Do Gang Members in Prisons Impact Others to Recidivate?

An Empirical Analysis

Job Market Paper

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Abstract

Gangs are present in the criminal world across the globe, and they are frequently associated with a range of activities such as the exercise of power, violence, territorial control, and resistance. This paper investigates the relationship between in-prison exposure to specific peers – gang members and reincarceration. Existing qualitative evidence shows that gang members are distinct from other offenders in the peer group in terms of criminal experience, network, and skills. Using a quasi-experimental variation and administrative data of the adult population incarcerated at a state department of corrections, I examine the impact of exposure to gang-affiliated offenders in prisons on non-affiliated offenders' reincarceration probability upon release. I find that exposure to gang-affiliated peers increases the probability of getting re-incarcerated. A 1 standard deviation increase in the exposure of an inmate to gang members leads to 5.34 percentage points increase in reincarceration probability within 3 years of release. I propose that exposure to gang members increase the probability of reincarceration because gang members are in general more violent, they are criminally more skillful, and they expand their outreach in-prison.

JEL codes: K42, K39, J88, I30

Introduction

Significant resources are allocated to rehabilitate the offenders across the U.S., and day-to-day incarceration costs are approximately $76-$200 per inmate (Doleac, 2018; Duwe, 2017). While prison-based rehabilitation efforts aim to discourage future criminal behavior, two-thirds of those released return to the custody (Doleac, 2019). Existing literature focuses on the impacts of social interactions among juveniles in prisons, role of prison conditions, and prison-based programming to understand the in-prison drivers of future criminal behavior. However, little is known about the impacts of social interactions among incarcerated adults. In this paper, I empirically investigate the impact of in-prison exposure to gang affiliated offenders on the probability of reincarceration of non-affiliated offenders. I study the impact of exposure to gang members because they are criminally organized, possess a stronger network, have greater outreach, and criminal skills than non-affiliated offenders (Skarbek, 2014). Consequently, exposure to gang-affiliated offenders may offer non-affiliated offenders the opportunities to learn new criminal skills or may help them expand their criminal outreach.

While existing evidence shows that gang members are involved in organized crime and perpetrate violence (Castillo & Kronick, 2020), little is known about the interaction of gang members with other offenders active in the criminal world. My study attempts to fill the research gaps in two understudied areas of research in the empirical literature related to gangs – first is the specific institutional settings that lead to the spread of gang behavior. In contrast, second is the interaction of gang members with other groups and offenders active in the criminal world. Understanding how gangs expand and their members interact with other incarcerated individuals is policy relevant since significant resources are spent to impede the activities of gang members.[2] In 2018, NIJ estimated approximately 13% of the 1.5 million U.S. inmates to be affiliated with gangs (Pyrooz, 2018). The number of gang members relative to the overall prison population may not seem significant. However, many scholars and practitioners argue that gang expands their outreach inside prisons, which poses additional challenges for the criminal justice system (Skarbek, 2014).

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[2] Few examples of initiatives to deter gang related activities are as follows.
i. Weisel & Shelley (2004) report that approximately $500,000 are spent to support different gang control strategies across different police jurisdisctions across U.S.
ii. U.S. Department of Justice offers grants summing to $100,000 per agency to support the Gang Resistance Education and Training Program (G.R.E.A.T).

Estimating the consequences of interactions with gang members has been challenging due to data and methodological limitations. Most datasets on incarcerated individuals do not allow researchers to distinguish between gang affiliated and non-affiliated offenders. Moreover, causal identification of the impacts of social interactions requires detailed information on location where individuals are incarcerated, sentence characteristics, and post-release outcomes. I overcome the identification challenges by relying on a unique panel administrative data set from a large state department of corrections. The administrative records allow me to distinguish gang affiliated incarcerated individuals from non-affiliated individuals. I rely on the panel nature of admin data to identify the impact of exposure to gang members using quasi-experimental variation in cohort composition and time spent with gang members. Like Bayer, Hjalmarsson, and Pozen (2009) and Stevenson (2017), I calculate exposure to gang members using non-affiliate's cohort composition, specifically time spent with gang members. I rely on within facility-unit variation in exposure to gang members, which I show is uncorrelated with observable characteristics and the predicted reincarceration rate of non-gang affiliated inmates.

I find that exposure to gang-affiliated peers increases the probability of getting re-incarcerated within 1, 2, and 3 years of release. The results suggest that a one standard deviation increase in the exposure of an inmate to gang-affiliated inmates in a prison unit increases the reincarceration probability within 1, 2, or 3 years by 1.99, 3.56, and 5.34 percentage points. On average, 3.12 percent of the offenders released from the prison return to custody within 1-year of release, 8.10 percent return within 2 years of release, and 11.6 percent return within 3 years of release by committing a new felony. I show that the results are robust to alternative specifications such as inclusion to neighborhood fixed effects, sample of first-time felony offenders, sample of inmates with no juvenile records, and conservative sample that corrects for error in measuring exposure by omitting inmates released at the beginning and end of sample periods.

How do gang members influence others to recidivate? The literature from Economics, Criminology, and Psychology posits three possible mechanisms. The first channel is psychological, based on the idea that gang members are on average more violent and aggressive than non-affiliated inmates. Being confined with such individuals can destigmatize violent behavior and make individuals more susceptible to aggressive and violent behavior (Stevenson, 2017; Kahan, 1997; Posner, 1997). The second possible explanation is directly related to prisons

as a school of crime. Exposure to peers such as gang members can help inmates learn new criminal skills or they may get access to better criminal networks, such as drug dealers, increasing the return to crime after release (Bayer, Hjalmarsson, and Pozen, 2009). Third, inmates have limited control over who they interact with in prison. To protect against potential threats of extortion or physical harm from other inmates, non-affiliated inmates may cooperate with gang members to seek their protection while being incarcerated in exchange for post-release collaborations or for facilitating gangs in illicit activities inside prisons (Skarbek, 2014). I provide empirical evidence of the relative importance of the mechanisms and show that the main findings are consistent with the second mechanism: inmates who are engaged in productive work activities are less likely to recidivate than inmates who are not engaged in productive work activities.

Estimating the negative impact of such interactions on recidivism has direct implications for housing policies related to inmates. For instance, removing gang affiliates from the general prison population and placing them in restrictive housing is a much-debated controversial issue among the policy audience but there isn't much empirical research pertaining to this topic (Pyrooz, 2018). To my knowledge, my paper is one of the first studies that attempt to present a data-driven point of view related to the consequences of placing gang members among the prison population of adult offenders. My study also contributes to the existing economics of crime literature by focusing on peer effects among adults, a group of offenders understudied in the peer effects literature.

The rest of the manuscript is organized as follows: I discuss theoretical foundations in section 2, institutional background in section 3, data description in section 4, empirical strategy in section 5, results, and mechanisms in section 6 and 7, and implications in section 8. Finally, I present discussion in section 9.

Theoretical Foundations

The study builds on the literature in economics, sociology, and criminology related to gangs, interaction among inmates in prisons, and reincarceration. Below, I discuss the existing evidence related to these potential channels in detail.

a. *Effect of Exposure to Violent Behavior*

The first mechanism through which the exposure to gang-affiliated inmates affects the propensity to recidivate of a non-affiliated inmate is through the increase in exposure to violence or risky behavior. Compared to non-affiliated prison inmates, gang-affiliated prison inmates are more likely to possess dysfunctional emotional dispositions (Mallion & Wood, 2018). They are also more likely to engage in violent behavior than non-affiliated individuals (Klein, Weerman, & Thomberry, 2006) and are comparatively less afraid of being victimized than non-affiliated offenders (Lane & Fox, 2011).

The mechanism relates to the direct social influence or through destigmatizing violent activities. Existing evidence in psychology and criminology suggests that in addition to factors such as wages in the illegal vs. legal sectors of economy, decision to engage in a criminal activity is also influenced by factors such as social norms, social influence, and stigma associated with crime (Kahan, 1997). Aggressive or illegal behavior is often flourished when such activities are not stigmatized and individuals are willing to accept it as a norm (Kahan, 1997; Posner, 1997). Stevenson (2017) finds that exposure to peers who come from unstable homes and have higher levels of aggression leads to an increase in crime after release, as well as an increase in crime-oriented attitudes and behaviors. Moreover, qualitative, and quantitative evidence shows that first-time experiences, such as harsher prison conditions or prosecution for first misdemeanors, are strong predictors of future criminal activity (Agan, Doleac, & Harvey, 2021). Therefore, being confined with individuals prone to violent or risky behavior, such as gang members, particularly for the first time may normalize illicit behavior for a non-affiliated inmate, consequently affecting their propensity to recidivate.

b. Prison as a school of crime

The second channel through which a gang-affiliated inmate affects the propensity to recidivate of a non-affiliated inmate is through the criminal skill transfer or by providing access to better networks. Past work has shown that in-prison exposure to peers incarcerated for a similar type of crime or exposure to peers from unstable homes increases the individual's probability of reincarceration. Bayer, Hjalmarsson, & Pozen (2009) analyze peer effects among juvenile offenders in Florida and find that peers influence individuals who already have some experience in a particular crime category. Other studies confirm the external validity of the results presented by Bayer, Hjalmarsson, & Pozen (2009) and test peer effects among juvenile offenders convicted for similar crimes. Damm & Gorinas (2020) analyze the effect of other inmates' criminal

background and other socio-economic characteristics on recidivism among young adults. They find that exposure of young offenders convicted of drug-related crimes to other young offenders who are convicted of similar crimes increases the probability of recidivism with a drug-related offense. Similar to the existing studies, Ouss (2011) analyzes the influence of in-prison interactions on post-release behavior among prisoners incarcerated in France and finds evidence of peer effects for skill-intensive offenses.

Damm & Dustmann (2014) study the effect of growing up in a high crime neighborhood on the criminal behavior of youth in the context of Denmark refugee immigrants who were assigned to neighborhoods quasi-randomly. They find that the share of young people convicted for violent crimes in the neighborhood increases convictions of male refugees later in life. Billings & Schnepel (2020) analyze the impact of social interactions within neighborhoods upon reentry on recidivism. They find that a former inmate is less likely to reoffend if more of his peers held captive upon reentry. Using data on inmates released after mass pardon in Italy, Mastrobuoni & Rialland (2020) find homophily in peer-group formation concerning age, nationality, and degrees of deterrence. In addition, they find that mafia criminals have a higher tendency of partner formation, both with the mafia and non-mafia members. Therefore, organized criminals such as gang members can influence non-gang members' recidivism upon release through channels such as criminal skill transfer or by connecting them with others in the criminal world.

c. Collaborations with gang-affiliated inmates to ensure protection

The third channel through which exposure to gang affiliated inmates impact the propensity to recidivate of a non-affiliated inmate is through transitory or permanent collaborations between gang-affiliated inmates and non-affiliated inmates. Skarbek (2014) establishes that gang-affiliated offenders significantly influence day-to-day politics in correctional facilities. Being around offenders who are influential inside prisons, such as gang members, can affect the individuals' propensity to recidivate in the following way. In the prison context, individuals have very little control over who to live within their facility unit, thus having limited control over interactions. Violent victimizations are prevalent in correctional facilities (Wooldredge & Steiner, 2013), and such incidents often go unreported (Department of Justice, 2019). The rising prison population and limited resources constrain the authorities to ensure the safety of individuals confined in correctional facilities (The Sentencing Project, 2020).

Consequently, prison inmates may rely on non-government organizations, such as gangs, to ensure their safety in prisons (Skarbek, 2014). Members of powerful gangs can exploit non-affiliated inmates by providing them protection against potential threats in prisons in exchange of collaborations for illicit activities in prisons (Skarbek, 2014). Such an exchange between non-affilaited inmates and gang-affiliated inmates may extend to post release collaborations to perform illicit activities, without joining the gang per se. Consequently, the presence of gang members can increase the propensity of non-affiliated inmates to recidivate upon release.

