having a substance abuse problem was found to only be mildly related to recidivism. However, the authors were unable to examine whether or not unique substance abuse factors (e.g., drug abuse versus alcohol abuse) were differentially related to recidivism.

Eisenberg et al (2019) investigated static and dynamic risk factors, based on Central Eight risk domains, as predictors of violent and/or general recidivism. The Central Eight risk domains were found to be predictive of violent and general recidivism, however, with small-to-moderate effects. The dynamic risk factors (potentially changeable factors, such as Substance Abuse and Criminal Network) were more strongly related to recidivism than the static risk factors (features of the offenders' histories that are not amenable to intervention, such as prior offenses). Criminal history and antisocial pattern were the strongest predictors of both general and violent recidivism as well as substance abuse, education/employment, family/partner, and personal/psychological problems. Similarly, Yukhnenko, Blackwood, and Fazel (2020) examined the most commonly reported risk

factors for recidivism in community-sentenced populations. They concluded that dynamic risk factors, such as mental health needs, substance misuse, association with antisocial peers and employment problems, increased risk of recidivism in community sentenced populations. They also asserted that the strength of these associations was comparable with static risk factors, such as age, gender and criminal history.

A dynamic predictor of recidivism is drug and substance use and abuse (Bonta, Law, & Hanson, 1998; Dowden & Brown, 2002). Bonta et al., (1998) examined substance abuse factors in predicting both general and violent recidivism among mentally disordered offenders and found that drug abuse yielded a slightly stronger relationship with general recidivism than did alcohol abuse. Similarly, Dowden and Brown (2002) found that a combined drug/alcohol abuse in addition to exclusive drug abuse demonstrated the strongest predictive influence on criminal recidivism followed by parental substance abuse history and alcohol abuse.

Olver, Stockdale, and Wormith (2011) investigated predictors of psychological treatment attrition for offenders across program types. They concluded that offenders failing to complete psychological treatment increase their risk for recidivism and those who would benefit the most from treatment (high risk and high needs) were least like to complete treatment. Results indicated that treatment noncompleters were higher risk offenders and apt for attrition.

Hanson and Morton-Bourgon (2005) found that on average, most sexual offenders were more likely to recidivate with a nonsexual offense than a sexual offense. The major predictors of general and violent recidivism were variables related to antisocial orientation, such as antisocial personality, antisocial traits, and a history of rule violation, similar to the

same risk factors among mentally disordered offenders noted by Bonta et al., (1998) and unselected groups of offenders (Gendreau et al., 1996).

2.2.2. *Reentry Programs for Recidivism*

Several studies have explored the impact of a reentry program on recidivism, including the effectiveness of prison-based and post-release reentry programs and aftercare services as well as factors that enhance the successful reentry of former offenders (e.g., Bouffard & Bergeron, 2006; Hunter et al., 2016; Seiter & Kadela, 2003; Zhang, Roberts, & Callanan, 2006). Although the results have been somewhat mixed about the effectiveness of reentry programs, some factors have been consistently found to be significant in reducing recidivism—support while in prison and upon release as well as program completion by the ex-offender.

Olson, Rozhon, and Powers (2009) examined the experiences related to Illinois' efforts to reduce the recidivism of drug-abusing offenders through a comprehensive prison-based and community-based substance abuse treatment and aftercare program using descriptive statistics, bivariate analyses and logistic regression. They found that support was pertinent for the effectiveness of aftercare programs for offenders newly released from prison as they were 52% less likely to return to prison when compared to those not receiving aftercare programming; however, for effectiveness, the continuum of care from prison to the community can be substantial (i.e., 2–3 years) and requires substantial time and organizational and political commitment.

White, Saunders, Fisher, and Mellow (2012) examined a jail-based reentry program in New York City that included prerelease and 90 days of post-release services by

comparing samples of participants with nonparticipants and program completers with non-completers. Findings demonstrated that program participants performed no better than non-participants over a 1-year follow-up; but those who remained engaged for at least 90 days in the post-release services experienced significantly fewer and slower returns to jail. Furthermore, a study of a reentry program in Texas noted that inmates who completed all phases of the program were 50% less likely to be rearrested within two years of their release compared to a matched comparison group (Johnson & Larson, 2003).

A large study of a reentry program, the Serious and Violent Offender Reentry Initiative (SVORI), collected data on characteristics and needs, service receipt, and outcomes (i.e., re-arrest, reincarceration, and supervision data) with a sample of 2,391 adult and juvenile males and adult females from 12 adult programs in 14 states regarding post-release recidivism (Lattimore & Visser, 2009). They found no significant differences between recidivism rates of SVORI participants and non-participants; in particular, there was not a significant improvement for adult male SVORI participants regarding arrest and reincarceration rates at 24 months. Yet, service increases were linked to modest improvements in post-release outcomes such as housing, employment, self-reported criminal behavior, and drug use.

Project Re-Connect (PRC), a voluntary prisoner reentry program, provides case management and direct monetary support to participants (ex-offenders) for up to six months. Wikoff, Linhorst, and Morani (2012), comparing recidivism rates between PRC participants and eligible non-participants, indicated that program participation and possession of a high school diploma or its equivalent were associated with a reduced

likelihood of new convictions while substance abuse was associated with higher risk of subsequent convictions.

2.2.3. *Faith-based Reentry Programs*

Although the body of research about secular reentry and recidivism is vaster, there is a small amount of research related to faith-based and religious programs. One study that focused on a faith-based program was conducted by Johnson, Larson and Pitts (1997) of structured religious programming in four New York prisons on the criminal history, prison adjustment, and recidivism for the entire cohort of nearly 40,000 inmates released from the New York State prison system between January 1, 1992, and April 30, 1993, including each individual who had been rearrested. There was no significant difference between the two groups, showing that those involved in the program had similar rates of recidivism as inmates who did not participate in the program. However, they found that inmates who were more active in the program had lower rates of re-arrest in the year following release after controlling for level of involvement.

Another study was conducted by Johnson and Larson (2003) examining the InnerChange Freedom Initiative (IFI), a Christian-focused program operating in prisons in multiple states, incorporating biblical teaching, life-skills education, and group accountability. It includes a three-phase program involving prisoners in 16 to 24 months of in-prison programs and 6 to 12 months of aftercare following release from prison. The researchers tracked the two-year post-release recidivism rates for prisoners that entered the program from April of 1997 through January of 1999 and released from prison prior to September 1, 2000. In addition, the study included multi-year, in-depth interviews with

staff and participants and comparison groups. They found that inmates who completed all phases of the program were 50% less likely to be rearrested within two years of release compared to a matched comparison group.

Hercik (2004) conducted an evaluation of a reentry program in Tomoka, Florida, that is a part of the Kairos Horizon Communities Corporation, which was founded to establish faith-residential programs in prison. The program begins with a three-day session followed by a 12-month program that adds a new group of 50 men every six months, focusing on strengthening relationships and increasing personal and family responsibility and employability. Based on the outcomes of a goals assessment, the researchers found that program participants did not have significantly lower re-arrest rates than comparison sample members. However, the Horizon program participants were on the street for longer periods of time before re-arrest.

A general conclusion of previous research is that there is not a definitive conclusion on the effectiveness of reentry programs as they relate to recidivism; however, some findings have noted that there are factors that curb recidivism such as the provision of resources and support to meet the needs of ex-offenders, the length of time of the program, and the commitment level of the ex-offender. We believe that more research should be conducted of faith-based reentry programs because as Roman et al (2007) suggested, systematic research and assessment are necessary to begin building a body of research that articulates and operationalizes the diverse elements faith-based programs, regardless of service domain, and how such diverse elements make a difference in comparison to other programs.

