Abstract

Title of Document: SMART SENTENCING: A LOOK AT THE DIFFERENTIAL EFFECTS OF PRISONS AND JAILS

Kathleen Ann Frey, Doctor of Philosophy, 2018

Dissertation Directed by: Professor Kiminori Nakamura
Department of Criminology and Criminal Justice

Criminological research has long explored the impact of incarceration on recidivism. However this line of research typically combines jail and prison as a single type of incarceration sentence and does not distinguish between these two different sentences. Judges often can choose between a prison or jail sentence for certain categories of offenders, but little research offers any perspective on potentially differential impacts of the two types of sentences on recidivism. The lack of understanding about the consequences of prison and jail sentences hampers the efforts to improve the criminal justice system. Using data from Pennsylvania, the current study examines the impacts of prison and jail, as two separate types of sentences, on recidivism. Pennsylvania offers a unique sample of offenders where jail inmates may be

serving up to five years' incarceration and prison inmates may be serving a sentence shorter than 1 year , compared to most other states where jail is typically a 1-year sentence or less and prison serves for sentences longer than 1 year. Propensity score matching was utilized to compare those with jail and prison sentences who are otherwise comparable, thus allowing balance on observables. In particular, the sentencing guidelines were utilized to ensure the comparability of offenders regarding the seriousness of the current offense and the prior record and to focus on offenders who could have received either prison or jail sentence based on judicial discretion. Results from a statewide sample indicate that within a short follow-up period following release from incarceration, there is largely a null effect of prison on rearrest. However, given longer recidivism follow-up periods, prison is shown to increase the probability of rearrest compared to jail. Although, using a county sample reveals a negative effect of prison on rearrest within a year of release, once reincarceration is accounted for and longer follow-up periods are used, there is largely a null effect of prison on recidivism. Several subsamples were examined revealing largely null effects. Findings indicated racial differences in recidivism based on confinement in prisons and jail. Additional tests were conducted to attempt to understand the differences within facilities that could affect recidivism by comparing across jails, although the results were largely null. Findings from this study reveal key policy implications regarding judicial decision making. In the long-term, once reincarceration is taken into account, there is no strong evidence to suggest that a difference in recidivism exists between prison and jail, suggesting that judge sentencing decisions can be guided by budgetary concerns and facility capacity.

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By

Kathleen A Frey

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Advisory Committee:

Assistant Professor Kiminori Nakamura, Chair

Associate Professor Brian Johnson

Professor James Lynch

Assistant Professor Lauren Porter

Professor Peter Reuter, Deans Representative

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Chapter 1: Introduction

Mass Incarceration has become the corrections rhetoric in the United States over the last four decades. Over this time period through harsher sentencing and the use of incarceration as the primary instrument of crime control, the incarceration rate grew 5-fold (National Research Council [NRC], 2014), culminating in a situation where 1 in 100 adults are behind bars (Pew, 2008). While the prison growth tends to receive public attention, the jail population has increased as rapidly as the state prison population (Applegate, 2011; NRC, 2014; Roman et al., 2006). According to the Bureau of Justice Statistics (BJS), today over 1.5 million offenders are in prisons and nearly 730,000 offenders are in jails (Kaeble and Glaze, 2016).

Prisons and jails are costly and can take away resources from other state and local functions. According to the NRC (2014), today, corrections is the third greatest expenditure, after Medicaid and education, for state budget spending. Keeping pace with the incarceration growth, total state spending on corrections increased from $6.7 billion in 1985 to $53.2 billion in 2012, and jails cost local governments $26.8 billion (NRC, 2014). In part, due to this excessive spending on corrections many states are seeking to use less incarceration. For example, several states have implemented a justice reinvestment scheme, which "is a data-driven approach to improve public safety, reduce corrections and related criminal justice spending, and reinvest savings in strategies that can decrease crime and reduce recidivism" (Council of State Governments [CSG], n.d.).

As states seek to reduce budgets spent on prisons, some use jails as an alternative. For example, North Carolina, South Dakota, and Nebraska have used justice reinvestment

schemes to keep certain classes of offenders, such as misdemeanants and probation violators, out of prison by placing them in jails instead (CSG, 2014; CSG, 2015; Davies et al., 2015; Lawrence, 2016). Another major shift to local corrections occurred in California. Faced with the 2011 Supreme Court ruling in *Brown v. Plata*, California was ordered to reduce the prison population by approximately 40,000 inmates or 25% of the inmates at that time (Petersilia, 2014). As an effort to reach the level of population reduction, California' Public Safety Realignment transferred the authority of non-serious, non-violent and non-sex offenders as well as technical parole violators from the state prison system to counties (jails and probation). The impact of Realignment was dramatic. Within the first year, the number of prison admissions declined 65% from 96,000 in 2011 to 34,300 in 2012 (Petersilia, 2014), and the reduction in California was responsible for 70% of state prison population reductions in 2011 (Carson and Sabol, 2012). Although overall public safety was not compromised following Realignment (Lofstrom and Raphael, 2013, 2016; Sundt et al., 2016), a result of the unprecedented transfer of offenders to the custody of local government was that jail incarceration rates overall increased despite the state incarceration rate decreasing (Lofstrom and Raphael, 2013). The number of more serious offenders, as well as time served, also increased in jails (Grattet et al., 2016). Furthermore, even though violent crime rates did not increase, it is not clear whether the previously-prison-bound offenders who are now sent to county jails fare in terms of recidivism (Bird and Grattet, 2016).

California experienced a similar realignment situation earlier involving juvenile incarceration. In the early 1990's, California saw a dramatic increase in youth prison populations. With a growing fear of youth crime and a push at the county level to reduce

incarceration costs, youth were being sent to state facilities instead of local agencies. This overcrowding led to deteriorated conditions within facilities and resulted in the 1996 California Juvenile Justice Realignment (Krisberg et al., 2010; Ouss, 2015). In order to prevent counties from sending youth to the state facilities, this realignment charged the counties for each juvenile offender sentenced to the state system. The fines would be heaviest for lower level offenders and lowest for more serious offenders to keep only the most serious offenders in the state system. This bill forced each county to finance its own corrections system without relying on the state subsidies, thus making corrections budgeting decisions county-based. Ultimately, the act became a natural experiment as nothing within the criminal justice system changed, the only aspect that changed was the counties fiscal responsibility. The results of the bill were an increase in diversions of juveniles from the corrections systems, meaning that less youth were being incarcerated (Ouss, 2015). In the end, the counties paid no more than they were prior to the bill and budgets were not greatly impacted.

California's realignments highlight a larger issue of fiscal incentives affecting our incarceration policy and provide a clue as to how mass incarceration can be reversed. Prisons, the most severe and most expensive sanction, are funded at the state level, while jails and probation are funded at the local level. Thus, judges and prosecutors, who are also mostly funded out of county budgets, can receive all the tough-on-crime benefits by generating prison sentences, while they bear almost no costs of the prison sentences. As Pfaff (2017: 143) puts it, for prosecutors and judges "leniency is actually more expensive than severity, and severity is practically free," which creates a moral hazard problem, what Zimring and Hawkins (1991) termed the "correctional free lunch." There is

increasing attention and empirical evidence that the de-facto state subsidy programs reduce reliance on local corrections, especially jails, and lead to an overuse in the prison system (Ball, 2014; Ouss, 2015, Lynch, 2011; Phelps, 2013; Raphael and Stoll, 2014). As shown in California's 1996 juvenile realignment, one way to reduce this "free lunch" dependency is to realign incentives. In Michigan, fiscal incentives were used for counties to decrease prison sentences, especially the "straddle cell" cases in the state sentencing guideline, in which offenders can be sentenced to state prison, jail, or community sanctions (Greene and Mauer, 2010; Phelps, 2013).