Institutional Background

This section discusses the institutional details related to the intake process, facility units, and assignments across facilities units at the department of corrections.[3]

Facilities and Facility Units

The department of corrections comprises 16 facilities spread across counties. Within each facility, there are entirely independent locations known as facility units. Several unique features of the facility units facilitate the identification strategy used in this paper. First, these facility units are entirely detached and are independent of other facility units within the same facility. Second, each unit is classified at a different security level. For instance, a certain facility comprises six different facility units, and among these, the one of the units is a minimum-security or represents a security level of 2, while another unit is at security level 5. Since the facility units vary in security levels, inmates are assigned to the units depending on their risk profiles and criminal histories. It makes little sense to use variation in gang exposure across facilities or facility units because there could be many factors varying across these units that result in biased estimates. Therefore, I rely on the variation in gang exposure within the facility units resulting from the assignment of inmates across these units and from new entrants and releases.[4]

Intake Process and Facility Unit Assignments

Upon intake to the department of corrections, inmates are placed at reception centers where they go through the "classification process." The classification process is an integral part of the corrections plan of inmates during their tenure at the department of corrections. The classification process involves custody classification of inmates and evaluation of their internal risk level.

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[3] The name of the specific state department of corrections is omitted due to confidentiality reasons.
[4] See identification section for more technical details on assignment and identification.

Custody classification and the internal risk level of an inmate are solely determined based on individual-specific characteristics, including the criminal history of inmates and the risk level the inmates present to the public, staff, and others. Several factors contribute to the calculation of internal risk scores, including offense category, prior offense history, escape history, history of institutional violence, gang affiliation status, and current age.

The metrics calculated during initial custody classifications determine inmates' housing and work assignment decisions. These classifications are objective functions of an inmate's criminal history recorded under a standardized rating system based on factual data. Correctional officers are directed to make assignment decisions based on the classification of inmates and their judgment. Based on the custody classification, inmates' needs of programming and work, the risk that inmates pose, health needs, availability, and timing until inmates are released, inmates are assigned to correctional facility units. At the stage of facility unit assignment, inmates can neither reject a particular housing assignment nor request to be assigned to a different facility.

During the assignment process, correctional officers are not aware of inmates' precise peer cohort composition across different facility units. Therefore, the presence of certain inmates in a facility unit does not impact the facility assignment of other inmates. However, as per the technical reports, there are rare cases where correctional officers are directed not to put the inmates together. For instance, the only possibility that inmates are prohibited from being placed in certain facility units due to other inmates' presence is if an inmate is on the "Do Not House With" (DNHW) list. Inmates with parents or siblings incarcerated in the correctional system are on the DNHW list. Correctional officers are advised not to house inmates with documented DNHW issues in the same institution where there is a possibility that the DNHW inmates may have to share housing cells, transport, meals, and institutional activities. Unless there are extreme limitations to the housing options, correctional officers are advised not to put DNHW inmates together.

Identification and Facility Assignment of Gang Affiliated Inmates

The department of corrections defines a typical gang as a formal or informal organization whose members or associates engage in the commission, attempt a commission, or solicit a felony act. The most common gang memberships include Aryan Brotherhood, New Mexican Mafia, West Side City Crips, and other street gangs. Officers at the department of corrections identify gang-affiliated inmates based on several observed characteristics. These characteristics include tattoos, symbolism, documents, publications, authorship, court records, group photos, associations,

contacts, other agencies, and self-admission. The staff assigns a lower weight to some characteristics such as symbolism, while the staff puts more weight other factors such as court documents and information from other agencies. The affiliation status of an inmate with a particular gang occurs at the initial classification stage.

Based on the individual characteristics, the staff analyzes whether an inmate is a validated gang member or a gang member suspect, a renounced gang member, or not a gang member. Along with gang membership statuses, the staff also records the association with a particular type of gang. For instance, the staff identifies that members of a famous gang, New Mexican Mafia, have circular tattoos with patterns involving a skull, double "MM," and flames around the circle. The administrative data set provides information on an inmate's affiliation status and specific gang names to which an inmate is affiliated. The suspected gang members are placed in minimum and more frequently in medium or above medium-security facility units, while validated gang members are classified in maximum-security units. For analysis in this paper, I calculate exposure to gang members using both validated and suspected gang members.

One potential concern is related to the possible errors in identification of gang members by the correctional facility unit staff. Recent developments in the criminology literature show that administrative records are a reliable source of identification of gang membership status of inmates. For instance, Pyrooz, Decker, & Owens (2020) find large positive correlations between individual's self-reported gang membership status and that recorded by the correctional facility unit staff.

Data

Sample Description

The data set contains information on population of inmates released from all state (public and private) facility units of the state department of corrections between July 1st, 2013, and June 30th, 2018. The individual panel data set provides detailed information on inmates' demographic characteristics, gang membership status, release and admission dates for the sentencing offense, prior offense history characteristics, sentencing offense related characteristics, facility units of admission and release, neighborhood where an inmate is released, and reincarceration following release. Demographic characteristics include information related to an inmate's gender, race, ethnicity, age, and information on whether an inmate has completed high school or has a GED diploma. Prior offense history includes information about whether an inmate has a history of prior

felony convictions and the type of prior offenses committed. The data provides detailed information on type of sentencing offense (violent, burglary, etc.), length of sentencing offense, and felony seriousness of sentencing offense.

Information related to release dates, admission dates, sentence dates, and facility unit from which inmate is released after completing the sentence allows identifying the periods in which inmates overlap in their stay at the correctional facility unit from which they are released. To construct the final sample, I exclude inmates that are in heath facility unit or are there for very short stays. Inmates in the analysis are incarcerated across different facility units.

Overall, the analysis sample is a panel dataset consisting of 78,461 inmates. Out of these, there are 16,712 gang-affiliated inmates, while there are 61,749 non-affiliated inmates. The key outcome of interest is reincarceration, which I define as return to the correctional facility unit by committing a new felony charge within 1 year, 2 years, and 3 years of release. It should be noted that the measure of reincarceration excludes all prison returns due to a technical violation because the administrative data allows me to distinguish prison returns due to a new felony from prison returns due to a community supervision violation. Table 1 present the summary statistics of the key characteristics of the sample of inmates that are not affiliated with gangs. Table 1 indicates that 3.1% of the non-affiliated inmates returns to prison due to a new felony within 1-year of release, 8.1% return within 2 years, while 11.6% return within 3 years of release. The Table also presents percentage of inmates that return to prison due to a technical violation. Approximately 18-20% of the inmates return to prison due to a technical violation within 1-3 years of release.

The proportion of non-affiliated inmates with a GED or a high school diploma is 54.4 and average community score of inmates is 2.176. In terms of racial mix, 27.8%, are Hispanics, while 12% of the inmates are African Americans. An overwhelming majority, 44.5%, of inmates are incarcerated for drug-related offenses, 20.8% are convicted of violent crimes, 7.3% are convicted of theft, and 9.6% are convicted of assault. In terms of felony type and seriousness, 5.5% of the inmates are incarcerated due to a medium category of serious felony, and 55.4% of the inmates have prior records of adult felonies.

[Insert Table 1]

Table 2 presents the summary statistics of key characteristics of gang affiliated inmates. The Table shows that 7.8% of the gang-affiliated inmates return to prison within 1 year of release

due to a new felony, 19.7% return within 2 years, and approximately 26.3% return to the facility unit due to a new felony within 3 years of release. Approximately 23-24% of the gang-affiliated inmates return to prison due to a technical violation within 1-3 years of release. Overall, 55.8% of the gang affiliated inmates have a high school diploma or GED. The average community score of a gang-affiliated inmate is 5.55. Almost 53% of the gang-affiliated inmates are Hispanics, while 14.7% of gang-affiliated inmates are African Americans. Most gang-affiliated inmates (32.8%) are convicted of drug-related offenses, and 23.6% are convicted of violent crimes. Fewer gang affiliated inmates are incarcerated for less serious felonies (felonies of low or medium seriousness), while most of the gang-affiliated inmates (34.5%) are convicted of serious offenses. Most of the gang affiliated inmates (~75%) have a record of prior adult adjudication.

[Insert Table 2]

Comparison of Characteristics of gang affiliated and non-affiliated inmates

The descriptive statistics presented in Table 1 and Table 2 show that gang-affiliated inmates have riskier profiles compared to the non-affiliated inmates. The comparison of average characteristics show that gang affiliated inmates have higher reincarceration rates than non-affiliated inmates. Furthermore, gang-affiliated inmates are more likely to have a record of prior adult felony convictions. To make in-depth comparisons of the criminal profiles of gang affiliated and non-affiliated inmates, I use several risk metrics. These risk metrics include community risk scores, violent risk scores, and overall risk scores. An inmate's community score ranges from 1 to 8, and it presents the risk that an inmate poses on the community. In contrast, a violent score (ranging from 1 to 8) presents a risk of engaging in a violent activity. The overall risk level of an inmate (also ranging from 1 to 8) measures an inmate's relative risk to recidivate. The department of corrections calculates the overall risk scores based on the community and violent scores. These scores allow to identify the specific risk profiles of inmates.

Figure 1 presents various measures of average risk scores among gang affiliated and non-affiliated inmates. The average community score of non-affiliated inmates is 2.1. In contrast, the average community score of gang-affiliated inmates is 5.5. The comparison of community scores suggest that gang affiliated inmates pose greater risk for community outside prisons relative to non-affiliated inmates. Gang affiliated inmates have a higher average violent score compared to the non-affiliated inmates. The overall risk level of gang-affiliated inmates is higher compared to

the non-gang affiliated inmates. The Figure shows that gang-affiliated inmates' average risk score is 4.5, while the average risk score of a gang non-affiliated inmate is 2.3. Overall, the descriptive comparisons indicate that gang affiliated inmates have riskier criminal profiles compared to non-affiliated inmates.

[Insert Figure 1]

Measure of Exposure

To construct a measure of peer exposure, I use the variation in the number of days that overlap between gang-affiliated inmates and non-affiliated inmates in a correctional facility unit. I determine the number of overlapping days as follows. Consider two inmates in a facility-unit f. One of these inmates k is a gang-affiliated inmate, while the other inmate i is non-affiliated. I summarize the possibilities of interaction between i and k in Figure 2. As shown in Figure 2, following are the possible cases in which an inmate i has an opportunity of interaction with a gang affiliated inmate k a facility unit:

1. k is admitted before i, and the release date of k is between $i's$ admission and release date.
2. k is admitted after i, and is released before i is released.
3. k is admitted before i, and is released after i.
4. k is admitted after i, and is released after i.

[Insert Figure 2]

It should be noted that during the overlapping days between i and k, the opportunity of interaction also depends on the total members that individual is exposed to during sentencing period. Considering the varying possibility of exposure depending on the facility unit population, I use the probability of interaction between a specific gang-affiliated inmate k and a non-affiliated inmate i as weights in the exposure variable. I construct the measure of exposure as follows:

$$exposure_{i,K} = \frac{d_{i,1}.W_{i,1}}{D_i} + \frac{d_{i,2}.W_{i,2}}{D_i} + \frac{d_{i,3}.W_{i,3}}{D_i} + \cdots + \frac{d_{i,K}.W_{i,K}}{D_i}$$

$$expsoure_{i,K} = \frac{\sum_{k=1}^{K} d_{i,k}.W_{i,k}}{D_i}$$

(1)

and

$$W_{i,k} = \frac{1}{T}$$

(2)

where, $exposure_{i,K}$ is a measure of exposure of an inmate i to all gang members K during his term in prison, $d_{i,k}$ are the number of days that overlap between a non-affiliated inmate i and a gang-affiliated inmate k, D_i are the total number of days that an inmate i spend in prison during his term. W_i is a weight that accounts for the probability that an inmate i gets an opportunity of interaction with a member k, and T is the total number of inmates that an inmate i is exposed to during his term in a correctional facility unit. Since the goal of this paper is to estimate the impact of gang affiliated inmates' exposure on non-affiliated inmates' reincarceration probability, the analysis sample excludes gang members and consists of non-affiliated members only. Consequently, none of the individuals in the analysis sample contributes to the exposure variable of other inmates in the analysis sample.