3. Data and Variables

The dataset used in this study comes from two main sources – the Davidson County Sheriff’s Office (DCSO) and the MOV program. It is based on male inmates who were released between the period 2000 and 2017. Information was provided by the MOV program on all the men who either attended MOV classes while incarcerated or participated in the aftercare programs post prison release. We then reconcile this data with information received from the DCSO to verify information and obtain criminal information records. Participants in the MOV program are the *treated* group. For the control group, we obtained from the DCSO a random sample of male inmates who were also incarcerated but did not receive any MOV services. Random selection of the control group was done on the basis of age, number of convictions and race. We link records of prisoners using an office of court administration (OCA) number. Both control and treated groups were followed over the aforementioned period and information was collected for each arrest. Therefore, our data is measured at the person-offender level.¹ We drop observations with missing information on prison release date and other information used in the empirical analysis. This leaves us with a sample of 9,056 person offenses during this period.

Our dependent variable, recidivism, is measured as the number of years before a person returns to prison. Three categorical variables are created based on whether the individual returns to prison within one, two or three years. In other cases, we also use the length of time since an inmate was last arrested. The covariates used in this study were

¹ It is possible that individuals in our sample may have committed an offense outside of the Davidson County or Tennessee prison systems. We are unable to account for any such re-incarceration information. To the extent these individuals have been tracked for almost two decades, the likelihood of a significant number of offenses being committed out-of-state over this period is likely to be the exception rather than the norm.

selected based on availability of data as well as their suitability as relevant predictors. Offender characteristics include the following: age, age at release, race, Hispanic ethnicity, the amount of time serve in prison, number of arrests, reason for release, year of release and type of prison facility.²

Our data offers several advantages. First, it allows us to follow ex-prisoners over a relatively long period of time, far longer than most studies. Second, tracking recidivism over this time period was done in a fairly meticulous manner. Third, we are able to obtain reliable measures of recidivism because of access to precise information on prison release dates and the date of reoffending. Finally, our data on recidivism compares favorably with the rates of the prison population from whence our sample came.

Table 1 reports the summary statistics for the full sample of male offenders. In general, 37.9 percent of the sample did return to prison within the first year after being released, 41.7 percent returned to prison within two years and 43.1 percent returned within three years. Half of the sample comprise men who are part of the MOV program. Of this amount, about 3 percent participated in the 6-month after-care while 1 percent were program participants in the year-long after-care program. Just over 60 percent of these prisoners are African-Americans, with the remainder comprising mainly of White prisoners. On average, these offenders serve 629 days in prison and are 46 years old at the time of their release.

[Insert Table1 about here]

² We also consider the reason for arrest as a control variable.

Table A1 in the appendix shows the summary statistics for both the MOV and non-MOV offenders in the sample. On average, offenders in the MOV program were less likely to return to prison under any of the measures of recidivism compared to the non-MOV offenders. There were similarities in both groups as it pertains to the percentage being Black as well as White. On the other hand, there were marked differences in that the MOV participating inmates were older and tended to have a higher criminal disposition as shown by the number of days in prison and the total arrests. To the extent that the MOV program participants appear to have longer prison experiences than the control sample suggest the potential for selection bias.³ It must be noted, however, that the superior recidivism rates among the MOV participants may also be indicative of some program effects.

Figures 1 to 3 give some temporal graphical representation of the three main measures of recidivism for MOV program offenders and other male inmates in the sample. As shown in all three figures, the patterns of returning to prison are similar for both groups prior to start of the MOV program in 2009.⁴ We next turn to the empirical strategy which allows us to isolate the influence of the covariates to determine the impact of the program on recidivism.

[Insert Figures 1 to 3 about here]

³ Later, we formally address this possible sample selection issue.

⁴ Even though the MOV program began in 1997, our data on the aftercare programming begins from 2009.

4. Empirical Strategy

4.1. Estimation Method

This section explores the effects on recidivism rates for program participants. We use a standard difference-in-differences (DID) method, commonly used in the empirical literature, to assess the effects of the program. In this approach, we compare the likelihood of recidivating among a cohort of inmates receiving treatment with the likelihood of recidivating among the control group. We model this approach as follows:

$$(1) \quad Y_{it} = \alpha + \beta_1 Treated_i + \beta_2 Post_t + \beta_3 Treated_i * Post_t + X_i \Omega + \eta_t + \varepsilon_{it}$$

where subscripts denote offender i released in year t . The variable Y_{it} is the probability that offender i released in year t returns to prison in a subsequent year. *Treated* is a binary variable that equals one if an offender is eligible to receive treatment in the program. We consider that eligible inmates may participate in one of several programs. In the main results, *Treatment* is defined in the following ways: (i) equals to one if an eligible offender participates in the programs, (ii) equals to one if eligible felons participate in the 6-month (180-day) aftercare program and (iii) equals to one if an eligible inmate participates in the 12-month program.⁵ The coefficient on *Treatment*, β_1 is the treatment-group specific effect accounting for the average differences between the treated and the control group. *Post* is the binary variable which indicates the year in which the inmate starts receiving program services. The associated coefficient, β_2 provides an estimate of the post treatment effect. The matrix of variables \mathbf{X}_i include offender-specific demographic, criminal and prison characteristics such as described in the previous section. We account for release fixed

⁵ Any inmate participant of the 12-month post-release program would have also participated in the 6-month program prior.

effects with η_t , while the error term is represented by ε_{it} . The key policy variable β_3 is the coefficient on the interaction term between the treatment dummy and the program start dummy, capturing the average effect of the program on recidivism rates. Clustering of standard errors is done at the office of court administration (OCA) level to allow for non-independence within the offices of court administrations.

DID models rely on the assumption that both the treatment and control groups demonstrate similar trends in outcomes in the absence of the program. If this is not the case, then any observed impact may be attributable to differences in trend rather than the treatment effect. To assess for potential trend differences, we follow Angrist and Krueger (1999) by comparing the trends in recidivism for both groups. Figures 1 to 3 make it clear that offenders in the program and the control group follow the same overall trend leading up to these after-care programs which began in 2009. In the next sub-section, we perform a more rigorous analysis to test the common trend assumption.

In addition, a causal interpretation of the parameter β_3 is dependent on the random assignment of offenders. This may be problematic because to be accepted into the MOV program, participants have to be in prison for at least six months and must be willing to demonstrate a commitment to be in the program. Nevertheless, we tested for non-randomness or sample selection by comparing several individual characteristics that may simultaneously influence both the likelihood of being in the MOV program and recidivism rates. We do so by regressing each attribute on the *MOV* indicator with and without fixed effects for year of release, type of prison facility and reason for sentencing.⁶ Figures 4 and

⁶ First, we estimate the model $x_i = \pi_0 + \pi_1 MOV_i + \varepsilon_i$, where x_{is} is the individual-level attributes and *MOV* is an indicator for an offender who is participant in the program. Next, we obtain the standard estimates from π_1 and then compare the differences in the estimates obtained from a regression model with and without the fixed effects.

5 present results that show the standardized differences in the estimates for *MOV* and non-*MOV* participants with (Figure 4) and without fixed effects (Figure 5). The inclusion of the fixed effects results in only a negligible change in the differences for some of the attributes.