As the incarceration rates soared and overcrowding plagued many state prisons, counties have been increasingly burdened to house state prisoners, blurring the distinction between prison and jail (Albert, 2010; May et al., 2014). Recently there has been an increase in advocacy for reducing reliance on incarceration, and shortening sentences (e.g., Holder, 2016). There is a general consensus in research that longer incarceration stays do not reduce recidivism, showing that longer prison sentences do not act as a deterrent nor do they have an incapacitation effect (Loughran et al., 2009; Snodgrass et al., 2011; Wermink et al., 2017). Focusing on the use of long sentences may not actually have any beneficial impacts, therefore using shorter sentences may save costs and not increase recidivism. In other words, more offenders will fall into the sentencing range where both jail and prison are potential outcomes. In other words, there is possibly an increasing overlap in many states where an offender could receive either prison or jail sentence. In California, Michigan, and other justice reinvestment states, the main driver behind the shift toward local corrections is the costs and the rather exclusive focus on reducing state prison incarceration. What is missing in this policy discussion is the public

safety aspect, or recidivism consequences of this shift (Pew, 2011). Currently, there is very limited knowledge on recidivism impacts of prison sentences against jail sentences (Ball, 2014). Research indicating whether prison and jail are exchangeable in terms of its impact on recidivism, can help inform currently arbitrary sentencing decision making on the appropriate place of confinement.

Extant sentencing and corrections research rarely distinguishes prison and jail. Recent scholarship on sentencing argues against the use of the "total incarceration variable" that combines prison and jail sentences as one category, and finds that this variable construction is inappropriate because different factors predict the two incarceration sentences, citing the need to differentiate between prison and jail as distinct sentence outcomes (Holleran & Spohn, 2004; Harrington & Spohn, 2007; Harrington, 2008).

> Considered together, the results of our study suggest that jail and prison sentences-which we contend are qualitatively different types of punishment -should not be combined into a single response category. Their correlates are different…Separating jail sentences from prison sentences enhances our understanding of the sentencing process and the factors that affect the sentences that judges impose (Holleran & Spohn, 2004, 236).

The lack of attention to the distinction between prison and jail is evident, not only in the sentencing literature that focuses on incarceration as the outcome variable, but also in the literature that uses sentence type as the independent variable predicting recidivism. In both these cases, jail and prison are rarely, if ever, separated as different sentences. In the latter research, to date, studies tend to focus on differences between custodial (prison and jail) and non-custodial (e.g. probation) sentences or different lengths of time served (e.g., Nagin et al., 2009). The literature on collateral consequences of incarceration also

often ignores the distinction between prison and jail (e.g., Western, 2002). While the existing research may not be informative about differential effects of prison and jail on recidivism, there are reasons to believe that prison and jail can impact recidivism differently and should be treated as two entirely different sentences, which will be elaborated upon in the upcoming literature review.

The research community has noted that compared to prisons, jails have received little scholarly attention, and still little is known about the populations it serves, effects of programming, and consequences of incarceration on post-release life, including recidivism (Bales and Garduno, 2016; Frost and Clear, 2012). Some basic distinctions between prison and jail are well documented. Prison tends to hold more serious offenders who are sentenced for longer than a year, while jails house lower level offenders whose incarceration term is typically under one year (Bales and Garduno, 2016). Prisons and jails also vary in their size. Typical prisons hold a larger population of offenders than jails. Nearly half of prisons housed more than 500 inmates in 2005 (Stephan, 2008), while about 40% of jails housed less than 50 inmates, and only about 10% housed more than 500 inmates (Stephan, 2011). Thus, although mega-jails exist in urban centers, where for example, Los Angeles County Jail house over 17,000 and New York City Jail houses about 10,000, typical jail capacity is more limited. Jails are typically managed by law enforcement agencies (e.g., county sheriff's department) and manage highly heterogeneous and fluid populations, making it challenging to provide coherent correctional programming (Roman and Chalfin, 2006). Jails house pre-trial offenders, those who are waiting for transfers to other correctional and mental health facilities, and sentenced offenders. Only about 4 in 10 jail inmates are sentenced offenders (Minton and

Zeng, 2016; Solomon et al., 2008). Even though state and federal prison populations are larger than the jail population on any given day, the number of individuals who experience jail incarceration is much greater than that of those who experience prison incarceration (Bales and Garduno, 2016). In 2015, state and federal prisons admitted just over 600,000 offenders, while local jails admitted nearly 11 million, or about 18 times what prisons experienced (Carson and Anderson, 2016; Minton and Zeng, 2016). Over 80% of jail inmates are incarcerated for less than a month (Beck, 2006), and over half of the jail population changes every week (Minton and Zeng, 2016).

Existing recidivism statistics suggest that both prison and jail inmates face a high risk of experiencing recidivism upon release compared to those receiving non-custodial sentences. A series of BJS reports have documented that just over 40% of released state prisoners are rearrested and 30% return to prison within 1 year, and approximately two thirds are rearrested and a half are reincarcerated within 3 years (Beck and Shipley, 1997; Durose et al., 2014; Langan and Levin, 2002). Unlike recidivism studies on prisoners, studies on jail recidivism are few and far between. However, existing statistics suggest that jail recidivism rates are similarly high. Among sentenced offenders who were released from jail in 2015 in Hampden County, Massachusetts, about 40% experienced a new arraignment (similar to rearrest) within 1 year (Lyman, 2017). Among sentenced jail offenders in Montgomery County, Maryland who were released between 2003 and 2004, 41% of males and 32% of females were rearrested within 1 year (Uchida et al., 2009). In Washington D.C., about 40% of sentenced offenders who were released from the Department of Corrections (jail) in 2007 were rearrested within 1 year and approximately 60% were rearrested within 3 years (Nakamura and Weiss, 2012).

Comparisons across these recidivism studies suggest that there is a noticeable similarity in reported recidivism rates between jail populations and also between jail and prison populations. However, these similarities do not necessarily indicate that the effects of prison and jail incarceration on recidivism are similar (Lyman and LoBuglio, 2006). Potential differences in policing and community supervision practices make direct comparisons across jurisdictions difficult, and more importantly, the characteristics of those who are sentenced to prison and those who are sentenced to jail are likely different. Compared to jail populations, prison populations tend to be more male and more non-white (Carson and Anderson, 2016; Minton and Zeng, 2016) and likely have a more extensive criminal history on average but as a result are older on average (James, 2004). Accounting for these population differences is important as they can affect recidivism. Ultimately, despite similar rates of recidivism across prison and jail samples, none of these studies cast an appropriate conclusion regarding differences between the two groups.

Using matching methodses, the current study accounts for differences in the types of offenders sentenced to prison and jail, as well as jurisdictional differences to make a more accurate comparison of recidivism between prison and jail inmates. Thus, this study focuses on those offenders on the margin and make comparisons between similarly situated offenders receiving the alternative sentence. Data come from Pennsylvania, which offers a sentencing scheme that is uniquely suitable to explore the differential impact of prison and jail in the era where the distinction between them is becoming blurred. Specifically, while most states sentence offenders to jail if the sentence is one year or less, Pennsylvania, allows offenders with a sentence of up to five years to be

committed to jail. The state also allows for prison sentences of less than one year. Thus, unlike a small number of prior studies that are based on small samples of offenders on the margin, this study allows a larger sample of relatively similar jail and prison inmates, therefore allowing for a more accurate understanding of the impacts of sentence on recidivism.