Empirical Strategy

To analyze the impact of the in-prison exposure to gang affiliated inmates on reincarceration probability of non-affiliated inmates, I estimate the following regression model:

$$y_{irft} = \beta_0 + \beta_1 exposure_{irft} + X_i'\gamma + \alpha_t + \delta_r \times \omega_f + \epsilon_{irft}$$

(3)

where, y_{irft} is an indicator variable equal to one if individual i, with risk profile r, living in a facility-unit f, released in quarter t, returns to the correctional facility unit after committing a new felony. Measure of exposure to gang members in the correctional facility-unit is $exposure_{irft}$, which is constructed using eq (2). I estimate the impact of exposure on the outcome variable, y_{irft}, for three different time horizons – 1-year, 2-years, and 3-years of the release of an inmate i from prison. The sample size varies for each of these time horizons and shrinks for more extended time horizons (i.e., 2-year and 3-year) relative to shorter time horizon (i.e., 1-year).[5]

X_i is a vector of controls which include demographic characteristics such as gender, race and ethnicity, criminal history variables such as length of sentencing offense, *any* record of prior juvenile adjudications, *any* record of prior felony conviction, type of sentencing offense, type of felony seriousness, days of sentencing offense, and age at release. I add facility-unit-by-risk level

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[5] For instance, for 1-year recidivism, the sample consists of all inmates released from prison before July 2017. In contrast, for 2-year recidivism, I take the sample of all inmates released from prison before July 2016, while I take the sample of all inmates released from prison before July 2015 for 3-year recidivism.

fixed effects specified $\delta_r \times \omega_f$, and α_t represents quarter of release fixed effects. ϵ_{irft} is an error term capturing unobservable factors that impact reincarceration probability.

Given the above specification, what drives the variation in exposure of non-affiliated inmates to gang-affiliated inmates? The variation in exposure is driven by entry and exit of both gang affiliated and non-affiliated inmates in the following way. Assume that inmate A and B are both non-affiliated inmates with same risk score s_0 and enter the same facility unit u_0. A key difference that results in the difference in exposure for A and B is that A enters u_0 in time period t_A while B enters the facility unit in time period t_B, where $t_A < t_B$. The cohort composition of inmates in terms of proportion of gang members in facility unit u_0 varies in periods t_A and t_B because gang-affiliated and non-affiliated inmates constantly enter and exit the facility unit u_0 because of their sentence ending and beginning dates.

Identification Assumption

To interpret β_1 as the causal effect of exposure to gang members on inmate $i's$ probability of reincarceration, the variation in variable $exposure_{irft}$ must be orthogonal to individual characteristics conditional on the fixed effects and control variables specified above. This leads to an assumption which states that conditional on individual characteristics, facility-unit-by-risk and quarter of release fixed effects, factors that influence inmate $i's$ risk of reoffending post-release, are uncorrelated with the measure of exposure to gang members, $exposure_{irft}$. Below I present a discussion on factors that can potentially bias β_1 and steps that I take to mitigate such potential confounders and present a test of the identifying assumption.

Identification Concerns

Unobserved factors specific to time periods in which inmates are released can invalidate the identifying assumption. For instance, shocks to economic activity may affect propensity to recidivate of individuals released in specific time periods. To mitigate such concerns, I include quarter of release fixed effects, α_t, specified in the equation above and compare individuals released within the same quarter. Moreover, quarter of release fixed effects also control for trends in the criminal activity. Another identification concern is the potential non-random sorting of inmates across facility units – specific types of inmates (e.g., drug offenders) are likely to be placed in specific facilities. Such sorting can invalidate the identifying assumption leading to biased estimates. In addition, inmates with different risk levels might be treated differently in facility units

that may affect their reincarceration probability upon release. Therefore, I include facility-unit-by-risk level fixed effects, $\delta_r \times \omega_f$, to ensure that the impact of gang exposure is identified using within-facility-unit variation.

Intuitively, individual $i's$ exposure to gang-affiliated inmates is endogenous if the following holds true. It has to be the case that correctional facilities staff constantly revise their allocation decisions of gang affiliated inmates based on the presence of non-affiliated inmates in the correctional facility units. More precisely, staff assigns gang affiliated inmates to facility units where non-affiliated inmates even at same risk scores have worse outcomes in terms of reincarceration for unobserved reasons. This allocation rule implies that in month m_1, certain facility unit u_0 has a cohort of non-affiliated inmates that are more likely to recidivate despite similar risk scores, so gang members are allocated in facility u_0. In contrast, in month m_2 certain facility unit u_1 has a cohort of non-affiliated inmates that are more likely to recidivate despite similar risk scores, so gang members are now allocated to facility u_1. However, it is unlikely to hold true because correctional facilities neither update their decision rule constantly nor evaluate cohort composition of inmates while placing inmates across correctional facility units.

The identification assumption presented above implies that inmate $i's$ exposure to gang-affiliated inmates must be orthogonal to the characteristics that influence inmate's reincarceration conditional on controls and relevant fixed effects. To empirically evaluate the identifying assumption, I present a balance test that analyzes the relationship between exposure and inmate $i's$ characteristics that affect the risk of reoffending. More precisely, I analyze whether the predicted reincarceration probability based on inmate $i's$ observable characteristics is correlated with exposure variable. Based on individual characteristics, I calculate the predicted reincarceration rate for each non-gang affiliate in the sample. I then regress the predicted reincarceration rate on exposure conditional on relevant fixed effects specified above. Table 3 presents the results of the regression of predicted reincarceration on exposure. The Table highlights that exposure is uncorrelated with predicted reincarceration, which is evidence that the variation in exposure is exogenous to the individual-specific factors that explain the risk of reoffending.

[Insert Table 3]

As an alternative test, I evaluate the correlation between demographic and criminal history characteristics of an inmate i and measure of exposure. Table 4 presents the regression results that take measure of exposure as an outcome and characteristics of inmate i as regressor. It should be

noted that each row corresponding to column (4) presents a coefficient from a *separate regression* of exposure on inmate $i's$ specific characteristic. Column (1) of Table 4 presents the unconditional mean of inmate $i's$ characteristics. Column (2) presents the unconditional correlation between inmate $i's$ demographic and criminal history characteristics and exposure, while p-values associated with this correlation are presented in column (3). Column (4) presents the correlation between inmate $i's$ demographic and criminal history characteristics and exposure conditional on *time* specific trends, length of sentencing offense, and facility-unit-by-risk level fixed effects, while p-values associated with this correlation are presented in column (5). The results presented in column (4) emphasize on the importance of inclusion of relevant fixed effects specified in the equation above; 4 out of 30 inmates $i's$ characteristics are significant at 1%. This provides strong evidence that within facility-unit variation in exposure is unrelated to inmate $i's$ characteristics.

[Insert Table 4]

As an additional balance test, following Billings and Schnepel (2020), I take measure of exposure as an outcome of interest and inmates' characteristics as regressors in a single regression. Table 5 presents the results of this regression. Column (1) presents the results of regression model excluding fixed effects, column (2) presents coefficients conditional on quarter of release fixed effects, and column (3) presents coefficients conditional on both quarter-of-release and facility-unit-by-risk level fixed effects. As shown in column (3), the key regressors of interest (except for sentencing offense length) are uncorrelated with measure of exposure. This further support that the key regressor is not correlated with the determinants of reincarceration conditional on facility-unit-by-risk level and quarter-of-release fixed effects.

[Insert Table 5]

Results

Main Results

Table 6 presents the main regression results that take exposure to gang members in a correctional facility unit as a regressor and recidivism within 1, 2, and 3 years of release through new felony charges as outcomes of interest. I estimate the models after including individual level controls, facility-unit-by-risk level fixed effects, and quarter of release fixed effects. Column (1) presents the results of the regression that takes recidivism within 1 year of release as an outcome, column (2) presents the results of regression that takes recidivism within 2 years of release as an outcome,

and column (3) presents regression results that take recidivism within 3 years of release as an outcome.

I find that exposure to gang-affiliated peers increases the probability of getting re-incarcerated within 1, 2, and 3 years of release. The results from column (1) show that a 1 standard deviation increase in the exposure of an inmate to gang-affiliated inmates in a correctional facility unit significantly increases the probability of getting incarcerated for a new felony charge by 1.9 percentage points. The estimates from column (2) suggest that a 1 standard deviation increase in gang members' exposure in a correctional facility unit leads to a 3.56 percent increase in the probability of reincarceration within 2 years of release. A 1 standard deviation increase in the exposure of an inmate to gang members leads to a 5.34 percentage points increase in recidivism probability within 3 years of release. On average, 3.12 percent of the offenders released from the prison return to custody within 1-year of release, 8.1 percent return within 2 years of release, and 11.6 percent return within 3 years of release. Compared to the sample means, the results presented in Table 6 show an increase of 63 percent in 1-year recidivism, 43 percent increase in 2-year recidivism, and 46 percent increase in 3-year recidivism.

[Insert Table 6]

Heterogeneous effect of exposure to gang affiliated inmates

Next, I estimate the differential effects of exposure to gang members across different groups of non-affiliated inmates in the sample. Specifically, I analyze the effects of gang exposure on inmates incarcerated for specific sentencing offense including violent crimes, theft, sex-related offenses, assault, robbery, forgery/fraud, burglary, law enforcement related violations, drug offenses, weapon-related crimes, and other offenses. In addition, I also present the heterogeneity analysis for non-affiliated inmates with different risk levels (e.g., low risk offenders (risk-level = 1), high-risk (risk-level = 5). In Table 7, I present the heterogeneous effects of exposure to gang-affiliated inmates across different types of sentencing offenses. Table 7 takes recidivism through a new felony charge within 3-years of release as an outcome. Each row in the Table presents a separate regression that includes the same controls and fixed effects discussed in section 4 (excluding type of sentencing offense as a control variable) and the specific sub-sample for which the analysis conducted is specified by the row-title. I find that exposure to gang affiliated inmates

has a statistically significant impact on the recidivism of inmates who are incarcerated for violent crimes, burglary, and drug related offenses.

The results from Table 7 show that for inmates incarcerated for violent crimes, a 1 standard deviation increase in exposure to gang-affiliated inmates leads to a 5.8 percent increase in the propensity to recidivate within 3 years of release. Those who are convicted of burglary and dug related offenses, a 1 standard deviation in exposure leads to 6.5 and 5.34 percentage points increase in the probability to recidivate within 3 years of release. Table 7 also shows that exposure to gang members do not have statistically significant impact on the recidivism of non-affiliated inmates who are convicted of theft, assault, robbery, fraud, law enforcement related offenses, and weapon-related offenses.

[Insert Table 7]

I present the effect of exposure to gang-affiliated inmates across different risk profiles. To quantify the risk profiles, I use the risk levels of non-affiliated inmates. As discussed earlier, risk levels are defined as the individual's relative risk to recidivate based on general risk and violent risk. The risk levels range from 1 to 5 (5 = highest risk to recidivate, 1= lowest risk to recidivate). In Table 8, I present the model results estimated separately for inmates with each of the risk levels. A key difference between the specification presented in Table 8 and the earlier specification is that I include facility unit fixed effect instead of the facility unit by risk level fixed effects in the models presented in Table 8.

The results show that a 1 standard deviation increase in an exposure to gang-affiliated inmates leads to an increase of 7.7 percent in the probability of recidivism within 3 years of release for those with risk-levels 3. Similarly, a 1 standard deviation increase in exposure to gang-affiliated inmates leads to an increase of 6.7 percent in the probability of recidivism of non-affiliated inmates with risk levels 5. Table 8 also shows that exposure to gang members do not have statistically significant impact on the recidivism of non-affiliated inmates on risk levels 1, 2, and 4. Overall, I do not find that a consistently increasing or decreasing effect of gang exposure on non-affiliated inmates' recidivism that have higher risk scores (e.g., risk score 4, risk score 5) relative to those with lower risk scores.

[Insert Table 8]

Sensitivity of estimates to alternate specifications

In this section, I discuss the robustness of estimates to alternate specifications and sub-samples. Following are the alternate specifications that I take to test the stability of the observed effect.

i.   Neighborhood Fixed Effects

First, differences in the neighborhood where inmates are released can also have a differential impact on recidivism. For instance, economic conditions such as the availability of jobs for incarcerated individuals may vary across neighborhoods, resulting in differences in recidivism. To mitigate such differences and test estimates' robustness, I include zip code fixed effects in equation (3). Inclusion of zip code fixed effects allows comparing individuals released in the same zip code. Table 9 presents the regression estimates with zip code fixed effects. Coefficients for all three recidivism outcomes are larger in magnitude compared to the baseline specification and are statistically significant. I find that a 1 standard deviation increase in exposure increase the probability of 1-year recidivism by 2.19 %. Similarly, a 1 standard deviation increase in exposure to gang members in prisons results in 3.56% and 5.03% increase in 2-year recidivism and 3-year recidivism rates, respectively.