4.2. Common Trend Assumption Test

DID models assume there is a common trend between both treated and the untreated groups. Put another way, in the absence of the program, any trend in the return to prison for the treated and control groups must be the same. Testing the common trend assumption is equivalent to a placebo test whereby one assumes the program began in a period other than the actual one. To do this, we estimate Equation (1) for the period 2000 to 2007 which was two years before the start of the *MOV* program. Keeping the treated and control groups the same, we assume the program fictitiously begins in 2005. For the common trend assumption to hold, we expect to find no significant effect on the coefficient of the interaction term. Results of this analysis are shown in Table 2, where the main coefficient of interest is statistically insignificant for each of the recidivism outcomes. This is an important finding because it suggests that institutional, environmental, social and other factors have a similar effect on both groups, thus lending greater credence to our DID strategy.

4.3. Potential Mechanisms and Endogeneity

Prisoners may participate in the program for a variety of reasons. Some of these may be related to wanting to remain “busy” and not idle with their time, a sense of social

interaction or their being involved in some productive activity may help with parole cases or decrease their prison sentence on the grounds of good behavior. For others, program participation may increase the likelihood of a successful transition back into society after being released and thus, lowering the chances of them recidivating. It may also be the case that those who participate in the MOV program may possess some (unobserved) characteristics such as motivation, drive, a sense of spirituality, etc. that may predispose inmates to doing well in the program, finding success and thus, end up being less likely to return to prison. If these situations lead us to inaccurately attribute the lower recidivism rates to the program, then we encounter the problem of self-selection. Selection bias occurs when one or more unobservable factors are correlated with participation in the program. This type of bias may also be due to omitted variables. While we attempted to account for selection bias previously, the limitation of the dataset implies that we cannot completely rule out non-randomness. As an alternative to reducing selection bias, we undertake an alternative quasi-experiment using propensity score matching techniques which has been shown to be effective in producing estimates similar to those obtained from randomized trials (Becker & Ichino, 2002).

4.4. Propensity Score Matching (PSM) Methods

The DID method described above would lead to biased estimates of the impact of the program if they are a function of the initial levels of the covariates. For example, it is possible that program effects on recidivism will be greater for older men and those with shorter criminal history. As an alternative to DID analysis, we perform an analysis of recidivism rates using a Propensity Score Matching (PSM) method (Rosenbaum & Ruben,

1983). The key assumption with this approach is that both treatment and comparison groups exhibit similar characteristics along the unobservables. Indeed, as Stuart (2010) notes, if the unobservables are correlated with the observables, which is highly likely, propensity score matching can identify causal effects and is therefore warranted.

The PSM method compares the recidivism outcomes in treated offenders (MOV participants) versus those that are not treated despite having the same probability of being treated conditional on their pre-treatment observable characteristics. There are two steps involved in undertaking PSM techniques. First, a logit model is estimated with a program participation dummy as the dependent variable and all controls for demographic and prison characteristics of offenders, including age, age squared, race, time served in prison and its square, number of arrests and its square, reason for release, year of release and type of prison facility. The model produces fitted values or propensity scores which indicate the probability of an individual participating in the program conditional on a set of characteristics. Second, the propensity scores are used to match treated and untreated offenders. For each matched sample, we compute the difference in outcomes between the treated and control offenders. The average of the differences for each matched sample is then computed to obtain an average treatment effect for the treated (ATT).

PSM methods may provide a better indicator of a program's effectiveness on targeted groups than OLS regressions (Heckman, 1996). As part of a sensitivity test, we use several matching methods which are based on different functions. While PSM methods are unable to account for unobservable heterogeneity, later we show how PSM estimates can be used to test the sensitivity of our results to unobserved sample selection bias. Even under some of its most favorable conditions (i.e. where the propensity score regression is

correctly specified and the matching methods are effective), PSM can generate bias through the information pruning process and may render treatment effects model dependent.⁷ Elu et al. (2019) suggest that “matching on covariates” is a better approximation technique which gives greater credence to identifying the causal effect of the treatment.⁸

5. Results

5.1. Benchmark Results

This section presents the estimation results regarding the effect on recidivism rates between offenders exposed to the programming and the control group. The dependent variables are recidivism rates for one, two and three years. All specifications include race, age and its square, days in prison and its square, total arrests and its square, year of release, reason for release and type of facility.

Table 3 reports the main results from the simple DID estimation that include no controls but our main coefficients. Columns 1 to 3 report the DID estimates of our key explanatory variable which is the effect of any program participation (*AnyTreatment*Post*). Columns 4 to 6 present results on the effect of being in the 6 month program (*Treatment6month*Post*) and columns 7 to 9 provides evidence on the differential impact when inmates participate in the 12 month program (*Treatment12month*Post*). The first three columns indicate that any treatment from the program reduces the recidivism rates of program participants. The impact is statistically significant. On the other hand, being in the six month program increases the recidivism rate for the treated participants

⁷ King and Nielsen (2019) referred to this as the PSM *paradox*.

⁸ Results from the parameter estimates of the treatment effects associated with this procedure are available upon request.

relative to the non-participating inmates (columns 4 to 6). Treatment in the 12-month program with no controls has a negative and significant effect (columns 7 to 9). These results present a first pass at the data. There may be observable factors such as personal and other characteristics that may influence the differences in recidivism rates between the treated and control groups.

[Insert Table 3 about here]

In Table 4, we re-estimate Equation (1) with the covariates including the year of release fixed effects, reason for release and facility type dummies. Our results are analogous and qualitatively similar to those shown in Table 3. In columns 1 to 3, the coefficient on the interaction term ranges between -0.060 and -0.081. These coefficients imply that relative to inmates who did not participate in the program, any treated inmates are 6.0 to 8.1 percentage points (or 15.8 to 19.2 percent) less likely to return to prison. Estimates in columns 4 to 6 on the impact of 6 month program treatment remain positive and statistically significant even with the set of control variables. More specifically, recidivism rates increase by 9.3 to 10.6 percentage points (22.3 to 28.0 percent) for participants in the 6-month programs relative to other non-treated inmates. Those participants who stay in the year-program (Columns 7 to 9) show a marked decrease in recidivism rates of between 14.4 and 17.2 percentage points (38.0 and 40.3 percent).

This latter finding is consistent with a more broad-based aftercare program designed to better equip these men with the skills and other support necessary to increase their likelihood of succeeding outside of the prison walls. Olson, Rozhon and Powers (2009) find that recidivism rates decline substantially for inmates who participate in and

complete pre- and post-release programs that lasts well over a year.⁹ In summary, these results provide evidence that the program is associated with decreases in recidivism among the treated offenders.

[Insert Table 4 about here]

5.2. Propensity Score Matching (PSM) Results

Table 5 displays PSM estimates obtained from the following matching algorithms: nearest neighbor matching using 1 nearest neighbor, Nearest Neighbor matching using 3 nearest neighbors, Caliper matching with a caliper of 0.0001, Radius matching with a caliper of 0.0001, Local Linear regression and (7) Kernel matching using normal density. See Table A2 for the logit regression to obtain the propensity score estimates. The propensity estimates are similar to the OLS estimates as shown in column 1. As Columns 2 to 7 show, all coefficients are negative and mostly statistically significant. All of these findings indicate differences in recidivism rates between men who received and who did not receive MOV programming services conditional on being matched on their propensity to receive such services.