The remainder of this paper is organized as follows. Chapter 2 discusses the literature related to recidivism and sentencing. While there is little research that focuses specifically on differences between prisons and jails, a variety of related research has been compiled to indicate why there would be expected differences in recidivism between prisons and jails. Chapter 3 discusses the data and variables and the methodology that will be utilized in this study. Chapter 4 discusses quantitative results of the different analyses, while chapter 5 summarizes the major conclusions, policy implications, and limitations of the study.

Chapter 2: Literature Review

Too often in correctional research and policy discussion are jail and prison used interchangeably, with incarceration utilized as a generic term including both types of facilities and populations housed. Much of the current literature includes an analysis of either prisons, jails, or a combination of the two without regard to the differences between the two places of confinement. Many studies have pointed out that there are a variety of ways in which prisons and jails are different (Bales and Garduno, 2016; Walker, 2014), however there is little attention paid to how the differences could theoretically affect recidivism. This section focuses on building the rationale behind the likely heterogenous effects of prison and jail. While the current study does not empirically address how these mechanisms influence recidivism, it takes the first necessary steps to understand if prisons and jails have differential effects on the individual. The mechanisms are discussed according to theoretical perspectives: deterrence, institutional culture and learning, stigmatization and labeling, and rehabilitation and social support.

2.1 Deterrence

Deterrence theory suggests that severity of punishment along with certainty and swiftness, can deter offending and reoffending (Beccaria, 1963). The length of sentence is often considered an indicator of severity (Cullen et al., 2011). Thus, if the sentence length is an indicator of "cost" experienced by offenders, it is reasonable to consider prison, which houses longer-sentenced offenders, as more costly and consequently more

of a deterrent than jail. Further, if novelty and unknowness is what makes punishment more punitive, prison may carry more deterrent weight. Even though mass incarceration brings the experience of serving time in prison more prevalent than ever (Western, 2006) which may have diminished the deterrent effects (Petersilia, 2003), it is still the case that far more people have either a direct experience of staying in local jail or know someone who has gone to jail (Bales and Garduno, 2016).[1] Prisons may be more deterrent than jails because of their locations. Bedard and Helland (2004) found that a longer distance from a prison leads to lower recidivism as a result of increasing visitation difficulty, evidence consistent with the argument that distance is punitive and deterrent because it takes away something that is valued by the inmates.

While there is reason to deem prison as the more punitive incarceration, research on offender perceptions provides a different story. Offenders tend to rate jails as the most punitive sanction along with boot camps (May et al., 2004, Wood and May, 2003; Wood and Grasmick, 1999). The environment into which sentenced offenders are committed can be considerably different between prison and jail. Local jail environment is often portrayed as more chaotic and dangerous than prison (Cornelius, 2012; Gibbs, 1982; Irwin, 1985; May et al., 2014). When offenders are committed to jail they may experience behavioral issues such as violent resistance to arrest and incarceration as well as substance intoxication and withdrawal. Jail inmates often combat unmanaged mental illness, which is prevalent and acute, and there is often very little information about offenders available to jail administrators to make appropriate classification and housing

[1] A survey of the general public in Florida revealed that over 60% reported either having been incarcerated personally or knowing someone who had been incarcerated (Rose and Clear, 2004). Given the higher prevalence of jail incarceration compared to prison, most of the reported incarceration experience is likely a stay in local jail.

arrangement (Cornelious, 2012). By the time offenders are admitted to prison, most of the initial behavioral issues have been stabilized, and more documented information about offenders' criminal history, substance use, and mental health is available. Due to the relatively short incarceration length and limited resources in jails, classification systems tend to be more primitive in jails (Brennan, 1987), resulting in a dangerous uncertainty where offenders do not know who they are housed with (May et al., 2014).[2] The majority of inmates being in pre-trial status does not indicate that jails house non-serious offenders (Backstrand et al., 1992; Petersilia et al., 2000; Roman et al., 2006; Walker, 2014). Profiling pre-trial inmates in the Los Angeles County jail in 1996, Petersilia and colleagues describe them as the "worst of the worst" charged mostly with felonies and with an extensive criminal history (Petersilia et al., 2000: xix). In the Philadelphia jail system, drug charges are most common among pre-trail inmates, but about a third of them are charged with violent offenses (Roman et al., 2006). The vast majority of these jail inmates are also "churners" who have previous admissions in the Philadelphia jail (Roman et al., 2006).

Offenders also tend to view prisons more favorably than jails because prisons offer more programs and opportunities for advancement and privileges (Williams et al., 2008), and the relative lack of programming and large amounts of idle time in jails can lead to unpredictability (Gibbs, 1982). In a recent ethnographic work on jail inmate life in California, one inmate described the prison and jail stay the following way: "In prison, you're home. You're just home. They try to make it comfortable for you. Jail is

[2] It is not uncommon for classification procedures in state prison systems to take months (Hardyman et al., 2004), while most jail inmates are released within weeks.

punishment" (Walker, 2014: 12). "Few individuals who have been to jail and prison would choose to go to jail versus prison if given the chance" (Walker, 2014: 11).

Offender perceptions of jail as a more punitive incarceration sentence may lead to an expectation that jails are more deterrent than prisons. However, there is very little research that empirically tests this proposition. A recent study that uses measure of subjective perceptions of incarceration severity found that more perceived severity does not reduce recidivism (Raaijmakers et al., 2017). Even if jails are perceived to be more punitive and harsh, it is not clear such experience can deter future offending. Other research also suggests that the attempts to increase pains of imprisonment and make inmates life miserable can trigger a more defiant response and could diminish the legitimacy of the sanctioning agent (Griffin, 2006; Sherman, 1993; Tyler, 2006; 2010), likely increasing recidivism.

Thus, while the existing research suggests that offenders consider a stay in jail more of a painful experience than a stay in prison, the perceived aversion to jail may not lead to deterrence and possibly increase recidivism. Based on the deterrence literature, it is hypothesized that those who go to jail will be at a greater chance of recidivating than those sentenced to prison.

2.2 Institutional Culture and Criminogenic Learning

Prisons and jails have been argued to be 'schools of crime,' where criminogenic learning of techniques, behaviors, and neutralizations for crime can take place through interactions between inmates. "People who serve time in prisons often return home with stronger ties to other criminals, greater criminal skills, and more antisocial attitudes"

(Petersilia, 2003: 223). In a review of evidence on the incarceration effects on recidivism, Nagin et al. (2009) suggests that criminogenic learning and prison culture may explain a lack of deterrent and possibly recidivism-inducing effects of incarceration.