[Insert Table 9]

ii. Prior engagement in criminal behavior

The current analysis sample consists of all inmates irrespective of their prior felony records. However, all baseline specifications include controls for prior felony records or prior engagement in criminal activity because existing evidence suggests that prison conditions or involvement in the criminal justice system effects the individual's future criminal behavior. For instance, Agan, Doleac, & Harvey (2021) show that nonprosecution of non-violent misdemeanor offenses reduce criminal complaints over the next two years. The findings imply that entry into the criminal justice system impacts the probability of engaging in criminal behavior in the future. Furthermore, prison conditions also impact an individual's propensity to engage in criminal behavior after release (Lerman, 2009).

I test the robustness of estimates by focusing on two different samples of inmates with no prior criminal records. First, I present the results of the main specification Eq (3) for a sample of offenders with no prior felony records in Table 10. The results suggest that a 1 standard deviation increase in exposure increases the probability of 1-year recidivism by 1.73 percentage points. Similarly, a 1 standard deviation increase in exposure to gang members in prisons results in 4.07 percentage points and 4.82 percentage points increase in 2-year recidivism and 3-year recidivism

rates respectively. All three coefficients are significant in magnitude and are statistically significant.

[Insert Table 10]

Next, I present the results for sample of inmates with no prior records of juvenile adjudications in Table 11. I find that a 1 standard deviation increase in exposure increases the probability of 1-year recidivism by 1.29 percentage points. Similarly, a 1 standard deviation increase in exposure to gang members in prisons results in 2.93 percentage points and 5.54 percentage points increase in 2-year recidivism and 3-year recidivism rates, respectively.

[Insert Table 11]

iii. Conservative sample of non-affiliated inmates

It is possible that peer exposure is calculated with measurement error for inmates released towards the beginning or the end of the sample period. For instance, the full sample consists of all inmates released from the DOC from July 1^{st,} 2013, and June 30^{th,} 2018.[6] To remove the possible measurement error in the exposure variable, I omit all inmates that were released towards the beginning and end of sample periods. Specifically, I exclude 17,252 out of 43,506 inmates and keep only those in the sample released before July 2014 and after June 2017. Table 12 presents the results of this specification. I find that a 1 standard deviation increase in exposure increases the probability of 1-year recidivism by 1.58%. Similarly, a 1 standard deviation increase in exposure to gang members in prisons results in 3.23% and 3.97% increase in 2-year recidivism and 3-year recidivism rates respectively. The coefficients reduce in magnitude but are comparable with main specification results.

[Insert Table 12]

iv. Stability of coefficient to additional peer controls

To test the stability of coefficient of the peer exposure to gang members, I include additional peer exposure measures in the regression as covariates. Existing literature shows that exposure to certain types of peers with certain characteristics (such as, specific sentencing offense) also impacts recidivism. I create additional peer exposure measures based on the traits of peers that inmates are exposed to. The additional traits include race, age, and sentencing offense types.

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[6] As discussed earlier, the sample size varies depending on the specification as well. For instance, specification that takes 1-year recidivism as an outcome consists of those offenders released before July 2017, while specification that takes 3-year recidivism as an outcome consists only offenders released before July 2015.

Measures of exposure to peers with these specific traits are built using the same method presented by equation (2).

Table 13 presents the results of regression that include the additional peer measures as covariates. I find that a 1 standard deviation increase in exposure increases the probability of 1-year recidivism by 1.04%. Similarly, a 1 standard deviation increase in exposure to gang members in prisons results in 2.25% and 5.4% increase in 2-year recidivism and 3-year recidivism rates respectively. The coefficients reduce in magnitude but are comparable with main specification results.

[Insert Table 13]

v. Possibilities of measurement error in exposure

As per the discussion in the institutional details section, inmates are transferred to their respective facility units from the reception center. The analysis presented above uses information on the facility units from which inmates are released, assuming that their respective tenures are spent in the same facility unit. Based on the reports and anecdotes, it could be possible that inmates do not remain within the same facility unit. Movements of inmates occurs *if* custody levels of inmates are revised during their tenure. There are two types of movements that are likely to occur for inmates. First, it could be the case that inmates are moved to different cells within the same facility unit. Second, it could also be the case that inmates are transferred to a different facility unit. The former movement is not likely to result in measurement error in exposure variable because the main specification relies on the variation in exposure that exists within the same facility unit. Even if inmates are moved across cells, they remain within the same facility unit.

The latter type of movements, i.e., across facility-unit movement occur due to the following reasons. First, inmates with certain physical and mental health needs are likely to move across facility units for treatment. Second, inmates with long tenures, such as lifetime imprisonment sentences are likely to move because their custody level is revised. I argue that both cases are accounted for to some extent because the analysis sample excludes: (1) all inmates with higher mental health scores, (2) inmates admitted to health facilities, and (3). inmates with sentences more than five years.

To further mitigate concerns related to measurement error arising from the movement of inmates, I take a sample of all inmates with a sentence length of twelve or fewer months. As

mentioned earlier, custody levels are reviewed on annual basis therefore inmates with shorter sentences (i.e., sentence length of twelve months or fewer) are unlikely to move. Table 14 presents the results of regression for a sample of inmates incarcerated for twelve or fewer months. I find that a 1 standard deviation increase in exposure increases the probability of 1-year recidivism by 0.8%. Similarly, a 1 standard deviation increase in exposure to gang members in prisons results in 1.2% and 2.19% increase in 2-year recidivism and 3-year recidivism rates respectively. The coefficients have reduced in magnitude but are statistically significant. One potential reason of the reduction in magnitude of coefficients is that the inmates are incarcerated for a shorter time frame and are exposed for shorter periods.

[Insert Table 13]

Mechanisms

Psychological Channel

One potential mechanism through which exposure to gang members increases recidivism is that gang members are more violent and aggressive. Therefore, exposure to such individuals may destigmatize violent behavior for non-affiliated inmates. Moreover, qualitative and quantitative evidence suggests that first-time experiences, such as harsher prison conditions or prosecution for first misdemeanors, are strong predictors of future criminal activity (Agan, Doleac, & Harvey, 2021). Intuitively, the findings from these papers imply that the effect of exposure to gang members should be more pronounced for individuals exposed to gang members for the first time. For instance, a non-affiliated inmate who has prior exposure to violent individuals such as gang members is less likely to be impacted. To examine the impact of first-time exposure to gang members, I calculate gang activity in the non-affiliated inmate's neighborhood using the information on neighborhoods in the administrative dataset. The underlying assumption is that gang activity in non-affiliated inmate's communities is a proxy of prior exposure to violent behavior caused by gang members. For example, suppose there is a lot of gang activity or violent behavior perpetrated by gang members in a non-affiliated individual's neighborhood. In that case, such an individual is relatively more familiar with the behavior of gang members and is less likely to be impacted by gang members inside prisons.

To do so, I first calculate the number of gang members released in a particular zip code. I then divide the zip codes into quartiles based on the number of gang members. Next, I match the zip code of each non-affiliated inmate with a quartile number calculated in the first step. Overall,

for each non-affiliated inmate's zip code, the associated quartile number shows the frequency of gang activity (or a proxy of violent activity) in that zip code. The assumption is that an inmate in the zip code in the 1st quartile is not used to being around more violent criminals than an inmate in the zip code in the 4th quartile. I then run separate regressions [Eq (3)] for each quartile zip code for 1-year and 2-year recidivism.[7] Figure 3 presents the coefficient along with the confidence interval for each of the quartiles. Individuals in the 4th quartiles are less likely to be impacted by exposure to gang members than individuals in the first quartile which shows that the evidence is consistent with the literature and theory discussed above.

[Insert Figure 3]

Access to Better Networks or Skill Transfer

Gang members are, on average more criminally skilled individuals with access to better networks. The second mechanism proposes that non-affiliated inmates may acquire criminal skills or get information related to networks (such as drug dealers) by *socializing* with gang members. With plenty of time in prisons and little activity, inmates may learn new skills such as drug manufacturing, theft or they may get an opportunity to learn about drug dealers and suppliers in the area through gang-affiliated inmates. This holds particularly true for those non-affiliated inmates that are not involved in productive work activities inside prisons. Concretely, the criminal skills transfer hypothesis holds for inmates that are exposed to gang members, but they do not engage in any productive activities, thus have plenty of time to interact with others in the facility unit. To test this mechanism, I run separate regression models [Eq (3)] for inmates involved in productive activities and those not involved in productive activities. The administrative data set allows identifying individuals who participate in work-related programs or work in correctional facilities. These work activities include construction technology, building maintenance, welding, upholstery, horticulture, carpentry, business technology, etc. Therefore, I use participation in work-related activities as a proxy of productive activities.

Table 15 presents the regression results for the sub-sample of inmates that worked inside prisons, while Table 16 presents the regression results for the sub-sample of inmates that did not work. I find that a 1 standard deviation increase in exposure to gang members does not have a

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[7] As noted earlier, time horizons associated with outcome variable, recidivism, shrinks the sample size. For instance, for three-year recidivism, sample consists of inmates released from prison before June 15th, 2015. The sample size is further reduced once I divide the data into zip code quartiles. Therefore, to draw meaningful conclusions, I only focus on 1-year and 2-year recidivism rates that have large enough sample sizes for the quartile analysis.

significant (both statistically and economically) impact on recidivism of inmates who worked in the prisons. In contrast, a 1 standard deviation increase in exposure leads to a 2.0% increase in the probability of recidivism within 1 year of release for inmates who did not work in the correctional facilities. Similarly, a 1 standard deviation increase in exposure led to an increase of 3.58% and 5.58% increase in 2-year and 3-year recidivism of inmates who were not involved in work-related activities in prisons.

[Insert Table 15 and Table 16]

Implications of in-prison exposure to gang members on in-prison learning and correctional programming outcomes of inmates

In this section I present analysis of the implications of in-prison exposure to gang-affiliated inmates on learning and correctional programming outcomes of non-affiliated inmates. To quantify learning outcomes, I evaluate the program completion status of non-affiliated inmates who participate but do not complete functional literacy program, GED program, and cognitive thinking program. Each of these programs vary in their structure and length.

The goal of functional literacy classes is for individuals to pass the minimum eighth-grade literacy standard. The targeted population includes offenders with limited technical knowledge and limited English language development skills. The program is designed to provide reading, writing, mathematical, and other basic skills necessary for an individual to adjust in a working environment. An individual's eligibility for the functional literacy program is evaluated upon admission to the department of corrections. In contrast, GED program targets those individuals who do not have a high-school diploma or GED. Individuals study for and take the GED test. The target population of the GED program includes those who achieve the 8th-grade functional literacy standard or those who test above the 8th grade standard upon admission. Individuals who complete the GED program receive a diploma from the Department of Education. The cognitive thinking program is a cognitive restructuring program offered to individuals at the prison. Cognitive restructuring programs aim to teach pro-social life skills that improve individuals' behavior inside prisons and upon release.

Table 17 presents the regression results that takes program completion status as an outcome. More precisely, the outcome variable takes value of one if an inmate who participates in

a program completes the program while it takes value of zero if an inmate who participates do not complete the program. Column (1) presents the results of regression that takes functional literacy program completion as an outcome, column (2) presents the results of regression that takes GED program completion as an outcome, and column (3) presents the results of regression that takes cognitive thinking program completion as an outcome. I find that increased exposure to gang affiliated inmates significantly reduces the probability of completing a program for participants of programming.

A 1 standard deviation increase in exposure to gang members reduces the probability of completing a functional literacy program by 7.34 percentage points. On average, 87.4% of the participants of functional literacy program complete the program, which suggests a reduction of 8% from the baseline average. Similarly, 1 standard deviation increase in exposure to gang members reduces the probability of completing a functional literacy program by 10 percentage points. In contrast, 1 standard deviation increase in exposure to gang members reduces the probability of completing a functional literacy program by 15.7 percentage points.