[Insert Table 5 about here]

5.3. Sensitivity of Results to Unobserved Heterogeneity

Our results are still subjected to sample selection bias because PSM estimates are based only on observable traits. Put another way, PSM models cannot account for sample

⁹ In general, participants in the 12-month post-release aftercare program would have also received program services at least six months prior to their prison release.

selection due to unobserved heterogeneity. A propensity score analysis to investigate the role of unobserved self-selection bias is performed using the Stata “mhbound” procedure (Becker & Caliendo, 2007) that allows us to incorporate an unobserved factor that simultaneously affects the outcome and the likelihood of program participation. This method introduces a selection bias to assess whether the treatment effect of the program increases (decreases) when the bias is positive (negative). The results of this procedure are shown in Table A3. In columns 1, 2, and 3, the p-values (p_{mh+}) are zero for all levels of gamma that comfortably reject the null hypothesis that the treatment has been overestimated when a positive selection bias has been introduced. We also reject the null hypothesis that the treatment effect is underestimated for most levels of gamma. Based on these findings, it does not appear that our estimates are overstating the “true” impact of the program on recidivism rates.

5.4. Results by Heterogeneity

We examine whether our results exhibit heterogeneous effects on program participants. In Table 6, we limit our sample to demographic subgroups according to race, specifically, African Americans and Whites. Given that African Americans are more likely to return to prison than Whites (Hartney and Vuong, 2009), we undertake this type of analysis to investigate the heterogeneous impacts of the program on these two racial groups. Those identified as Blacks who received program assistance did not experience any significant change in recidivism outcomes (Panel A). This does not appear to be an artifact of the data. On the other hand, we find decreases in all measures of recidivism, ranging from 12.8 to 16.1 percentage points for Whites (Panel B).

[Insert Table 6 about here]

We also examine how recidivism rates are impacted when Equation (1) is estimated for various age groups. Panels A to E of Table 7 present regressions results for the respective age groups: 23-34, 35-44, 45-54, 55-64 and 65 and older. The effect of the program for individuals inmates in the age categories below the age of 45 (Panels A and B) is still negative but insignificant. On the other hand, we find significant effects of the program in lowering recidivism rates among the older age groups (Panels AC to E).

[Insert Table 7 about here]

5.5. Robustness Checks and Sensitivity Analyses

Next, we turn our focus to several robustness checks and sensitivity analyses as shown in Table 8. As a first check, we added dummies to indicate the reason for each arrest. The type of arrest may have an impact on the likelihood of an ex-offender returning to prison. These results are shown in Panel A. Across the board the treatment effect, although smaller in magnitudes, is negative and statistically significant for all recidivism outcomes. Panels B shows the results when we estimate the impact of the program using logit models. Unsurprisingly, the results are qualitatively unchanged.

We then carry out a robustness check on the PSM estimates by employing propensity scores as weights in our model shown in Equation (1). The purpose of this reweighting is to give greater (lower) weight to the untreated offenders who are most (least) similar to the treated offenders. The results are presented in Panel C where we find the estimates to be negative and statistically significant and larger in magnitude.

As another robustness check, we utilize non-parametric techniques, namely Cox proportional hazard, which does not require assumptions about the underlying functional form of the model. These models are widely used in criminal justice research and other fields such as medicine where an observation is at risk for an event to occur. We are interested in modelling the effect of programming on the hazard of returning to prison. Panel D presents estimates of the hazard ratios. In all cases, the hazard of returning to prison is significantly reduced for program participants. Panel E extends the analysis further by estimating the hazard model after including the propensity score as an independent variable. The idea behind this mixed strategy is as follows. We are interested in utilizing a non-parametric approach to obtaining the effect of program participation on recidivism after controlling for the impact of offender personal and other attributes on the propensity to participate. If the MOV program dummy variable is still statistically significant after the inclusion of the propensity score variable, then we argue that our results are not driven solely by selection bias. Our results clearly show the program still has a negative impact on recidivism rates.

[Insert Table 8 about here]

5.6. Cost-Savings

It might be interesting to consider societal benefits as a result of any reduction in recidivism rates that may be attributable to the program. Using some back-of-the envelope techniques, we estimate the quantitative program impact by looking at the discounted present value of the expected cost savings to the state associated with an inmate if he does not recidivate at a later time as a result of participating in the program. We perform this

calculation using data on the state annual incarceration that is estimated at \$21,000, sample data and estimates from the regression analyses.¹⁰ Since estimates of the savings is based on present value, we assume an annual discount rate of 3 percent. The calculated estimates are shown in Table A4. These estimates are cost savings and are based on the mean values of relevant variables from the sample data. The calculated estimates in Table A4 indicate that the reduction in recidivism for males participating in the program results in cost savings of approximately \$440,000 in present value terms. This amount represents the present value of incarceration costs avoided for ex-offenders who avoid recidivating within one year and spending about two years in prison.

These estimates are intended to be illustrative of the potential minimum cost savings associated with the program. Costs such as the loss in tax revenues to the state and other implicit costs are likely to push this estimate higher.

6. Summary and Conclusion

In this study, we estimate the effect of an aftercare program on recidivism rates of ex-offenders who were released from prison during the period 2000 to 2017. In particular, we exploited a program that offered a variety of services to some men during their prison terms and after they were released, while other offenders did not participate in the program.

Our estimates suggest that the program has been beneficial in reducing recidivism rates for program participants. Benchmark estimates imply that the program was associated with estimated reductions in the probability of recidivating of 6.0 to 8.7 percentage point. This effect is statistically significant as it implies a 15.8 to 19.2 percent reduction in the

¹⁰ This is based on information provided by the Tennessee District County Sheriff Office where the cost to incarcerate one inmate for a period of one day is \$57.84, or approximately \$21,111.60 per year.

probability of returning to prison after first release. Our results are robust when we correct for sample selection based on unobserved heterogeneity. The program helped to reduce recidivism among Whites but not Blacks. Prime working age males as well as those nearing the retirement age are found to be most impacted by the program. The estimated effects are robust to various model specifications and estimation methods.

The program provides a cautionary tale about the need to evaluate programs beyond just their overall effect. It may be just as important to see whether these programs help some groups but not others. Post-release residential programs may have to pay particular attention to ways to be more thoughtful about offering assistance to Blacks and younger offenders of the prison system. Additionally, it is conceivably possible that this type of program may be unattractive to persons who are unwilling to participate in a Christian-based program. At the same time, programs such as MOV could serve as a model for structuring other programs for other faiths.

Recently, it appears that Evangelical Christians have aligned with the current administration (Schwadel and Smith, 2019) to a degree that seems to abandon Judeo-Christian values of compassion, serving the poor, and loving your neighbor as yourself (Fowler, 2020). The rise of the Black Lives Matter movement has created a complicated tension with some white evangelical Christians thereby creating skepticism and a noticeable divide between faith organizations and the marginalized or disenfranchised community members they serve. As the term “social justice” becomes pejorative and criminal justice reform becomes increasingly politicized, it is important for faith organizations who operate to serve formerly incarcerated citizens to address these issues with clearly stated intentions to remain apolitical and enforce anti-discrimination laws.

Overall, the results are very relevant because they show that programs designed to aid the formerly incarcerated in transitioning back to society may help to keep most men outside of the prison walls. Our findings suggest there is a role for private sector programs to provide services that specifically meet the needs of individuals committed to transforming their lives. Future work assessing the mechanisms through which aftercare programs impact recidivism is essential. Further, estimating the spillover effects attributable to these types of programs is necessary for effective policy decision making.