Research has long documented the process of new inmates acculturate themselves into the values and norms of prison society, what Clemmer (1940) referred to as prisonization. The prison culture can be considered a product of coping strategies that inmates employ to respond to the "pains of imprisonment", deprivations of liberty, services and goods, autonomy, and security (Sykes, 1958). Others argue that the prison culture is not created solely by incarceration but also by the prior experiences and characteristics that inmates bring into the prison environment (Irwin and Cressey, 1962). From both perspectives, the institutional culture is expected to be more deeply rooted in prisons. Correctional facilities designed to house longer-term inmates congregate offenders with more extensive criminal history and can foster a distinct prison culture as a response to more pronounced and enduring feelings of deprivation. "The inmate who has served a longer amount of time, becoming more prisonised in the process, has had his tendencies toward criminality strengthened and is therefore more likely to recidivate than the inmate who has served a lesser amount of time" (Jaman *et al,* 1972: 7). Prison inmates with longer sentences also tend to be engaged in misconducts in the early stages of incarceration (Adams, 1992; Toman et al., 2015), suggesting that prisons, due to higher volume of longer sentenced offenders, may be more volatile.

There are a variety of other factors that can shape the prison and jail culture. There is some evidence to suggest that a shift toward determinate sentencing and abolition of discretionary release from prison can lead to more prisoner misconduct and a

more volatile confinement environment (Bales and Miller, 2012; Kuziemko, 2013; Santos, 2012). Based on his own imprisonment experience in the federal prison system, Santos (2012) observes that once the incentives to participate in programs and to avoid disciplinary actions are taken away, prisoners could adopt the "you've got nothin' comin'" culture (614) and make their institution home, rather than trying to reconcile themselves with society. There are similar observations in jail settings. Walker (2014), for example, found that having release dates (for sentenced offenders) provides hope, a meaning to the connections with family and friends, and allows them to plan for the life after incarceration. On the other hand, those without a release date, largely pre-trial inmates, have no certainty about how long they remain detained and more generally about their future, and have little reason to resist being socialized into the inmate culture (Walker, 2014). Walker (2014, 2016) also observed that the institutional life of jail inmates without release dates are racialized and violence and threats of violence is rife. Given the large proportion of jail inmates without release dates, compared to prison inmates, jail inmates struggle with more uncertainty and their confinement environment can be more stressful.

Time in cell may also play a role in how much the criminogenic institution culture affects inmates. Ouss (2011) looks at the effects of cellmates on learning within prisons. The study specifically focuses on short term offenders who spend a large amount of time in their cells during the day, thus targeting the specific effects of cellmates. The research finds that there is a criminogenic effect of incarceration on future offending for certain types of offenses. Prison inmates may spend more time away from cell due to daily

programming and treatment sessions that require the inmate to attend, therefore jails may lead to greater learning from cellmates.

When studies compare offenders in prison and jail while accounting for the confounding factors such as offense severity and criminal history, the sentence length is largely held constant as we should be comparing offenders with similar sentence length. However, effects of sentence length are not limited to the individual level. When low level offenders are placed in prison, they are exposed to relatively more serious offenders. According to the risk principle (Bonta and Andrews, 2016), correctional interventions are more effective (reducing recidivism) when intensity and dosage of interventions matches offenders' level of recidivism risk. Thus, correctional interventions that mix offenders of different risk levels can increase recidivism (Lowenkamp and Latessa, 2004). While the chances of low risk offenders being housed together with high risk offenders is higher in prison environment, because offenders in prison go through a more extensive classification and assessment procedure (Adams, 1992), mixing of risk levels in close proximity is likely avoided. In contrast, the relative lack of resources and fluidity of populations make classification and assessment in jail challenging, and exposure of low risk offenders to higher risk offenders might be more likely.

Research tends to show that harsher prison conditions and higher levels of security are criminogenic and can lead to increases in recidivism (Bench & Allen, 2003; Cam and Gaes, 2005; Chen and Shapiro, 2007; Lerman, 2009). Using regression discontinuity design, Chen and Shapiro (2007) found that increases in security levels do not reduce recidivism and found evidence that being placed in a higher security facility may even increase recidivism. Similarly, Gaes and Camp (2009) examined the effects of

security level on recidivism via randomized experiments; offenders were randomly assigned to different security levels. The results indicate that being sentenced to a higher security facility increased recidivism, suggesting that harsher, more restrictive prison environment can be criminogenic (Camp & Gaes, 2005). Similarly, through experiments, Bench and Allen (2003) found that offenders who were classified initially as maximum security but were randomly assigned to a medium security facility exhibited no more disciplinary activity than maximum security offenders who were housed in a maximum security facility. The finding is interpreted to indicate that inmate behavior is influenced not only by observable individual risk attributes but also by the labeling and behavioral expectations placed on them as well as contextual situations. The effects of labelling on recidivism will be discussed further in the next section.

In totality, criminogenic culture and norms are more likely to be entrenched in prisons compared to jails, and a given offender's risk of exposure to higher risk offenders with more extensive criminal experience is likely higher in prison. While jail environment overall may be plagued by a sense of uncertainty and hopelessness, among sentenced offenders with expected release dates, there may not be significant differences. Ultimately, based on the literature it is hypothesized that due to a criminogenic culture within prisons, prisons will result in a higher rate of recidivism than jails.

2.3 Labelling and Stigmatization

Collateral consequences of criminal records have expanded in recent decades, in the areas of employment, housing, education, government assistance, and civil rights (Mauer and Chesney-Lind, 2002). The felony and misdemeanor distinction is important,

as law and administrative policy only stipulates that only felony convictions automatically result in certain collateral consequences (Pager, 2007). For example, individuals with any felony convictions are ineligible for many of the professional and occupational licenses (National Inventory of the Collateral Consequences of Conviction, n.d.). Employers explicitly distinguish felony versus misdemeanor records for both severity and legal prohibition reasons, and thus those with felony records are clearly faced with more diminished employment prospects (Pager, 2007; Stoll and Bushway, 2008; Uggen et al., 2014). The current sample mostly consists of those who are convicted of felony offenses, regardless of confinement place, so there may not be differences in the level of collateral consequences between prison and jail sentenced offenders.

Although it is not clear whether incarceration has any additional stigmatizing effects beyond felony convictions, Davies and Tanner (2005) examined the impacts of multiple negative labels on future employment opportunities. While accounting for various confounders including poverty, family, age, marital status, schooling, deviant behavior, and community contextual variables, they found that youths who were incarcerated compared to those who experienced any other potentially stigmatizing event such as being stopped (beyond a simple traffic violation), charged, or convicted, were more likely to experience employment problems in the future. Doherty et al (2016) also found that among arrested young adult males, experiencing incarceration is associated with increased violent and property offending. Apel and Sweeten (2010) also found that incarcerated youths were less likely to be employed, compared to others who were convicted but not incarcerated. Interestingly, they found that non-employment following incarceration was due to labor force nonparticipation (not looking for work) rather than

unemployment (Apel and Sweeten, 2010). This finding is consistent with the labor force detachment as a result of anticipated social stigma from the incarceration experience. Grogger (1995) found that employment and earnings were negatively affected by incarceration but not probation, and the negative effects of incarceration was shorter for jail sentenced offenders than prison offenders.[3] Although the existing studies tend to find negative effects of incarceration on future employment (e.g., Western, 2002; Apel and Sweeten, 2010), there are some well-controlled studies that conclude no such negative effects, mostly attributable to the strong selection of incarceration (e.g., Loeffler, 2013). Also, it is challenging to distinguish between different mechanisms behind negative incarceration effects, labeling, as well as human and social capital disruptions due to incarceration spells. It also requires caution in attributing negative incarceration effects to stigma when the length of stay is not adequately accounted for.