[Insert Table 17]

Exposure of gang-affiliated inmates to gang-affiliated inmates

So far, the analysis focuses on the impact of exposure to gang-affiliated inmates on recidivism of non-affiliated inmates. While the results of this analysis point towards carving out policies that focus on segregating gang-affiliated inmates from non-affiliated inmates, it is imperative to understand the impact of exposure to gang-affiliated inmates on other gang-affiliated inmates. This section presents a supplementary analysis of gang member's peer effects on other gang members. I construct a measure of gang exposure for gang members using the equation (2). To estimate the impact of in-prison exposure to gang members on recidivism of gang members, I use specification (3) and only take a sample of gang members.[8]

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[8] As a test for identifying assumption, I evaluate the correlation between demographic and criminal history characteristics of a gang affiliated inmate i and measure of exposure. Table B2 presents the regression results that take measure of exposure as an outcome and characteristics of inmate i as regressor. It should be noted that each row corresponding to column (4) presents a coefficient from a *separate regression* of exposure on inmate $i's$ specific characteristic. Column (1) presents the unconditional mean of gang affiliated inmates characteristics. Column (2) presents the unconditional correlation between inmate $i's$ demographic and criminal history characteristics and exposure, while p-values associated with this correlation are presented in column (3). Column (4) presents the correlation between inmate $i's$ demographic and criminal history characteristics and exposure conditional on relevant fixed effects, while p-values associated with this correlation are presented in column (5). The results presented in column (4) emphasize on the importance of inclusion of relevant fixed effects specified in the equation above; 1 out

Table B2 presents the regression results that take exposure to gang members in a prison unit as a regressor and recidivism of gang-affiliated inmates within 1, 2, and 3 years of release through new felony charges as outcomes of interest. After including individual-level controls, facility-by-risk level fixed effects, and quarter-of-release fixed effects, I estimate the models. Column (1) presents the results of the regression that takes recidivism within 1 year of release as an outcome, column (2) presents the results of regression that takes recidivism within 2 years of release as an outcome, and column (3) presents regression results that take recidivism within 3 years of release as an outcome.

I find that exposure to gang-affiliated peers increases the probability of getting re-incarcerated within 1, 2, and 3 years of release. The results from column (1) show that a 1 standard deviation increase in the exposure of an inmate to gang-affiliated inmates in a correctional facility unit significantly increases the probability of getting incarcerated for a new felony charge by 2.82 percentage points. The estimates from column (2) suggest that a 1 standard deviation increase in gang members' exposure in a correctional facility leads to a 4.34 percent increase in the probability of reincarceration within 2 years of release. A 1 standard deviation increase in the exposure of a gang-affiliated inmate to other gang members leads to a 4.21 percentage points increase in recidivism probability within 3 years of release. It should be noted that the average reincarceration rates of gang affiliated inmates are higher than non-affiliated inmates. On average, 6.74 percent of the offenders released from the prison return to custody within 1-year of release, 17.2 percent return within 2 years of release, and 23.4 percent return within 3 years of release. Compared to the sample means, the results show an increase of 41 percent in 1-year recidivism, 25 percent increase in 2-year recidivism, and 17.9 percent increase in 3-year recidivism.

Conclusion

I study the impact of in-prison exposure to gang affiliated inmates on non-affiliated inmate's recidivism. Using quasi-experimental variation in non-affiliated inmate's exposure to gang affiliated inmates, I first show that variation in exposure to gang affiliated inmates is orthogonal to individual characteristics that explain the risk of re-offending conditional on facility-unit-by-risk and quarter of release fixed effects. The key findings show that in-prison exposure to gang affiliated peers increases the probability of recidivism through new felonies for non-affiliated

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of 30 inmates $i's$ characteristics are significant at 1%. This provides strong evidence that within facility variation in exposure is unrelated to inmate $i's$ characteristics.

inmates within 1, 2, and 3 years of release. The effects are robust to alternate specifications, variety of individual and peer controls, and fixed effect models.

I further study the impact of in-prison exposure to gang-affiliated inmates on different groups of non-affiliated inmates. I find that exposure to gang affiliated inmates has a statistically significant impact on the recidivism of inmates who are incarcerated for violent crimes, burglary, and drug related offenses. I also analyze the effect of exposure to gang-affiliated inmates across different risk profiles. Overall, I do not find that a consistently increasing or decreasing effect of gang exposure on non-affiliated inmates' recidivism that have higher risk scores (e.g., risk score 4, risk score 5) relative to those with lower risk scores. I find that in-prison exposure to gang affiliated inmates as a statistically significant impact on recidivism of inmates with risk scores 1, 2, and 4.

The observed effects are likely to be explained by at least three potential mechanisms: social contagion channel, network effects or learning of new skills, and control of gangs across prisons. The social contagion channel implies that a non-affiliated inmate who has prior exposure to violent individuals such as gang members is less likely to be affected by in-prison exposure to gang affiliated inmates. To examine the impact of first-time exposure to gang members, I calculate gang activity in the non-affiliated inmate's neighborhood using the information on neighborhoods in the administrative dataset. I find suggestive evidence that inmates belonging to neighborhoods with limited gang activity are more likely to be impacted by in-prison exposure to gang affiliated inmates.

In contrast, the second mechanism implies that non-affiliated inmates may acquire new criminal skills or may get access to better networks by socializing with non-affiliated inmates. To test this mechanism, I separately estimate the impact of in-prison exposure to gang-affiliated inmates for those non-affiliated inmates who work and those who do not work within the correctional facility units. I find that a 1 standard deviation increase in exposure to gang members does not have a significant (both statistically and economically) impact on recidivism of inmates who worked in the prisons. In contrast, I find that in-prison exposure to gang-affiliated inmates increases the probability of recidivism of those non-affiliated inmates who do not work in correctional facilities.

The current study has implications pertaining to housing-related policies of inmates across correctional facility units. Programming and rehabilitation-related activities aim to discourage future criminal behavior and costs of these activities sum up to $76-$200, yet two-thirds of those who are released return to the custody within few years (Doleac, 2019). My paper shows that exposure to gang affiliated peers potentially hinders the rehabilitation process of non-affiliated inmates. In addition to informing the policy debate, my research contributes to the existing limited body of empirical literature related to gangs – a significant group of individuals in the criminal world (Jacobs 1974). In the handbook of gangs, Decker & Pyrooz (2015) note the limitations of existing empirical literature on gangs, their expansion, and their interactions with others in the criminal world. My paper is one of the first studies that attempts to fill this gap and provide a data-driven point of view related to the consequences of placing gang members among the prison population of adult offenders. It also contributes to the literature on peer effects among adult prisoners, a group of offenders understudied in the peer effects literature.

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Figures

Figure 1: Comparison of risk profiles of gang affiliated and non-affiliated inmates
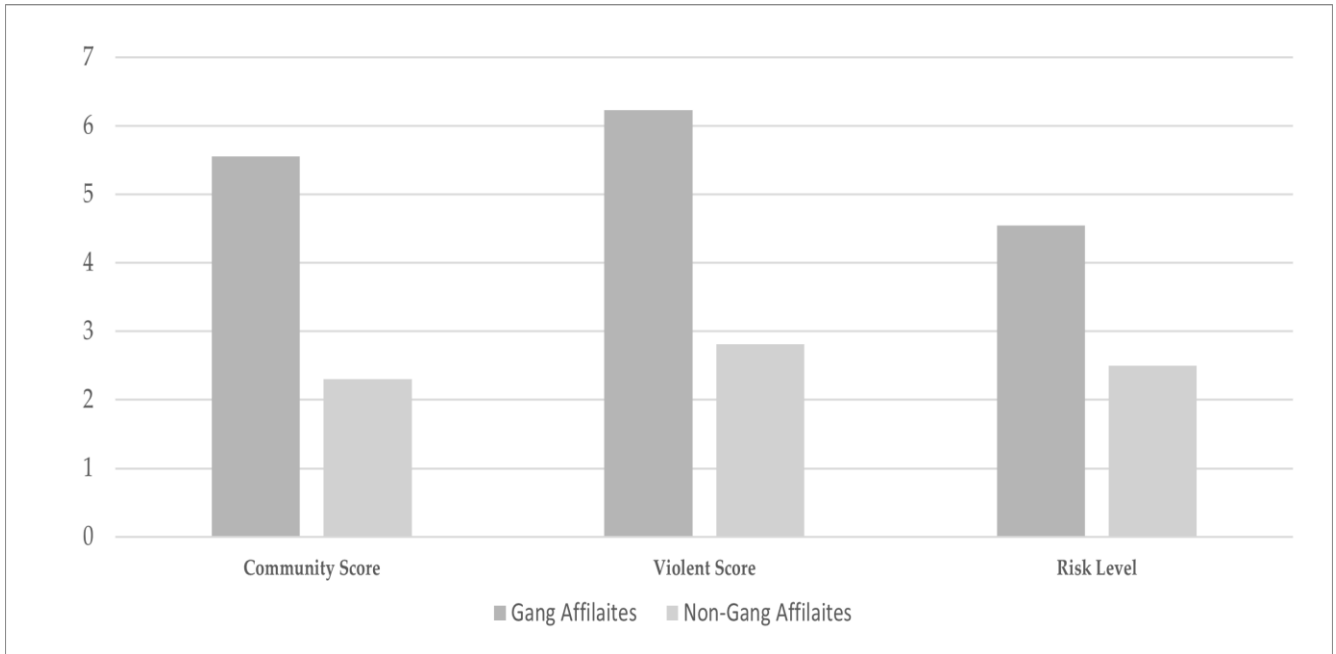
Notes: The Figure presents comparisons of risk profiles of gang affiliated and non-affiliated inmates. Community score ranges from 1 to 8, and it presents the risk that an inmate poses on the community. In contrast, a violent score (ranging from 1 to 8) presents a risk of engaging in a violent activity. The overall risk level of an inmate (also ranging from 1 to 8) measures an inmate's relative risk to recidivate. Darker bars present the risk scores of gang affiliated inmates while lighter bars present risk scores of non-affiliated inmates.