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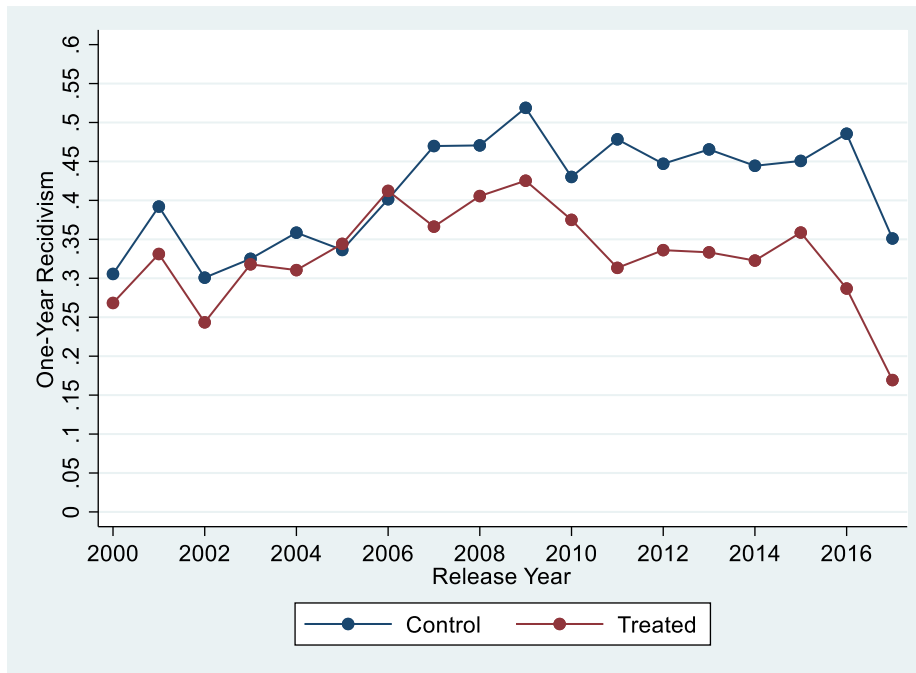
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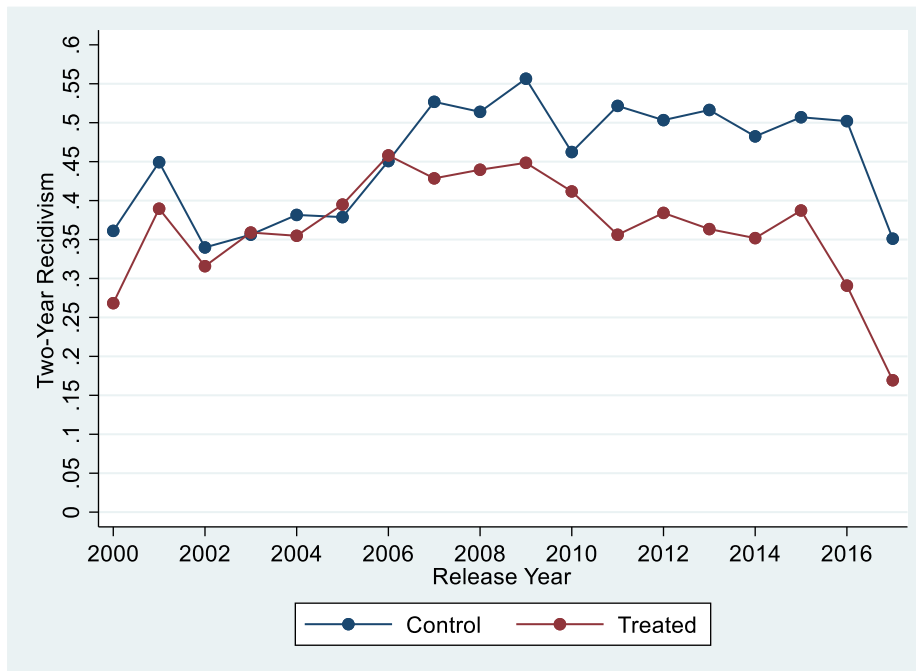
Zhang, S. X., Roberts, E. R., & Callanan, V. J. (2006). Preventing parolees from returning to prison through community-based reintegration. *Crime & Delinquency*, 52, 551-571. <https://doi.org/10.1177/0011128705282594>

Figure 1
One-Year Recidivism Rates



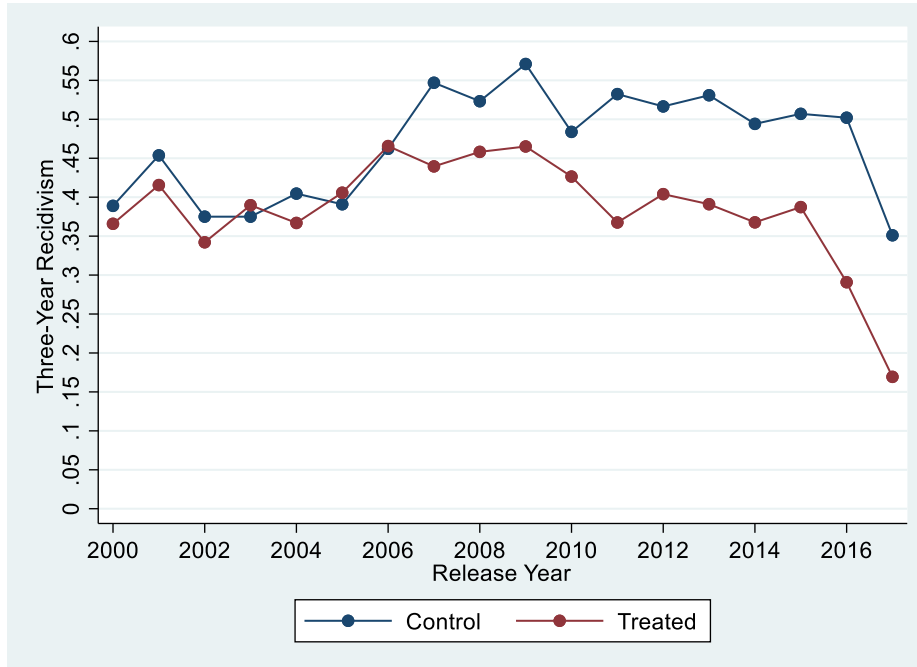
Notes: The figure plots the mean one-year recidivism rates by year of release for MOV sample and DSO sample.

Figure 2
Two-Year Recidivism Rates



Notes: The figure plots the mean two-year recidivism rates by year of release for MOV sample and DCSO sample

Figure 3
Three-Year Recidivism Rates



Notes: The figure plots the mean three-year recidivism rates by year of release for MOV sample and DCSO sample