Studies that utilize offender survey data provide some insights into what drives the incarceration effects. Such studies found that by and large jail inmates (Moore et al., 2013; 2016) as well as former prisoners (LeBel, 2012) have a strong belief that the public holds negative attitudes towards offenders and perceive that a stigma is attached to incarceration (LeBel, 2012). More importantly, the anticipation of personally experiencing stigmatization are associated with poor functioning in the community (Moore et al., 2016). Offenders sentenced to community-based punishments can remain in the community, keep jobs, and uphold family relationships and friendships. Being able to keep family and friend relationships intact may protect probationers from feeling stigmatized (Schneider and McKim, 2003). Jails tend to be more local thus, akin to

[3] One caveat of this study is that it did not account for incarceration length differences between prison and jail stays, thus it is just possible the result is due to length of stay as opposed to stigma.

community punishment, they may lack the stigmatic time away that offenders who are incarcerated in prisons experience. The anticipated and perceived stigma may be reduced for someone in jail given the proximity to the community.

Lastly, as the incarceration rate grew dramatically in the last four decades, the stigmatizing effects of incarceration may have softened. The experience of incarceration has been normalized to some extent, and research suggests that familiarity with offenders mitigates the stigmatizing views on offenders (Hirschfield and Piquero, 2010). Research also shows that minority-owned employers and employers with racially diverse employees tend to be more willing to hire those with criminal history, suggesting that those employers are more familiar with criminal records and their holders and view less negatively those with criminal histories (Pager, 2007; Uggen et al., 2014). The "relative labeling effects" (Paternoster and Iovanni, 1989) of prison and jail are not clear. On one hand, because direct and vicarious experience of jails is more prevalent, labeling effects may be less for jails. Jails are also local and provide more interaction with family, friends, and the community thus minimizing the impacts of the stigmatic experience of incarceration. On the other hand, it is possible that sentenced offenders in jail or prison have been sufficiently involved in the criminal justice system and already experienced an exclusion from the mainstream society, and thus there is no difference in labeling effects between prison and jail.

Although felony convictions, compared to misdemeanor records, can lead to more serious stigmatizing consequences, once seriousness of crime at the individual level is accounted for, there may not be any differences between prison and jail. What may differentiate prison and jail is the relative rarity of being sentenced to prison and the fact

that jails are located close to the community and offenders in jail may better maintain the sense of normalcy. To the extent that offenders in jail anticipate less stigma from others, they may experience better reentry and less recidivism, therefore it is hypothesized that prisons will result in greater recidivism than jails due to stigmatization and labelling.

2.4 Rehabilitation and Social Support

Since the era of "nothing works" (Martinson, 1974), the rehabilitative ideal and the merit of reentry services has been slowly gaining support (Cullen and Gendreau, 2000; Cullen and Gilbert, 2013). A long line of evaluation research and meta-analyses shows that there is rehabilitation and reentry programming that can reduce recidivism, including cognitive behavioral therapy, drug treatment, and basic education (Jonson and Cullen, 2015; Lipsey and Cullen, 2007; MacKenzie, 2006).[4]

One important advancement in correctional programming is the development of the risk-needs-responsivity (RNR) principles (Bonta and Andrews, 2015). The RNR principles suggest that recidivism risk should be assessed with actuarial instruments and that correctional interventions, including rehabilitative programs, are most effective in reducing recidivism if they focus on offenders who pose the greatest recidivism risk. Thus, even if jails do provide programs that are similar to those in prisons, the extent to which jails lack resources to administrator risk-need assessment can diminish their ability to lower recidivism.

[4] In a meta-analysis, French and Gendreau (2006) showed that having programming available in prisons overall are associated with reduced prison misconduct and that the reductions in misconduct ultimately are associated with reduced recidivism. Programming can also improve institutional safety by structuring inmates' daily activities (Wooldredge, 1998). Thus, programming not only can reduce recidivism but also can improve the safety and climate of the confinement environment.

Both prison and jail inmates face many challenges upon release making the reentry process difficult. Upon reentering the community, offenders need to adjust psychologically to the unstructured world and may also face various challenges in finding employment and housing, accessing treatment for substance addiction and mental illness, and following supervision stipulations (Garland *et al*, 2011). Substance abuse is prevalent for both prison and jail inmates. In 2002, 68% of jail inmates reported alcohol or drug dependence and abuse (Karberg and James, 2005), while 53% of state inmates and 46% of federal inmates reported drug dependence and abuse in 2004 (Mumola and Karberg, 2006). In 2005, 56% of state prisoners and 45% of federal prisoners had a mental health problem, while 64% of jail inmates reported a mental health problem (James and Glaze, 2006). Suicides and self-harming behaviors are more prevalent in jails than in prisons because the transition to confinement is more abrupt in jails and inmates may resort to such behaviors to alleviate themselves from acute emotional distress, isolation, and resentment (Adams, 1992; Toch, 1975). Recent statistics also suggest that suicide is the leading cause of mortality in jail (34% of all deaths in 2013) and more of a problem than in prisons (5.5% of all deaths) (Noonan et al., 2015). Both prison and jail inmates tend to have lower levels of education compared to the general public: 40% of state prisoners and 47% of jail inmates have not completed high school or its equivalent (Harlow, 2003). The lack of education can reduce access to employment, making reentry increasingly difficult for offenders.

Prisons tend to have a certain level of programming available to offenders that is standard across facilities. However, jails vary in their programming, leaving it to the discretion of the administrator and local government. Jails are limited in the provision of

programming for many reasons. First, jails often are not focused the same way as prisons on reducing recidivism due to housing so many temporary and short term offenders. Much of the day to day in jails is logistical, ensuring that there is enough space for all offenders and that conditions do not degenerate (Lyman and Lobuglio, 2006). "With high demands, limited resources, and a focus on care, custody, and control, sheriffs and jail administrators often consider the correctional goals of rehabilitation and reentry preparation as secondary" (Solomon et al., 2008: 5). Jails may not have nearly the same capacity to treat offenders compared to prisons. Jails have less time, staff, and other resources to dedicate towards treatment since offenders tend to stay for shorter terms and jails serve numerous functions (Solomon et al, 2008).

Across the board, programs and treatments are offered in a more limited matter in local jails than state prisons. The 2006 census of jails showed that, for example, only about 10% of jails had alcohol and drug treatment programs and 46% of facilities had some form of work program or work prerelease program (Stephan, 2011). In 2005, approximately 88% of state prisons offered inmate work programs, 85% offered educational programs and 74% of state facilities offered drug and alcohol dependency programming (Stephan, 2008).

The lack of programming in jails may become problematic in regards to helping inmates re-enter into society and keep away from criminal activity after release. One important example is mental health treatment (Mulvey and Schubert, 2016). Offenders with mental health issues tends to have higher rates of recidivism after release (Baillargeon *et al,* 2009), and jail offenders who receive mental health treatment and case management are less likely to recidivate (Solomon et al., 2006; Ventura et al., 1998).

Lovell and colleague (2002) conducted similar research in the prison setting and found lower recidivism rates for those who receive treatment. In jails, offenders may not be properly diagnosed with mental health disorders and thus are also released without proper treatment or without being directed to treatment. Many jail inmates who report problems of substance abuse and mental health are not treated, even when jails are equipped with some treatment capacity (e.g. Freudenberg et al., 2008).