Figure 2: Illustration of the construction of treatment variable
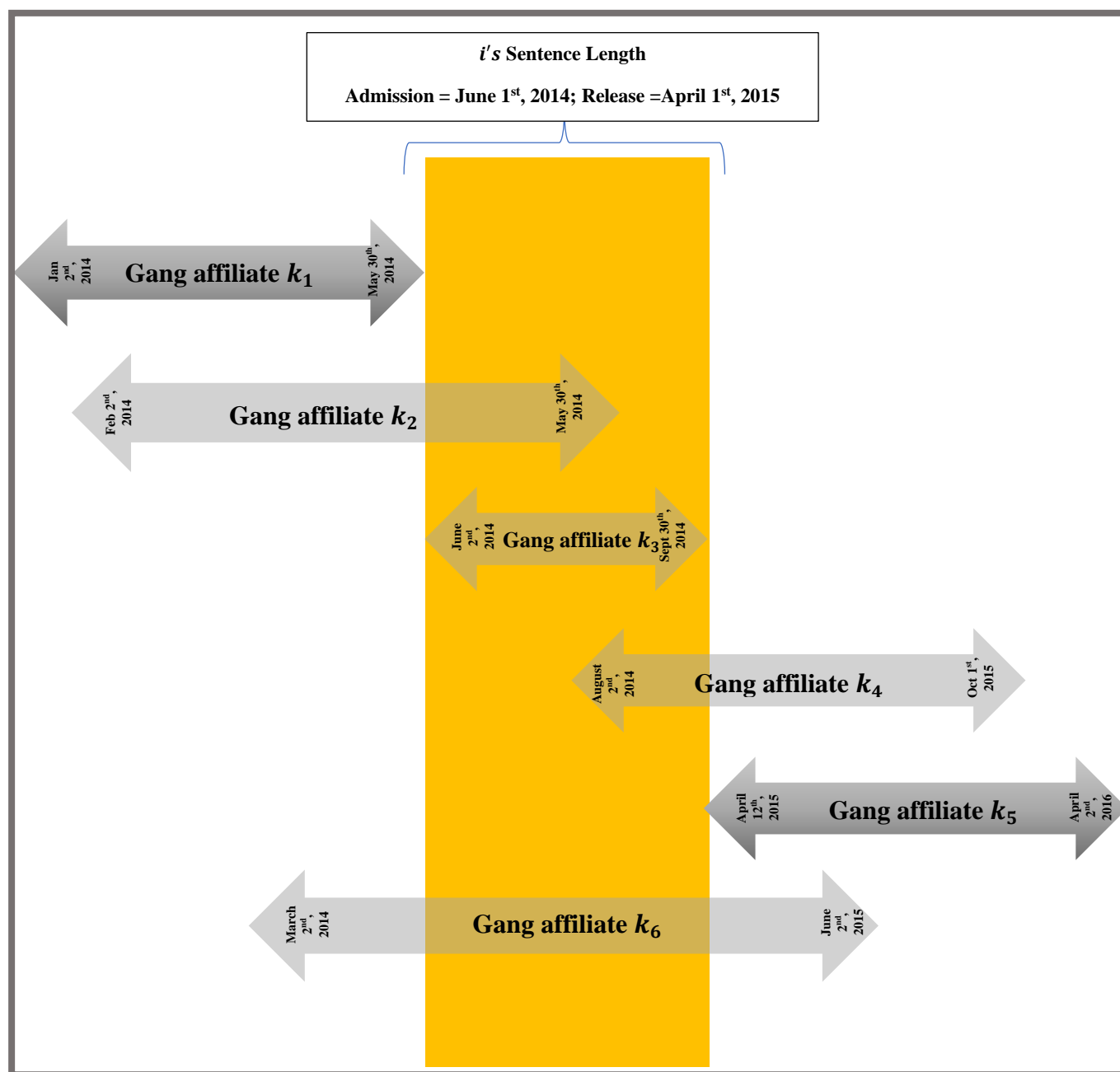
Notes: The Figure presents different possible cases of interaction between gang affiliated and a non-affiliated inmate. Each horizontal bar presents a unique case showing the possibility of overlapping time between gang affiliated and non-affiliated inmate. The bar has arrows on both ends which represent exists and entry of gang affiliated inmates. For instance, the first bar represents the exist and entry dates of a gang affiliated inmate k_1. The left arrow shows that a hypothetical gang affiliated inmate k_1 enters the correctional facility unit on Jan 2nd, 2014, while exists on May 30th, 2014. Solid yellow bar in the middle represents the entry and exit timeline of a non-affiliated inmate. The overlap between horizontal bar and solid yellow bar represents the case in which days overlap between a gang affiliated inmate and a non-affiliated inmate. For instance, gang members k_2, k_3 and k_4 have overlapping dates with non-affiliated inmate.

Figure 3: Mechanism 1 – Comparison of upper quartiles of gang-member activity vs. lower quartiles of gang member activity
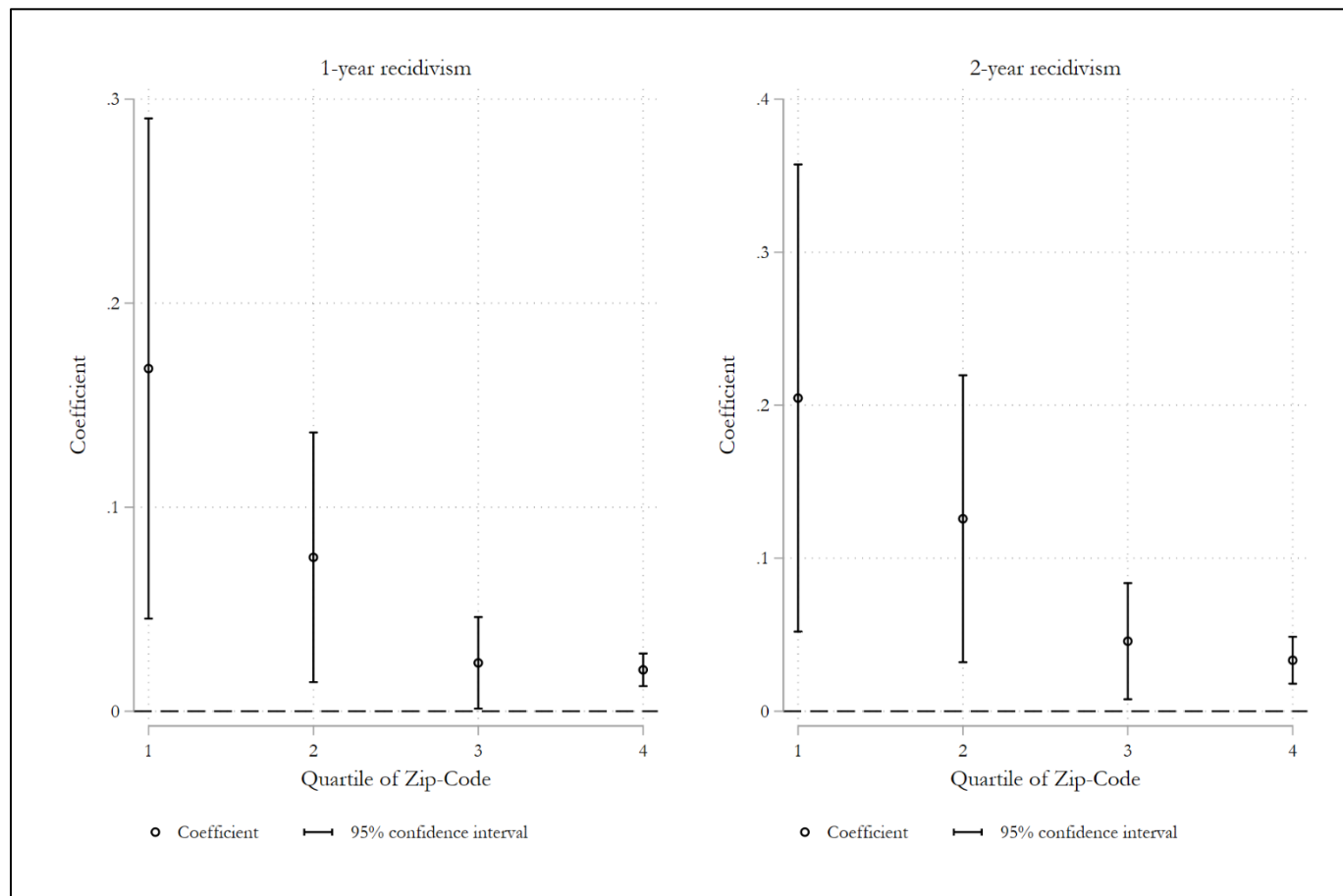
Notes: The Figure presents the results of regression presented in specification **(3)**. The unit of observation is an inmate, and the outcome variable is recidivism upon release. Figure at the left panel presents results of regression that takes recidivism within 1-year of release as an outcome, while figure at the right panel presents results of regression that takes recidivism within 2-year of release as an outcome. The subfigures present coefficient along with confidence intervals from a separate regression run for a different sample of inmates released in different quartiles of gang member activity in the neighborhood of release. The numbers on the x-axis in each of the sub-figures indicate different quartiles of gang member activity. Fixed effects include facility unit by risk level, and quarter of release fixed effects. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level.

Table 1: Descriptive statistics of inmates not affiliated with gangs

Characteristic	Mean	Std Dev	Min	Max
Panel A. Recidivism				
New felony (1-year)	0.031	0.174	0	1
New felony (2-year)	0.081	0.273	0	1
New felony (3-year)	0.116	0.32	0	1
Technical violation (1-year)	0.188	0.391	0	1
Technical violation (2-year)	0.199	0.4	0	1
Technical violation (3-year)	0.201	0.401	0	1
Panel B. Demographic characteristics				
High-School or GED	0.544	0.498	0	1
Community Score	2.176	1.475	1	8
African American	0.12	0.325	0	1
Hispanic	0.278	0.448	0	1
Hispanic non-US	0.012	0.108	0	1
Asian	0.004	0.064	0	1
Other	0.012	0.109	0	1
Panel C. Sentencing offense types				
Incarcerated for Theft	0.073	0.26	0	1
Incarcerated for Arson	0.002	0.05	0	1
Incarcerated for Vehicle-Related	0.024	0.152	0	1
Incarcerated for Sex-Related	0.03	0.171	0	1
Incarcerated for Assault	0.096	0.295	0	1
Incarcerated for Forgery/Fraud	0.054	0.227	0	1
Incarcerated for Burglary	0.079	0.27	0	1
Incarcerated for Murder	0.002	0.039	0	1
Incarcerated for Drug Related	0.445	0.497	0	1
Incarcerated for Kidnapping	0.006	0.08	0	1
Incarcerated for Homicide	0.001	0.034	0	1
Incarcerated for Others	0.069	0.253	0	1
Incarcerated for violent crimes	0.208	0.406	0	1
Panel D. Felony type				
Felony-Seriousness Low	0	0.01	0	1
Felony-Seriousness Medium	0.055	0.228	0	1
Felony-Seriousness High	0.38	0.485	0	1
Dangerous/Non-Repetitive Felony	0.013	0.111	0	1
Dangerous/Repetitive (1) Felony	0	0.019	0	1
Dangerous/Repetitive (2) Felony	0	0.01	0	1
Not Dangerous/Non-Repetitive Felony	0.902	0.297	0	1
Any prior adult felony adjudications	0.554	0.497	0	1

Notes: The Table presents descriptive statistics of the population of inmates that are released from the prison between July 1st, 2013, and June 30th, 2018, and are not affiliated with gangs. Column (1) reports mean of the characteristics of inmates, while column (2) presents the standard deviation. Column (3) and column (4) presents the minimum and maximum corresponding to a particular characteristic. Panel (A) reports the descriptive statistics of recidivism measures of inmates, while Panel (B) reports the descriptive statistics of demographic characteristics of inmates. Panel (C) and Panel (D) reports the descriptive statistics related to sentencing offense types and felony types. In Panel (A), new felony charge (1 year) is a dummy variable that takes value of 1 if an inmate returns to the prison facility because of new felony charges within 1 year of release, while technical violation (1 year) is a dummy variable that takes value of 1 if an inmate returns to the prison facility because of a parole violation within 1 year of release.

Table 2: Descriptive statistics of inmates affiliated with gangs

Characteristic	Mean	Std Dev	Min	Max
Panel A. Recidivism				
New felony (1-year)	0.078	0.267	0	1
New felony (2-year)	0.197	0.398	0	1
New felony (3-year)	0.263	0.44	0	1
Technical violation (1-year)	0.232	0.422	0	1
Technical violation (2-year)	0.248	0.432	0	1
Technical violation (3-year)	0.249	0.432	0	1
Panel B. Demographic characteristics				
High-School or GED	0.558	0.497	0	1
Community Score	5.555	1.341	1	8
African American	0.147	0.354	0	1
Hispanic	0.53	0.499	0	1
Hispanic non-US	0.003	0.055	0	1
Asian	0.002	0.048	0	1
Other	0.005	0.068	0	1
Panel C. Sentencing offense types				
Incarcerated for Theft	0.083	0.276	0	1
Incarcerated for Arson	0.002	0.042	0	1
Incarcerated for Vehicle-Related	0.03	0.171	0	1
Incarcerated for Sex-Related	0.015	0.121	0	1
Incarcerated for Assault	0.122	0.327	0	1
Incarcerated for Forgery/Fraud	0.035	0.185	0	1
Incarcerated for Burglary	0.096	0.294	0	1
Incarcerated for Murder	0.005	0.068	0	1
Incarcerated for Drug Related	0.328	0.47	0	1
Incarcerated for Kidnapping	0.009	0.094	0	1
Incarcerated for Homicide	0.001	0.031	0	1
Incarcerated for Others	0.06	0.238	0	1
Incarcerated for violent crimes	0.236	0.425	0	1
Panel D. Felony type				
Felony-Seriousness Low	0.001	0.028	0	1
Felony-Seriousness Medium	0.099	0.299	0	1
Felony-Seriousness High	0.345	0.475	0	1
Dangerous/Non-Repetitive Felony	0.056	0.229	0	1
Dangerous/Repetitive (1) Felony	0.001	0.035	0	1
Dangerous/Repetitive (2) Felony	0.001	0.026	0	1
Not Dangerous/Non-Repetitive Felony	0.732	0.443	0	1
Any prior adult felony adjudications	0.755	0.43	0	1

Notes: The Table presents descriptive statistics of the population of inmates that are released from the prison between July 1st, 2013, and June 30th, 2018, and are affiliated with gangs. Column (1) reports mean of the characteristics of inmates, while column (2) presents the standard deviation. Column (3) and column (4) presents the minimum and maximum corresponding to a particular characteristic. Panel (A) reports the descriptive statistics of recidivism measures of inmates, while Panel (B) reports the descriptive statistics of demographic characteristics of inmates. Panel (C) and Panel (D) reports the descriptive statistics related to sentencing offense types and felony types. In Panel (A), new felony charge (1 year) is a dummy variable that takes value of 1 if an inmate returns to the prison facility because of new felony charges within 1 year of release, while technical violation (1 year) is a dummy variable that takes value of 1 if an inmate returns to the prison facility because of a parole violation within 1 year of release.