Figure 4
Differences between Treated and Control

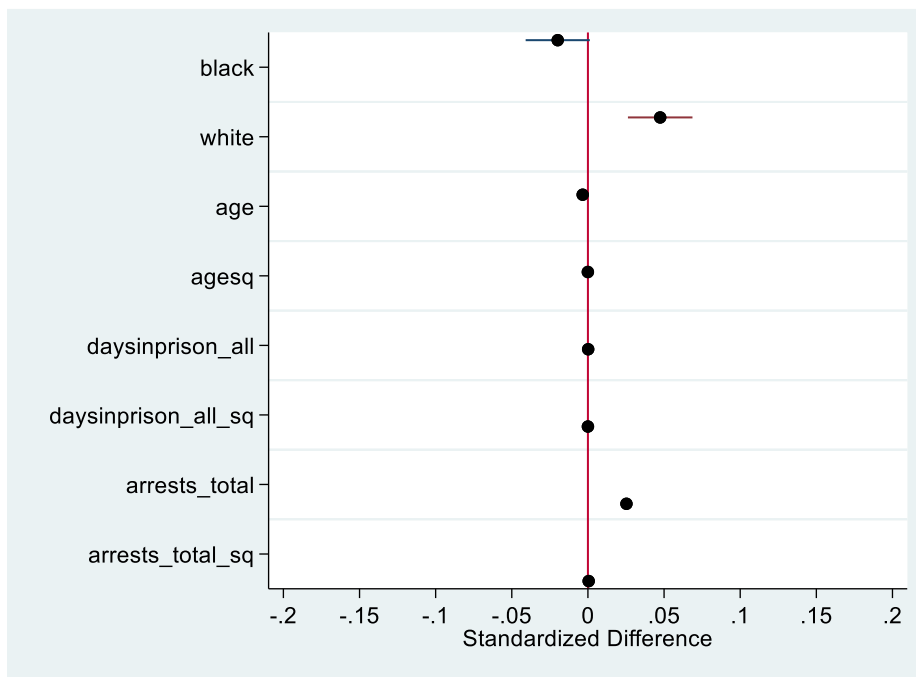


Figure 5
Differences between Treated and Control Groups conditional on Fixed Effects for Year
of Release, Type of Facility and Reason for Sentence

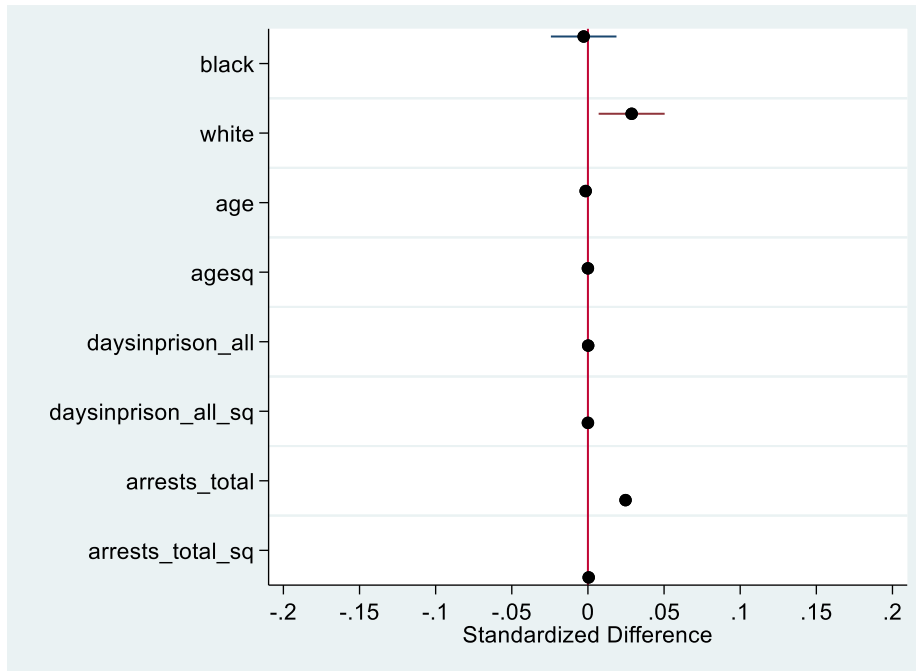


Table 1
Summary Statistics

Variable	(1)	(2)	(3)	(4)	(5)
	Mean	Std. Dev.	Min.	Max.	Obs.
<i>Outcome variables</i>					
Return to prison in 1 year	0.379	0.485	0	1	9,056
Return to prison in 2 years	0.417	0.493	0	1	9,056
Return to prison in 3 years	0.431	0.495	0	1	9,056
Time since last arrest (days)	117.403	318.86	0	4,489	8,709
Log (Time)	4.421	1.644	0	8.409	4,044
<i>Other Variables</i>					
Treated	0.491	0.500	0	1	9,056
<i>Treated6month</i>	0.027	0.161	0	1	9,056
<i>Treated12month</i>	0.010	0.101	0	1	9,056
Black	0.605	0.489	0	1	9,056
White	0.381	0.486	0	1	9,056
Other race or ethnicity	0.014	0.118	0	1	9,056
Age	36.572	11.526	17	67	9,056
Age at release	46.573	11.586	23	73	9,056
Days in prison	628.442	864.494	0	3465.322	9,056
Total arrests	4.935	9.938	0	50	9,056
Year of release	2009	4.629	2000	2017	9,056

Note: Authors' calculations

Table 2
The Impact of Reentry and After-Care Program on Recidivism Rates
(Testing the Common Trend Assumption)

Variables	(1)	(2)	(3)
	One-Year Recidivism	Two-Year Recidivism	Three-Year Recidivism
Any Treated	-0.012 (0.033)	0.014 (0.030)	0.021 (0.030)
Post	0.025 (0.047)	0.019 (0.045)	0.018 (0.044)
Any Treated*Post	0.015 (0.044)	0.002 (0.041)	-0.011 (0.040)
Reason for Release	Yes	Yes	Yes
Year of release	Yes	Yes	Yes
Type of Facility	Yes	Yes	Yes
Observations	3,149	3,149	3,149
R-Square	0.09	0.08	0.07

Notes: The main independent variable is an interaction of those who are eligible to participate in the program (Any Treated) and a dummy indicating the year when treatment first occurred (Post). The pre-program period is 2000-2004; Post program period is 2005-2007. The analysis period is 2000-2007 and the “fake” program period began in 2005. Regressions include the following controls: race, age, age squared, days in prison, days in prison squared, total arrests, total arrests squared, reason for release, year of release, type of facility. Standard errors are clustered at the originating case agency (OCA) level.

Table 3**The Impact of Reentry and After-Care Program on Recidivism Rates (No Controls)**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	One-Year Recidivism	Two-Year Recidivism	Three-Year Recidivism	One-Year Recidivism	Two-Year Recidivism	Three-Year Recidivism	One-Year Recidivism	Two-Year Recidivism	Three-Year Recidivism
Dependent variable:									
Any Treated	-0.028 (0.027)	-0.022 (0.023)	-0.022 (0.023)						
Post	0.077** (0.031)	0.073*** (0.027)	0.064** (0.027)						
Any Treated*Post	-0.095*** (0.036)	-0.109*** (0.032)	-0.106*** (0.032)						
Treated6month				-0.004 (0.047)	-0.010 (0.034)	-0.017 (0.036)			
Post				0.023 (0.020)	0.011 (0.018)	0.004 (0.018)			
Treated6month*Post				0.103** (0.050)	0.104** (0.040)	0.122*** (0.045)			
Treated12month							0.046 (0.059)	0.046 (0.049)	0.051 (0.050)
Post							0.027 (0.020)	0.016 (0.018)	0.009 (0.018)
Treated12month*Post							-0.212*** (0.048)	-0.225*** (0.048)	-0.221*** (0.046)
Control variable	No	No	No	No	No	No	No	No	No
Reason for release	No	No	No	No	No	No	No	No	No
Year of release	No	No	No	No	No	No	No	No	No
Type of Facility	No	No	No	No	No	No	No	No	No
Observations	9,056	9,056	9,056	9,056	9,056	9,056	9,056	9,056	9,056
R-Square	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Notes: The main independent variable is an interaction of those who are eligible to participate in the program (Treated) and a dummy variable indicating the year when treatment first occurred (Post). Treated6month and Treated12month are binary variables to indicate whether the inmate is a participant in the 6-month or 12-month aftercare programs, respectively. Statistical levels of significance are: * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$. Standard errors are clustered at the originating case agency (OCA) level.