Unlike state prisons that are often located in rural areas of the state but house offenders from predominantly urban population centers, county and city jails house offenders from the immediately surrounding community. Thus, the problems of jail inmates reflect the problems of the community. This is salient especially in rural counties, where opioid epidemic has hit hard in recent years but the treatment capacity in jail and outside tends to be limited (Ward, 2015). In addition, inmates in rural jails have limited programming opportunities while incarcerated, and struggle with limited public transportation options, affordable rental housing, and employment opportunities (Gee, 2006; Ward, 2015; Wodahl, 2006; Zajac et al., 2013). Even though urban jails house large populations, a larger number of jails are likely located in rural counties. For example, in Pennsylvania 48 out of 67 counties are considered rural (Zajac et al., 2012). These rural jails may not be meeting the programming needs of the correctional population who are suffering from issues such as drug addiction that require treatment or reentry help.

As noted earlier, there are significant barriers to providing correctional and reentry programming in jail settings, due to heterogeneous populations and high turnover rates. Limited studies on jail-based reentry programs and services, including

transportation, employment, substance abuse, have generated mixed results (Braga et al., 2009; Miller and Miller, 2010; White et al., 2012; Willison et al., 2014), but the studies that employed more rigorous methods (e.g., propensity score matching) led to promising results and demonstrate that despite the unique challenges in jail settings, reentry programs can reduce recidivism among jail inmates (Braga et al., 2009; Willison et al., 2014). There is one distinctive advantage of jail reentry programs over prison programs: local community-based service providers can take advantage of the proximity to jails and develop "in-reach" programs while inmates are still incarcerated (Willison et al., 2014). Community-based organizations can play a unique role in jail reentry (Crayton et al., 2010). For example, recently through the realignment funding in California, community colleges work with local jails to either allow inmates to take temporary education furloughs or have faculty come into the jails to offer courses (Mukamal et al., 2015). In fact, part of the underlying premises of Realignment in California was that shifting the responsibility of offenders to local governments would result in better outcomes because counties have a greater stake in rehabilitating offenders who will be released to the local community (Petersilia and Snyder, 2013). Another important proposed justification for Realignment was that moving offenders closer to their family and community-based reentry services should improve their reentry outcomes (Petersilia, 2014; see also Solomon et al., 2008), and because of relatively short stays, jail inmates are less disconnected from their families and jobs, and other positive social networks (Roman et al., 2006; Solomon et al., 2008).

The importance of family and friend support in reentry is consistent with several theories. For example, maintaining sources of informal social control during the

adulthood is important for desistance (Laub and Sampson, 2003; Sampson and Laub, 1993). Strain theory also posits that the emotional and instrument support of family and friends can ease the stresses associated with life in confinement and subsequent reentry (Agnew, 1992). It has been well documented that despite challenges, family and friends play a crucial role in providing financial, housing, employment, and emotional support to reentering prisoners (Harding et al., 2014; Travis, 2005; Western et al., 2015; Visher et al., 2004). One important mechanism for those in confinement to maintain social support from outside is visitation. Incarceration can be disruptive to prisoners' social relations, and research suggests that it can, for example, lead to instability and dissolution of marital relationships (Apel et al., 2009; Lopoo and Western, 2005; Massoglia et al., 2011). Maintaining family ties through visitation can strengthen their support during reentry (La Vigne et al., 2005). Importantly, research has largely shown that receiving visits from family and friends while incarcerated is associated with reductions in recidivism (Duwe and Clark, 2013; Hairston, 1991; Mears et al., 2012) as well as misconduct (Cochran, 2012).

Jails have an advantage over prisons in facilitating visitation. Jails are typically located within the county and are closer for families and friends to visit and do not require long trips or a full day off from work just to visit. Prisons, on the other hand, can be located across the state and are typically located in rural areas. Family and friends may not be able to make the long trip due to work, lack of transportation, lack of funds, and numerous other obstacles (Cochran and Mears, 2013).

Research based on a survey of visitors, however, shows a contrast of visitor experiences between jails and prisons. Studies on jail visitors tend to identify many

problems, particularly for small jails, such as poor treatment of visitors by correctional staff, unclean and unkempt meeting areas, a lack of privacy, long waiting periods, inaccessible and confusing visitation policy, and short visiting time (Arditti, 2003, Sitren, et al., 2009; Sturges, 2002; Sturges and Al-Khattar, 2009). Overall, in prisons, perceptions of issues such as cleanliness, security, visitation length, and agreement with the rules are fairly positive (Tewksbury and DeMichele, 2005). Similar to the provision of programming, the relative inferior visitation experience in jails is likely due to lack of resources and less focus on rehabilitation and reentry.

Even though several factors, including distance, length of stay, and heterogeneity within prisons and jails, make prison-jail comparisons of visitation patterns difficult, studies that document visitation patterns are still informative. In Florida, 42% of state prisoners who were incarcerated for at least a year were visited (Bales and Mears, 2008). In Minnesota, 61% of state prisoners who served on average 46 months were visited at least once over their entire incarceration (Duwe and Clark, 2011). There is very little information that exists on visitation in jails. One study on jail visitation by Pierce et al. (2017) finds that 55% of inmates in a county jail in a mid-Atlantic state were visited at least once during the average incarceration length of about 4 months. Thus, despite the short length of stay, jail inmates seem to have a higher likelihood of receiving visitation, most probably due to a shorter distance and relative convenience. Thus, despite the relative lack of resources, jails have an advantage of proximity to facilitate visitation that seems to be associated with reductions in recidivism.

On the whole, it is likely that prisons have a better capacity to reduce recidivism through programming. Prisons have more prevalent and structured programs that are

catered to individuals to improve life circumstances post release. Jails on the other hand, offer fewer programs, are assignment to the programs is not likely based on assessed needs. However, jails are closer to home and provide increases opportunities for visitation and connections to the community, which could reduce recidivism for jail inmates compared to prison inmates. Since rehabilitation is a major factor influencing recidivism and an area with extant literature, it is hypothesized that prisons will fare much better regarding recidivism than jails, despite the local proximity of jails.

2.5 Empirical Analysis of Sentencing and Recidivism

While very little work has been done comparing prisons and jails on recidivism, there have been varying types of sentencing comparisons within the criminological literature. Most studies have looked at the effects of single types of sentences such as incarceration, boot camps, probation, other intermediate sanctions, including intensive supervision, electronic monitoring, and community service on recidivism. Drawing from this literature, it can see that there are some differences in the effects of sentences on recidivism.

As some scholars have concluded (e.g., Cullen and Gendreau, 2000; MacKenzie and Farrington, 2015), sanctions that aim to be more punitive and sanctions that focus on surveillance and control tend to deliver no recidivism reductions. For example, intensive supervision (e.g., Petersilia and Turner, 1993) is typically not associated with recidivism reductions and they could be costly due to higher detections of technical violations and resulting reincarceration. Similarly, meta-analyses suggest that boot camps are no better than jail or prison in affecting recidivism (Wilson et al., 2005). Reviews and meta-

analyses on the effects of incarceration also suggest that incarceration, compared to community sanctions, has a null or somewhat criminogenic effect on subsequent reoffending (Gendreau et al., 1999; Nagin et al., 2009; Villettaz et al., 2015). Similarly, research indicates that increasing the length of incarceration sentence tends not to be beneficial (Loughran et al., 2009; Nagin, 2013; Nagin et al., 2009; Snodgrass et al., 2011).