Table 3: Identification Test 1 – Regression of predicted recidivism on exposure

	(1)	(2)	(3)
Exposure (standardized)	-0.0000317	0.000497	0.000364
	(0.000286)	(0.00103)	(0.00156)
Observations	35,095	27,049	18,500
Outcome Mean	0.0312	0.0810	0.116
Treatment Mean	0.00839	0.00839	0.00839

Notes: The Table presents the regression of predicted recidivism on exposure conditional on relevant fixed effects. The outcome variable, predicted recidivism, is constructed from a regression of recidivism on the following characteristics of inmates: demographic (gender, race, GED or high school diploma), criminal history measures (felony class, record of prior felony convictions, prior juvenile adjudications), and sentencing offense characteristics (type of sentencing offense dummies, felony seriousness of sentencing offense). Fixed effects in the regression include quarter of release fixed effects and facility-unit-by-risk level fixed effects. Standard errors are clustered at facility unit level.

Table 4: Identification test 2 – correlation between exposure and other characteristics

Characteristic	Mean	Correlation	P-value	Conditional Correlation	P-value
Panel A. Racial composition					
African American	0.12	0.021	0	0.008	0.18
Hispanic	0.278	0.015	0	0	0.96
Hispanic non-US	0.012	-0.002	0.15	-0.001	0.57
Asian	0.004	-0.001	0.01	-0.001	0.19
Other Race	0.012	-0.002	0.02	-0.001	0.66
Panel B. Demographic characteristics					
High-School or GED	0.795	0.134	0.01	0	0.34
Community Score	0.544	-0.009	0.44	-0.098	0
Males	2.176	0.236	0	-0.016	0.02
Panel C. Sentencing offense types					
Incarcerated for Theft	0.073	0.003	0.36	0	0.97
Incarcerated for Arson	0.002	0.001	0.06	0	0.7
Incarcerated for Vehicle-Related	0.024	0.005	0	0.001	0.61
Incarcerated for Sex-Related	0.03	-0.005	0.34	0	0.91
Incarcerated for Assault	0.096	0.029	0	0.007	0.21
Incarcerated for Forgery/Fraud	0.054	-0.009	0.02	-0.001	0.87
Incarcerated for Burglary	0.079	0.015	0	0.004	0.42
Incarcerated for Murder	0.002	0	0.91	0	0.52
Incarcerated for Drug Related	0.445	-0.084	0	-0.006	0.46
Incarcerated for Kidnapping	0.006	0.002	0.01	0.001	0.49
Incarcerated for Homicide	0.001	0	0.91	0.001	0.23
Incarcerated for Others	0.069	0.003	0.12	0.001	0.8
Incarcerated for violent crimes	0.208	0.039	0	0.011	0.1
Panel D. Felony type					
Felony-Seriousness Low	0	0	0.04	0	0.56
Felony-Seriousness Medium	0.055	0.001	0.77	0.007	0.17
Felony-Seriousness High	0.38	-0.051	0	-0.05	0
Dangerous/Non-Repetitive Felony	0.013	0.001	0.31	0	0.86
Dangerous/Repetitive (1) Felony	0	0	0.03	0	0.22
Dangerous/Repetitive (2) Felony	0	0	0.63	0	0.16
Not Dangerous/Non-Repetitive Felony	0.902	0.001	0.91	-0.019	0
Any prior adult felony adjudications	0.554	0.012	0.13	0.002	0.76

Notes: The Table presents the correlation between individual characteristics and measure of exposure. The individual characteristics include racial composition, demographic characteristics, sentencing offense characteristics, and felony type characteristics. Column (1) presents the average of a characteristic specific in the row title. Column (2) presents the unconditional correlation estimated from a regression of a characteristic on exposure. Column (3) present the p-value associated with correlated presented in column (2). Column (4) correlation estimated from a regression of a characteristic on exposure conditional on quarter of release and facility unit by risk level fixed effects. Column (5) present the p-values associated with correlated presented in column (4). Each row presents a separate regression of exposure and given characteristic. Finally, standard errors are clustered at the facility unit level. P-values are reported along with coefficients to represent statistical significance.

Table 5: Identification test 3 – correlation between exposure and other characteristics in one regression

VARIABLES	(1) Without FE	(3) +Fixed Effects
High-School or GED	-0.00529	-0.00498
	(0.0402)	(0.00536)
Age at release	-0.0489***	-1.80e-05
	(0.00978)	(0.000914)
Age at release squared	0.000465***	1.30e-05
	(0.000103)	(1.05e-05)
Caucasian	0.0653*	0.00330
	(0.0346)	(0.00521)
African American	0.276***	-0.00222
	(0.0608)	(0.00857)
Hispanic	0.118***	-0.00150
	(0.0341)	(0.00586)
Incarcerated for Vehicle-Related	0.0630	0.00208
	(0.0446)	(0.0119)
Incarcerated for Drug Related	-0.274***	0.00326
	(0.0693)	(0.00432)
Incarcerated for Burglary	-0.0241	0.00657
	(0.0688)	(0.00882)
Incarcerated for violent crimes	0.0751	-0.00515
	(0.0711)	(0.00636)
Stay at prison (Days)	-6.45e-05	-0.000472***
	(7.43e-05)	(5.00e-05)
Quarter of release fixed effects	No	Yes
Facility Unit by risk level fixed effects	No	Yes
Observations	42,911	42,128

Notes: The Table presents the correlation between individual characteristics and measure of exposure. The individual characteristics include racial composition, demographic characteristics, age at release, and other sentencing offense characteristics. Column (1) presents the results of regression without controlling for relevant fixed effects, while column (2) present estimates after including the relevant fixed effects. Finally, standard errors are clustered at the facility unit level. Significance levels are represented as follows: $* p < 0.1, ** p < 0.05, *** p < 0.01$

Table 6: Main regression results of impact of exposure on programming of inmates

VARIABLES	(1) Within 1-year of release	(2) Within 2-years of release	(3) Within 3-years of release
Exposure (standardized)	0.0199***	0.0356***	0.0534***
	(0.00362)	(0.00636)	(0.00875)
Observations	34,601	26,660	18,237
Facility Unit by Risk Level FE	Yes	Yes	Yes
Quarter of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Mean	0.0312	0.0810	0.116

Notes: The Table presents the results of main regression presented in specification **(3)**. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility unit. Column (1) presents the results of regression that takes recidivism due to a new felony within one year of release. Column (2) presents the results of regression that takes recidivism due to a new felony within two years of release. Column (3) presents the results of regression that takes recidivism due to a new felony within three years of release. Fixed effects include facility unit by risk level and quarter of release. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level. Significance levels are represented as follows: $* p < 0.1, ** p < 0.05, *** p < 0.01$

Table 7: Heterogeneity of impact of exposure by type of sentencing offense

Crime Category	Estimate	Standard Error
Incarcerated for violent crimes	0.058***	0.018
Incarcerated for Theft	0.012	0.042
Incarcerated for Assault	0.031	0.036
Incarcerated for Robbery	0.125	0.088
Incarcerated for Forgery/Fraud	0	0.056
Incarcerated for Burglary	0.065***	0.024
Incarcerated for Law Enforcement/Public Related	0.09	0.069
Incarcerated for Drug Related	0.053***	0.016
Incarcerated for Weapon-Related	0.063	0.061
Incarcerated for Others	0.042	0.036

The Table presents the heterogeneity of results of main regression presented in specification **(3)** for different samples of inmates. The samples correspond to the different categories of sentencing offense. Each row in the Table presents a separate regression for a sample of inmates. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility within three years of release. Fixed effects include facility by risk level and quarter of release. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level.

Significance levels are represented as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Heterogeneity of impact of exposure by risk level of inmates

Risk Level	Estimate	Standard Error
Risk Level 1	-0.003	0.025
Risk Level 2	0.036**	0.019
Risk Level 3	0.077***	0.017
Risk Level 4	0.005	0.026
Risk Level 5	0.067***	0.022

Notes: The Table presents the heterogeneity of results of main regression presented in specification **(3)** for different samples of inmates. The samples correspond to the different categories of risk levels. Risk levels presents the inmates' relative risk of re-offending. These scores are calculated upon intake of inmates to the correctional facility unit. Risk level ranges from one to five, where level one corresponds to low risk and level five corresponds to high risk. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility unit within three years of release. Each row in the Table presents a separate regression for a sample of inmates. Fixed effects include facility-unit by risk level and quarter of release. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level. Significance levels are represented as follows: $* p < 0.1, ** p < 0.05, *** p < 0.01$

Table 9: Robustness Test 1 – Inclusion of neighborhood fixed effects to the main specification

	(1)	(2)	(3)
Exposure (standardized)	0.0219***	0.0356***	0.0503***
	(0.00381)	(0.00661)	(0.00881)
Observations	32,042	24,643	16,817
Facility-Unit by Risk Level FE	Yes	Yes	Yes
Year of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Mean	0.0311	0.0814	0.117

Notes: The Table presents the results of regression presented in specification **(3)**. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility unit. Column (1) presents the results of regression that takes recidivism due to a new felony within one year of release. Column (2) presents the results of regression that takes recidivism due to a new felony within two years of release. Column (3) presents the results of regression that takes recidivism due to a new felony within three years of release. Fixed effects include facility unit by risk level, quarter of release, and zip code fixed effects. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level.

Table 10: Robustness Test 2 – Sample of inmates with no prior felony convictions

	(1)	(2)	(3)
Exposure (standardized)	0.0173***	0.0407***	0.0482***
	(0.00607)	(0.0108)	(0.0183)
Observations	14,659	10,881	7,176
Facility Unit by Risk Level FE	Yes	Yes	Yes
Quarter of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Mean	0.0281	0.0727	0.103

Notes: The Table presents the results of regression presented in specification **(3)**. The sample includes those inmates who have no prior records of felony convictions. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility. Column (1) presents the results of regression that takes recidivism due to a new felony within one year of release. Column (2) presents the results of regression that takes recidivism due to a new felony within two years of release. Column (3) presents the results of regression that takes recidivism due to a new felony within three years of release. Fixed effects include facility unit by risk level, quarter of release, and zip code fixed effects. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level.

Table 11: Robustness Test 3 – Sample of inmates with no prior juvenile adjudications

	(1)	(2)	(3)
Exposure (standardized)	0.0129***	0.0293***	0.0554***
	(0.00424)	(0.00807)	(0.0108)
Observations	25,098	19,566	13,516
Facility Unit by Risk Level FE	Yes	Yes	Yes
Year of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Mean	0.0271	0.0726	0.105

Notes: The Table presents the results of regression presented in specification **(3)**. The sample includes those inmates who have no juvenile adjudication records. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility. Column (1) presents the results of regression that takes recidivism due to a new felony within one year of release. Column (2) presents the results of regression that takes recidivism due to a new felony within two years of release. Column (3) presents the results of regression that takes recidivism due to a new felony within three years of release. Fixed effects include facility unit by risk level, quarter of release, and zip code fixed effects. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level.