Table 4
The Impact of Reentry and After-Care Program on Recidivism Rates

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	One-Year Recidivism	Two-Year Recidivism	Three-Year Recidivism	One-Year Recidivism	Two-Year Recidivism	Three-Year Recidivism	One-Year Recidivism	Two-Year Recidivism	Three-Year Recidivism
Dependent variable:									
Any Treated	-0.031 (0.022)	-0.019 (0.021)	-0.013 (0.021)						
Post	-0.056 (0.051)	-0.091* (0.048)	-0.153*** (0.049)						
Any Treated*Post	-0.060** (0.027)	-0.080*** (0.025)	-0.081*** (0.025)						
Treated6month				-0.044 (0.032)	-0.025 (0.033)	-0.021 (0.034)			
Post				-0.087* (0.051)	-0.131*** (0.048)	-0.193*** (0.049)			
Treated6month*Post				0.106** (0.049)	0.093* (0.050)	0.103* (0.054)			
Treated12month							0.039 (0.057)	0.045 (0.056)	0.054 (0.055)
Post							-0.084* (0.051)	-0.127*** (0.048)	-0.189*** (0.049)
Treated12month*Post							-0.144*** (0.053)	-0.168*** (0.055)	-0.172*** (0.049)
Reason for Release	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year of release	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type of Facility	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,056	9,056	9,056	9,056	9,056	9,056	9,056	9,056	9,056
R-Square	0.11	0.11	0.10	0.11	0.11	0.10	0.11	0.11	0.10

Notes: The main independent variable is an interaction of those who are eligible to participate in the program (Treated) and a dummy variable indicating the year when treatment first occurred (Post). Treated6month and Treated12month are binary variables to indicate whether the inmate is a participant in the 6-month or 12-month aftercare programs, respectively. Statistical levels of significance are: * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$. Regressions include the following controls: race, age, age squared, days in prison, days in prison squared, total arrests, total arrests squared, reason for release, year of release, and type of facility. Standard errors are clustered at the originating case agency (OCA) level.

Table 5
The Impact of Reentry and After-Care Program on Recidivism Rates
(Propensity Score Matching Results)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Outcomes	OLS Fixed Effects	Nearest Neighbor (1)	Nearest Neighbor (3)	Caliper (0.0001)	Radius with Caliper (0.0001)	Local Linear Regression	Normal Kernel	Obs.
One-Year Recidivism	-0.067*** (0.021)	-0.109*** [0.031]	-0.085*** [0.023]	-0.038 [0.040]	-0.054 [0.035]	-0.051*** [0.020]	-0.048*** [0.017]	8,970
Two-Year Recidivism	-0.067*** (0.019)	-0.148*** [0.037]	-0.106*** [0.026]	-0.073* [0.043]	-0.086** [0.036]	-0.064*** [0.022]	-0.063*** [0.019]	8,970
Three-Year Recidivism	-0.062** (0.019)	-0.145*** [0.034]	-0.101*** [0.026]	-0.095** [0.042]	-0.106*** [0.035]	-0.058*** [0.021]	-0.056*** [0.020]	8,970

Notes: The main independent variable *MOV* is a dummy variable that equals one if an ex-offender participates in the MOV program. OLS results with standard errors in (parentheses) are shown for comparison. Bootstrapped standard errors with 500 replications are shown in [brackets]. Results (Panels D-H) are based on a model of the form $Y_{it} = \alpha + \phi_1 MOV_i + X_i\Omega + \eta_t + \varepsilon_{it}$. The remaining columns report the matching estimator with a different algorithm as follows: (2) nearest neighbor matching using 1 nearest neighbor, (3) nearest neighbor matching using 3 nearest neighbors, (4) caliper matching with a caliper of 0.0001, (5) radius matching with a caliper of 0.0001, (6) Local Linear Regression and (7) Kernel matching using normal density. Statistical levels of significance are: * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$. Regressions include the following controls: race, age, age squared, days in prison, days in prison squared, total arrests, total arrests squared, reason for release, year of release, and type of facility.

Table 6
The Impact of Reentry and Aftercare Program on Recidivism Rates by Race

	(1)	(2)	(3)
Dependent variable:	One-Year Recidivism	Two-Year Recidivism	Three-Year Recidivism
Panel A: Blacks			
Any Treated*Post	-0.024 (0.026)	-0.041 (0.027)	-0.036 (0.027)
Observations	5,481	5,481	5,481
R-Square	0.11	0.11	0.11
Panel B: Whites			
Any Treated*Post	-0.128*** (0.034)	-0.147*** (0.035)	-0.161*** (0.035)
Observations	3,448	3,448	3,448
R-Square	0.14	0.13	0.12

Notes: The main independent variable is an interaction of those who are eligible to participate in the program (Treated) and a dummy variable indicating the year when treatment first occurred (Post). Statistical levels of significance are: *** indicates $p < 0.01$. Regressions include the following controls: race, age, age squared, days in prison, days in prison squared, total arrests, total arrests squared, reason for release, year of release, and type of facility. Standard errors, shown in parentheses, are clustered at the originating case agency (OCA) level.

Table 7
The Impact of Reentry and After-Care Program on Recidivism Rates
By Age Group

	(1)	(2)	(3)
Dependent variable:	One-Year Recidivism	Two-Year Recidivism	Three-Year Recidivism
<i>Panel A: Age 23 to 34</i>			
Any Treated*Post	-0.036 (0.070)	-0.097 (0.071)	-0.116 (0.072)
Observations	1,645	1,645	1,645
R-Square	0.16	0.16	0.16
<i>Panel B: Age 35 to 44</i>			
Any Treated*Post	-0.005 (0.040)	-0.035 (0.041)	-0.046 (0.042)
Observations	2,527	2,527	2,527
R-Square	0.13	0.13	0.13
<i>Panel C: Age 45 to 54</i>			
Any Treated*Post	-0.124*** (0.040)	-0.135*** (0.041)	-0.132*** (0.041)
Observations	2,436	2,436	2,436
R-Square	0.14	0.14	0.13
<i>Panel D: Age 55 to 64</i>			
Any Treated*Post	-0.094** (0.047)	-0.096** (0.048)	-0.093* (0.048)
Observations	1,831	1,831	1,831
R-Square	0.16	0.15	0.14
<i>Panel E: Age 65 and older</i>			
Any Treated*Post	-0.229* (0.122)	-0.281** (0.124)	-0.242* (0.125)
Observations	617	617	617
R-Square	0.19	0.16	0.14

Notes: The main independent variable is an interaction of those who are eligible to participate in the program (Treated) and a dummy variable indicating the year when treatment first occurred (Post). Statistical levels of significance are: * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$. Regressions include the following controls: race, age, age squared, days in prison, days in prison squared, total arrests, total arrests squared, reason for release, year of release, and type of facility. Standard errors, shown in parentheses, are clustered at the originating case agency (OCA) level.