The reviews and individual studies on the effects of incarceration largely ignore the prison-jail difference in their main conclusions, and that could limit the policy relevance. A recent study by Nagin and Snodgrass (2013), for example, combines jail and prison as an incarceration sentence and argue that the study "assumes the effect of incarceration in a state prison is the identical to the effect of incarceration in a county jail, and it further assumes that the conditions of confinement (e.g., security level of the facility, distance from friends and family) do not influence the impact of incarceration" (Nagin & Snodgrass, 2013: 612). While they find no effect of incarceration on recidivism, they do not account for differences between prison and jail that may impact recidivism, thus they could be muddying the effects of individual incarceration type. The studies on the incarceration length also typically does not consider the type of confinement (e.g. Nagin et al, 2009; Nagin and Snodgrass, 2013; Loeffler, 2013). Given that jail lengths tend to be shorter than prison lengths, the lack of relevance for incarceration length in the extant literature may be confounded by the place of confinement.

A very limited number of studies have tested the effects of state prisons versus local jails. In the by-variable matching study of alternative-to-incarceration (ATI)

programs in New York City, Savolainen et al. (2002) found that among felony offenders, jail was associated with higher recidivism (measured as rearrest), relative to state prison, as well as regular probation, and ATI placement. Cochran and colleagues (2014) looks at the effects of a wider range of sanctions, including probation, intensive probation, jail, and prison on recidivism using a sample of convicted felony offenders in Florida. Using propensity score matching, they found that those sentenced to probation or intensive probation were less likely to experience recidivism, which was measured as a felony reconviction, than those sentenced to prison or jail. In the direct comparison between prison and jail, they found that those sentenced to prison were more likely to recidivate than those sentenced to jail (Cochran et al., 2014; similar results are found in Mears et al., 2012).

2.6 Individual Correlates of Sentencing and Recidivism: Selection Bias

While sentencing literature suggests that individuals with certain characteristics are selected into prison and jail sentences, correctional literature indicates that these same characteristics also have an effect recidivism. For example, offenders with higher offense gravity scores, longer prior records, and who were black or Hispanic are more likely to be sentenced to prison than jail. In other words, "offenders sentenced to prison are qualitatively different than those sentenced to jail" (Holleran and Spohn, 2004: 212). While the review below focuses on sentencing predictors, many of the same factors that impact the sentence also have an effect on recidivism (Gendreau et al., 1996). Thus, in order to estimate the differential effects of prison and jail, it is necessary to account for the factors that can predict both sentencing outcomes as well as recidivism.

Focal concerns theory argues that judges make decisions based on the blameworthiness of offenders which includes the harm done to the victims, safety of the community, and the practical constraints of the sentencing decision (Steffensmeier et al., 1998). According to this theory, a judge may be harsher on a male offender than a female offender. Judges may feel a paternalistic need to protect women by sentencing them less harshly, women may be viewed as a caregiver and thus should not be taken away from the home and children, and females may also be viewed as less dangerous and blameworthy and more amenable to rehabilitation than males (Steffensmeier et al., 1993). Rodriguez and colleagues (2006) found that females were less likely to be sent to prison for property and drug crimes, and while equally likely as males to receive prison sentences for violent crimes, the sentences were shorter on average for females. Using data from the Pennsylvania sentencing commission, Johnson (2003) found that females are more likely to receive downward departures compared to males. Several studies indicate that males are more likely to receive harsher sentence than females, indicating that gender plays a role in a judge's sentencing decision (Spohn and Holleran, 2000; Steffensmeier et al., 1998). It is, thus, important to include gender in the model since a judge may be influenced in his/her decision to sentence a female to prison or jail if that judge sees one of those sentences as more or less severe.

Similarly, according to focal concerns theory, older offenders will receive less harsh sentences compared to younger offenders. Older offenders appear less dangerous and likely to pose a risk to the community. Research has shown that offender's age has an impact on sentencing. For example, Steffensmeier, Kramer, and Ulmer (1998) and Spohn and Holleran (2000) found that younger offenders are most likely to receive harsher

sentencing outcomes, which include the in/out prison decision and sentence length. Specifically, age interacted with other demographic characteristics such as gender and race to increase the severity of sentences (Spohn and Holleran, 2000). Age at first arrest was also included since it is likely that offenders who started younger are seen as more dangerous and less likely to rehabilitate. Those who were first arrested when young are also likely to have a longer prior record history, which will be discussed further.

Offense type is also a likely predictor of sentence severity, since offense type is associated with the offender's perceived dangerousness and blameworthy. For example, a violent crime and property crime which result in the same offense gravity score on a sentencing guideline, would possibly bias a judge to sentence the violent offender to prison over jail due to the belief that violent offenders are more culpable and blameworthy than property offenders. According to focal concerns theory, the perception of blameworthiness will have an effect on sentencing (Steffensmeier et al., 1998). Consistent with the view that more serious crimes are seen as more dangerous and causing greater harm to the victim, King and colleagues (2010) found that those with more serious offenses were at greater odds of receiving an incarceration term than those with less serious offenses. Kramer and Steffensmeier (1993) also found that offense severity played a large role in judges' sentencing decisions.

Research has indicated a clear trend that offender race plays a role in sentencing. Albonetti (1987, 1991) argued a case for bounded rationality in regards to the attribution hypothesis. According to this theoretical framework, judges make decisions with limited knowledge. Factors that impact these decisions include race, current offense, prior record, and other demographic factors. Given a short period of time and this limited information,

judges will make sentencing decisions based on these extralegal factors. Often prejudices and stereotypes may play a role in the judge's decision. Research shows that minorities tend receive harsher sentences than whites. Steffensmeier and Demuth (2001) found that Hispanics are more likely to receive that harshest sentences compared to other racial categories. On the other hand, Steffensmeier and colleagues (1998) found that young black men receive the most severe sentences, however race alone has the largest impact on sentencing. Bales and Piquero (2011) also found that blacks receive the harshest penalties, followed by Hispanics. These findings demonstrate the importance of accounting for race in the model, as race may play an important role in judges' sentencing decisions.

There is often a trial penalty for offenders sentenced by trial instead of plea. Research shows that offenders who go to trial are more likely to receive a harsher sentence than someone who pleads guilty (Johnson, 2006; Ulmer and Bradley, 2006; Ulmer and Johnson, 2004). It is important to include disposition type in the model, as the judge may take this factor into account when deciding final sentence.

Ulmer and Johnson (2004) found that differences between counties explain approximately 21% of the variation in sentencing outcomes outside of extralegal factors. Across counties, a differential impact on sentencing has also been found. Similarly, Johnson (2006) found that the judge and the sentencing county both affect whether a person is sent to prison and the sentence length. Wang and Mears (2010) examined the effect of racial and ethnic threat on the probability of either prison or jail sentences at the county level. They found that context matters, and that counties with greater racial threat were more likely to utilize prison sentences whereas counties with greater ethnic threat

were more likely to sentence offenders to jail. The probability of incarceration varies by county as well as individual level factors, indicating that it is not enough to control for individual case characteristics, but also the county level variation.

Finally, prior record is expected to have an effect of the decision for prison or jail. In agreement with focal concerns theory and attribution hypothesis, judges tend to sentence offenders with longer prior records to harsher sentences since these offenders are more dangerous and more likely to pose a threat to public safety via reoffending. Kramer and Steffensmeier (1993) found that after offense severity, prior record had the next largest effect of sentencing. Steffensmeier and colleagues (1993) also found that offense severity and prior record had the largest effect on the sentence imposed. Those with larger prior records were more likely to receive prison and receive longer sentences than those with short records.