Table 12: Robustness Test 4 – Sample of inmates released within a short time frame

	(1)	(2)	(3)
Exposure (standardized)	0.0158***	0.0323***	0.0397***
	(0.00488)	(0.00885)	(0.0117)
Observations	25,364	17,830	9,404
Facility Unit by Risk Level FE	Yes	Yes	Yes
Quarter of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Mean	0.0290	0.0812	0.121

Notes: The Table presents the results of regression presented in specification **(3)**. The sample includes those inmates who are released from DOC from July 1st, 2013, and June 30th, 2018. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility. Column (1) presents the results of regression that takes recidivism due to a new felony within one year of release. Column (2) presents the results of regression that takes recidivism due to a new felony within two years of release. Column (3) presents the results of regression that takes recidivism due to a new felony within three years of release. Fixed effects include facility unit by risk level, quarter of release, and zip code fixed effects. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level.

Table 13: Robustness Test 5 – Modified specification with the inclusion of peer controls

	(1)	(2)	(3)
Exposure (standardized)	0.0104**	0.0225**	0.0540***
	(0.00504)	(0.0107)	(0.0152)
Observations	34,601	26,660	18,237
Facility Unit by Risk Level FE	Yes	Yes	Yes
Quarter of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
All peer controls	Yes	Yes	Yes
Mean	0.0312	0.0810	0.116

Notes: The Table presents the results of regression presented in specification **(3)** with the inclusion of additional peer controls. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility. Column (1) presents the results of regression that takes recidivism due to a new felony within one year of release. Column (2) presents the results of regression that takes recidivism due to a new felony within two years of release. Column (3) presents the results of regression that takes recidivism due to a new felony within three years of release. Fixed effects include facility unit by risk level, quarter of release, and zip code fixed effects. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level.

Table 14: Robustness Test 6 – Effect for inmates incarcerated for shorter time to account for possible measurement error due to movement of inmates

	(1)	(2)	(3)
Exposure (standardized)	0.00812**	0.0122*	0.0219**
	(0.00385)	(0.00653)	(0.00900)
Observations	19,273	15,010	10,278
Facility Unit by Risk Level FE	Yes	Yes	Yes
Quarter of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Mean	0.0461	0.111	0.151

Notes: The Table presents the results of regression presented in specification **(3)** with the inclusion of additional peer controls. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility. Column (1) presents the results of regression that takes recidivism due to a new felony within one year of release. Column (2) presents the results of regression that takes recidivism due to a new felony within two years of release. Column (3) presents the results of regression that takes recidivism due to a new felony within three years of release. Fixed effects include facility unit by risk level, quarter of release, and zip code fixed effects. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level.

Table 15: Mechanism 2 – Effect of in-prison exposure to gang-affiliated inmates for those non-affiliated inmates who work within the correctional facilities

	(1)	(2)	(3)
Exposure (standardized)	0.00563	0.00571	0.00955
	(0.0126)	(0.0234)	(0.0325)
Observations	6,280	4,895	3,308
Facility Unit by Risk Level FE	Yes	Yes	Yes
Quarter of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Mean	0.0231	0.0653	0.102

Notes: The Table presents the results of regression presented in specification **(3)**. The sample includes those inmates who work within the correctional facilities. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility. Column (1) presents the results of regression that takes recidivism due to a new felony within one year of release. Column (2) presents the results of regression that takes recidivism due to a new felony within two years of release. Column (3) presents the results of regression that takes recidivism due to a new felony within three years of release. Fixed effects include facility unit by risk level, quarter of release, and zip code fixed effects. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level.

Table 16: Mechanism 2 – Effect of in-prison exposure to gang-affiliated inmates for those non-affiliated inmates who do not work within the correctional facilities

	(1)	(2)	(3)
Exposure (standardized)	0.0206***	0.0358***	0.0558***
	(0.00399)	(0.00754)	(0.0106)
Observations	28,244	21,686	14,842
Facility Unit by Risk Level FE	Yes	Yes	Yes
Quarter of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Mean	0.0330	0.0846	0.119

Notes: The Table presents the results of regression presented in specification **(3)**. The sample includes those inmates who do not work within the correctional facilities. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility. Column (1) presents the results of regression that takes recidivism due to a new felony within one year of release. Column (2) presents the results of regression that takes recidivism due to a new felony within two years of release. Column (3) presents the results of regression that takes recidivism due to a new felony within three years of release. Fixed effects include facility unit by risk level, quarter of release, and zip code fixed effects. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level.

Table 17: Implications – Effect of in-prison exposure to gang-affiliated inmates on in-prison learning outcomes of inmates

VARIABLES	(1) Functional Literacy	(2) GED	(3) Cognitive Thinking
Exposure (standardized)	-0.0734***	-0.100***	-0.157***
	(0.0146)	(0.0171)	(0.0252)
Observations	17,447	7,539	9,177
Facility Unit by Risk Level FE	Yes	Yes	Yes
Quarter of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Mean	0.874	0.295	0.825

Notes: The Table presents the results of regression presented in specification **(3)**. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility. Column (1) presents the results of regression that takes functional literacy program completion as an outcome. Column (2) presents the results of regression that takes GED program completion as an outcome. Column (3) presents the results of regression that takes cognitive thinking program completion as an outcome. Fixed effects include facility unit by risk level, quarter of release, and zip code fixed effects. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level.

Additional Appendix – Alternative measure of exposure

I test the robustness of my estimates to an alternative measure of exposure that incorporates the number of gang members an individual is exposed to in addition to the number of overlapping days. The key difference between this measure and the measure presented earlier is that it considers the relative proportion of gang members that an individual is exposed to. Mathematically, the measure is constructed as follows

$$exposure_{i,K} = \frac{\bar{d}_{i,K}}{D_i} \times \frac{n_K}{N}$$

where, $exposure_{i,K}$ is a measure of exposure of an inmate i to all gang members K during his term in prison, $\bar{d}_{i,K}$ is average number of days that overlap between a non-affiliated inmate i and gang-affiliated inmate K, D_i are the total number of days that an inmate i spends in prison during his term, n_K is the number of gang members an individual is exposed to during his tenure, and is the total number of gang members an individual i is exposed to during his tenure. As noted earlier, the analysis sample excludes gang members and consists of non-affiliated members only. Therefore, individuals in the analysis sample do not contribute to the exposure variable construction of other individuals in the analysis sample.[9]

Table A18*Table 6* presents the regression results that take measure of exposure presented above as a regressor and reincarceration due to new felony charges within 1, 2, and 3 years of release as outcomes of interest. I find that exposure to gang-affiliated peers increases the probability of getting re-incarcerated within 1, 2, and 3 years of release. The results from column (1) show that a 1 standard deviation increase in the exposure of an inmate to gang-affiliated inmates in a prison unit significantly increases the probability of getting incarcerated for a new felony charge by 1.49 percentage points. The estimates from column (2) show that a 1 standard deviation increase in gang members' exposure in a correctional facility unit leads to a 2.82 percent increase in the probability of reincarceration within 2 years of release. Finally, a 1 standard deviation increase in the exposure of an inmate to gang members leads to a 5.15 percentage points increase in recidivism probability within 3 years of release. Overall, the coefficient does not differ much

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[9] The results are robust to taking total number of days, i.e., $\sum_{k=1}^{K} d_{i,k}$ instead of average number of days in the measure presented above.

from those presented in main results, however, the magnitude of the estimated coefficients is slightly lower than the ones presented earlier.

Table A18: Impact of Exposure to Gang Members using Alternative Measure of Exposure

	(1) Within 1-year of release	(2) Within 2-years of release	(3) Within 3-years of release
Exposure	0.0149***	0.0282***	0.0515***
	(0.00500)	(0.00840)	(0.0135)
Observations	34,601	26,660	18,237
Facility-Unit by Risk Level FE	Yes	Yes	Yes
Year of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Mean	0.0312	0.0810	0.116

Notes: The Table presents the results of regression presented in specification **(3)**. The measure of exposure is presented in appendix I. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility unit. Column (1) presents the results of regression that takes recidivism due to a new felony within one year of release. Column (2) presents the results of regression that takes recidivism due to a new felony within two years of release. Column (3) presents the results of regression that takes recidivism due to a new felony within three years of release. Fixed effects include facility unit by risk level and quarter of release. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility unit level. Significance levels are represented as follows: $*p < 0.1$, $**p < 0.05$, $***p < 0.01$

Table B1: Impact of exposure of gang-affiliated inmates to other gang affiliated inmates

	(1)	(2)	(3)
Exposure (standardized)	0.0282***	0.0434**	0.0421**
	(0.00970)	(0.0182)	(0.0163)
Observations	7,222	5,894	4,280
Facility by Risk Level FE	Yes	Yes	Yes
Year of Release FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Mean	0.0271	0.0726	0.105

Notes: The Table presents the results of regression presented in specification **(3)**. The sample includes gang affiliated inmates. The unit of observation is an inmate, and the outcome is an indicator variable set to 1 if the inmate returns to the correctional facility unit. Column (1) presents the results of regression that takes recidivism due to a new felony within one year of release. Column (2) presents the results of regression that takes recidivism due to a new felony within two years of release. Column (3) presents the results of regression that takes recidivism due to a new felony within three years of release. Fixed effects include facility by risk level, quarter of release, and zip code fixed effects. The individual characteristics include racial composition, high school or GED, age at release, and other sentencing offense characteristics. Finally, standard errors are clustered at the facility level.

Table B2: *Identification test – correlation between exposure and other characteristics*

Characteristic	Mean	Correlation	P-value	Conditional Correlation	P-value
Panel A. Racial composition					
African American	0.148	-0.012	0.05	0.017	0.13
Hispanic	0.532	0.026	0	-0.025	0.1
Hispanic non-US	0.004	-0.002	0.02	-0.002	0.29
Asian	0.002	-0.001	0.12	-0.001	0.13
Other Race	0.005	0	0.8	0.002	0.3
Panel B. Demographic characteristics					
High-School or GED	0.54	-0.027	0	-0.073	0
Community Score	5.461	0.185	0	0.023	0.32
Panel C. Sentencing offense types					
Incarcerated for Theft	0.076	0.006	0.02	0.016	0.03
Incarcerated for Arson	0.002	-0.001	0.01	-0.001	0.12
Incarcerated for Vehicle-Related	0.032	0.003	0.06	-0.001	0.88
Incarcerated for Sex-Related	0.013	-0.007	0.09	0.005	0.07
Incarcerated for Assault	0.119	0.026	0	0.012	0.28
Incarcerated for Forgery/Fraud	0.04	-0.005	0.07	-0.004	0.52
Incarcerated for Burglary	0.096	0.002	0.56	-0.004	0.64
Incarcerated for Murder	0.001	0	0.33	-0.001	0.33
Incarcerated for Drug Related	0.344	-0.057	0	-0.025	0.04
Incarcerated for Kidnapping	0.001	0	0.04	0.001	0.5
Incarcerated for Homicide	0.062	0.002	0.4	0.01	0.19
Incarcerated for Others	0.227	0.02	0.02	0.011	0.44
Incarcerated for violent crimes	0.076	0.006	0.02	0.016	0.03
Panel D. Felony type					
Felony-Seriousness Medium	0.069	-0.001	0.8	0.001	0.82
Felony-Seriousness High	0.377	-0.043	0	-0.038	0.05
Dangerous/Non-Repetitive Felony	0.019	0.002	0.22	-0.001	0.75
Dangerous/Repetitive (1) Felony	0.001	0	0.62	0	0.62
Dangerous/Repetitive (2) Felony	0	0	0.34	0	0.34
Any prior adult felony adjudications	0.734	-0.001	0.91	0.027	0.03

Notes: The Table presents the correlation between individual characteristics and measure of exposure. The individual characteristics include racial composition, demographic characteristics, sentencing offense characteristics, and felony type characteristics. Column (1) presents the average of a characteristic specific in the row title. Column (2) presents the unconditional correlation estimated from a regression of a characteristic on exposure. Column (3) present the p-value associated with correlated presented in column (2). Column (4) correlation estimated from a regression of a characteristic on exposure conditional on quarter of release and facility by risk level fixed effects. Column (5) present the p-values associated with correlated presented in column (4). Each row presents a separate regression of exposure and given characteristic. Finally, standard errors are clustered at the facility level. P-values are reported along with coefficients to represent statistical significance.