Table 8
The Impact of Reentry and After-Care Program on Recidivism Rates
Alternative Specifications

	(1)	(2)	(3)
Dependent variable:	One-Year Recidivism	Two-Year Recidivism	Three-Year Recidivism
Panel A: Additional Covariates			
Any Treated*Post	-0.048** (0.021)	-0.063*** (0.021)	-0.065*** (0.021)
Observations	9,056	9,056	9,056
R-Square	0.17	0.17	0.16
Panel B: Logit Regressions			
Any Treated*Post	-0.055*** (0.020)	-0.076*** (0.020)	-0.078*** (0.021)
Observations	9,031	9,035	9,035
Pseudo R-Square	0.09	0.09	0.08
Panel C: Propensity Score Reweighting			
Any Treated*Post	-0.100** (0.020)	-0.098** (0.019)	-0.093** (0.019)
Observations	8,970	8,970	8,970
R-Square	0.18	0.18	0.18
Panel D: Cox Proportional Hazard Model			
MOV	-0.358** (0.140)	-0.358*** (0.127)	-0.348*** (0.124)
Observations	4,044	4,044	4,044
Pseudo R-Square	0.03	0.03	0.03
Log-Likelihood	-12,400	-13,400	-13,700
Chi-square	2055.43	2886.83	2788.90
Panel E: Cox Model with Propensity Score			
MOV	-0.263* (0.156)	-0.267** (0.143)	-0.265* (0.138)
Propensity score	-0.592** (0.292)	-0.587** (0.277)	-0.504** (0.270)
Observations	3,465	3,465	4,044
Pseudo R-Square	0.03	0.03	0.03
Log-Likelihood	-10,300	-11,200	-11,400
Chi-square	968.897	1037.356	989.732

Notes: Panels A to C: the main independent variable is an interaction of those who are eligible to participate in the program (Treated) and a dummy variable indicating the first year when treatment occur (Post). Logit regressions (Panel B) report the average marginal effects. Panel D to H: the main independent variable *MOV* equals one if an inmate is a participant in the program. Also, results (Panels D-H) are based on a model of the form $Y_{it} = \alpha + \phi_1 MOV_i + X_i \Omega + \eta_t + \epsilon_{it}$. Regressions include the following controls: race, age, age squared, days in prison, days in prison squared, total arrests, total arrests squared, reason for release, year of release, and type of facility. The specification in Panel A includes set of dummies for arrest reason. Standard errors, shown in parentheses, are clustered at the originating case agency (OCA) level. MOV = Men of Valor. Statistical levels of significance are: * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$.

Table A1
Summary Statistics of MOV and Non-MOV sample

Variable	(1) Mean	(2) Std. Dev.	(3) Min.	(4) Min.	(5) Mean	(6) Std. Dev.	(7) Min.	(8) Max.
	MOV Sample (N=4,451)				DSC Sample (N=4,605)			
<i>Outcome variables</i>								
Return to prison in 1 year	0.337	0.473	0.000	1.000	0.419	0.493	0.000	1.000
Return to prison in 2 years	0.374	0.484	0.000	1.000	0.459	0.498	0.000	1.000
Return to prison in 3 years	0.389	0.488	0.000	1.000	0.471	0.499	0.000	1.000
Time since last arrest (days)	124.606	316.346	0.000	4,489.000	110.428	321.158	0.000	4,258.000
Log Time	4.775	1.525	0.000	8.409	4.139	1.681	0.000	8.357
<i>Other Variables</i>								
MOV program	1.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000
Treated6month	0.054	0.226	0.000	1.000	0.000	0.000	0.000	0.000
Treated12month	0.021	0.143	0.000	1.000	0.000	0.000	0.000	0.000
Black	0.596	0.491	0.000	1.000	0.615	0.487	0.000	1.000
White	0.404	0.491	0.000	1.000	0.359	0.480	0.000	1.000
Hispanic	0.000	0.015	0.000	1.000	0.001	0.036	0.000	1.000
Age	36.025	10.781	18.000	67.000	37.099	12.182	17.000	66.000
Age at release	45.632	11.253	23.000	71.000	47.483	11.828	23.000	73.000
Days in prison	877.040	953.159	0.000	3465.322	388.157	688.655	0.000	3318.885
Total arrests	10.017	12.248	0.000	50.000	0.023	0.374	0.000	6.000
Year of release	2009.894	4.451	2000	2017	2009.133	4.765	2000	2017

Note: Authors' calculations

Table A2
Determinants of the Probability of Participating in the MOV Program
Logit Regression to Obtain Propensity Score

Variables	(1) MOV
Black	3.164*** (0.828)
White	3.406*** (0.829)
Age	0.048** (0.024)
Age squared	-0.001** (0.000)
Days in prison	-0.008*** (0.001)
Days in prison squared	0.000*** (0.000)
Total arrests	2.437*** (0.144)
Total arrests squared	-0.043*** (0.003)
Constant	-6.643*** (1.229)
Reason for Release	Yes
Year of release	Yes
Type of Facility	Yes
Observations	8,970
Log Likelihood	-3,069.061
Pseudo R-squared	0.51

Notes: The dependent variable *MOV* is a dummy variable that equals one if an inmate participates in the MOV program. Results are based on a model of the form $Y_{it} = \alpha + \phi_1 MOV_i + \mathbf{X}_i \boldsymbol{\Omega} + \eta_t + \varepsilon_{it}$. Statistical levels of significance are: ** indicates $p < 0.05$. Standard errors are shown in parentheses.

Table A3
Mantel-Haenszel (M-H) Bounds (“mhbounds”) Sensitivity Analysis

Gamma, Γ	(1)	(2)	(3)	(4)	(5)	(6)
	One-Year Recidivism	One-Year Recidivism	Two-Year Recidivism	Two-Year Recidivism	Three-Year Recidivism	Three-Year Recidivism
	p_mh+	p_mh-	p_mh+	p_mh-	p_mh+	p_mh-
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.2	0.0000	0.0002	0.0000	0.0001	0.0000	0.0003
1.25	0.0000	0.0044	0.0000	0.0026	0.0000	0.0065
1.3	0.0000	0.0414	0.0000	0.0291	0.0000	0.0576
1.35	0.0000	0.1897	0.0000	0.1530	0.0000	0.2414
1.4	0.0000	0.4781	0.0000	0.4264	0.0000	0.4613
1.45	0.0000	0.2432	0.0000	0.2810	0.0000	0.1815
1.5	0.0000	0.0715	0.0000	0.0867	0.0000	0.0451

Notes:

Gamma: odds of differential assignment due to unobserved factors

p_mh+: significance level (assumption: overestimation of treatment effect)

p_mh- : significance level (assumption: underestimation of treatment effect)

Table A4
Back-of-The Envelope Cost-Savings Analysis

Cost-Savings = Incarceration Costs Avoided

- Incarceration Costs Avoided=Number of recidivists avoided x Incarceration costs
 - a. Number of recidivists avoided = percent change in recidivism x Number in treatment group
 - i. Percent change in recidivism = 6.0 percent (see estimate in column 1 of Table 3)
 - ii. Number in treatment group = 184

So, number of recidivists avoided = $0.06 \times 184 = 11$

- b. Incarceration costs = \$21,000
 - c. Average length of stay in prison ≈ 1.7 years (approximated from 628.44 in Table 1)
- Therefore, Incarceration Costs Avoided = $11 \times \$21,000 = \$231,000$
- Assuming a discount rate of 3 percent and given that the average length of stay in prison is about 2 years (approximated from 628.44 days as shown in Table 1), we can calculate the total present value of incarceration costs avoided for an ex-offender who avoids recidivating within one year and spending 2 years in prison.

Total Present Value of Incarceration Costs Avoided = $\frac{\$231,000}{(1.03)} + \frac{\$231,000}{(1.03)^2} \approx \$441,069$