2.7 Literature Conclusions and Limitations

The theory and empirical literature reviewed above suggests that there is reason to examine differential impacts of prison against jail on recidivism. Recent correctional reforms, such as California's Realignment or justice reinvestment, are implemented under the assumption either that jails and prisons are interchangeable or that jails can lead to lower recidivism because of proximity to family and community resources. The review above however points to a more complex picture. Based on qualitative accounts and offender perceptions, confinement conditions of jails are inferior to those of prisons. Furthermore, despite the tendency of jails to bring in services and programs from the community, jails tend to be limited not only in providing programming but also other

aspects of facility operation that could impact recidivism, such as classification and risk-need-based assignment to interventions. In addition to the relative convenience of "in-reach" programs, jails also enjoy better access to visitation. All in all, given that offenders clearly perceive jails as less desirable and less rehabilitative, even after accounting for the physical proximity to family and community, and given that jails in general have less focus on rehabilitation and reentry, it seems that overall prisons will lead to better recidivism outcomes than jail.

To date, limited empirical evidence base exists for the differential impacts of prison and jail.[5] It is important to recognize that today's reforms that involve shifts from state prison to local jail are making the traditional distinction between prison and jail sentences less clear. As a result of efforts to ease costly mass prison incarceration and overcrowding, offenders with more serious history and lengthy sentences are increasingly housed in local jails. The literature on incarceration effects, especially more rigorous experimental and quasi-experimental work, is limited to short custodial sanctions because alternative (or comparison) sanctions are considered a substitute (Villettaz et al., 2015). This limitation also applies to the studies on prison-jail comparison. Typically, prison offenders who are comparable to jail offenders serve relatively short sentences. Thus, the existing studies that compare prison and jail offenders (Cochran et al., 2014; Savolainen et al., 2002) do not adequately answer whether prison or jail fares better. The current study takes advantage of the wide overlap of offenders who could receive prison or jail sentence.

[5] An ongoing study about California Realignment can shed light on the differential impacts of prison and jail on recidivism by comparing offenders who were incarcerated in state prison before Realignment but who are now incarcerated in local jail (Bird and Grattet, 2016).

There are other limitations of the existing prison-jail comparisons that the current study addresses. The scope of the study by Savolainen et al. (2002) is geographically limited to New York City, and the focus is also limited to ATI programs. Thus, generalizability to states and more typical incarcerated populations is uncertain. While the study by Cochran et al (2014) is closer to the current one, both in terms of the analytical approach and the sample, there are important differences that are relevant to the theory and policy implications. The 2014 study used measures of being in prison less than one year and less than two years to attempt to make the prison sample more comparable to the jail sample it does not explicitly ensure that the prison offender could have been sentenced to jail. Selection bias was introduced into the sample by assuming that a judge would consider jail for those in the prison sample, when it is possible that the judge would never be able to use jail as an alternative sentence. The fact that 16%-38% of offenders are removed in prison-jail comparisons because they were off common support (Cochran et al., 2014) may indicate a problem of limited comparability. Explicitly accounting for the constraints on judges sentencing through sentencing grids sets the current paper apart from the Cochran et al study, and it assures that as far as the guideline is concerned that compared offenders are similarly situated.

Pennsylvania also offers a unique advantage of comparing relatively similar offenders who could be sentenced to jail or prison. In most states, a jail sentence is less than a year and comparing jail-sentenced and prison-sentenced offenders could risk comparing those with significantly different sentence lengths. In Pennsylvania, offenders with maximum sentences as long as 5 years could be sent to county jail while those with sentences less than a year could be sentenced to state prison, which creates sufficient

overlap of comparable offenders. Pennsylvania offers a unique look at these longer sentences that normally are not seen in jails in other states, including Florida.

Further, it is important that the current study uses more complete measures of recidivism as the outcome. Cochran et al (2014) uses felony conviction as the sole recidivism outcome, which may capture serious reoffending, it misses more minor but prevalent reoffending (misdemeanor arrests). It also fails to account for the possibilities of reincarceration. Offenders released from incarceration, either jail or prison, are often under post-release community supervision (probation or parole), and violations of supervision conditions, some of which may not be criminal (technical violations), can return them to prison or jail. Those who are incarcerated as a result of arrests or violations are generally no longer at risk of further recidivism while incarcerated, thus relying on felony reconviction measure only likely underestimate true recidivism prevalence. The same problem is present for Savolainen et al. (2002), which uses rearrest as the recidivism outcome. While rearrest likely captures more complete recidivism patterns, failing to account for reincarceraton, either to jail or prison, is problematic given that incarcerated offenders, especially prisoners, tend to be on post-release community supervision. Thus, the current study is unique in its use of both rearrest and reincarceration, both in the state prison and county jail.

It is also important to examine possible heterogeneous effects of prison and jail. The current study examines the possibility that the effects of prison and jail may vary as a function of offender and sentence characteristics. For example, those in jails for short periods of time may have lower recidivism rates than those in prisons for the same period since programming may not be as important for these shorter stays. On the other hand,

offenders with long sentences may fare better in prisons since they will be subject to greater rehabilitation and reintegration programming. The effect of length of stay on recidivism may also be impacted by the frequency and amount of visitation, the time away from the family and employment, as the loss of income due to being incarcerated.

Additionally, this research explores possible heterogenous effects across sentencing grids. While the main matching analysis compares offenders within individual grids where current offense gravity score and prior record score are the same, it is possible that the effects of prison or jail systematically vary across grids. For example, offenders with less serious current offense and less extensive criminal history may be more susceptible to prison's criminogenic effects.

Crime types are also individually analyzed to explore variations in the prison effects on recidivism that may be a result of the severity of the offense committed by the offender. A study by the Pennsylvania Commission on Sentencing (2013) found that the current offense, offense gravity score, and race were all predictors of recidivism. Specifically, the study found that property crimes results in the highest probability of recidivism, followed by drug offenses, and finally violent offenses. In addition to recidivism heterogeneity across offense types, there may be difference in criminal learning based on the type of offense and facility an offender is sentenced to. Bayer and colleagues (2009) found that being exposed to offenders with similar crime types within a juvenile facility increases the probability that an offender will recidivate. Violent offenders in prison may be exposed to a greater number of violent offenders compared to jails which tend to house lower level, non-violent offenders, therefore violent offenders sent to prison may be at a greater risk of recidivism. On the other hand, drug offenders

sent to jail are likely to be exposed to more drug offenders than if they were sentenced to prison, therefore it is possible that drug offenders would have lower risks of recidivism has they been sentenced to prison due to the more serious nature of offenses sentenced to prisons.

Race differences were analyzed as well to account for differences in the prison and jail experience based on race. Blacks may experience incarceration differently than whites. Research has shown that blacks prefer prison sentences over alternative sentences, including jail due to perceived severity and risk assessments of these sentences (Applegate, 2014; May et al., 2004; Wood and May, 2003). Crouch (1993) argued that blacks are subject to greater disadvantage due to structural conditions of the community and society compared to other groups. He argued that "because so many of these inner-city males are imprisoned, they routinely find friends and even relatives already in prison who can provide information, protection, and material goods" (Crouch, 1993: 71). According to this argument blacks would prefer prison sentences over alternative sanctions not only due to the increased odds of violating conditions of the alternative sanctions, but because the experience within a prison would provide an environment where success to complete a sentence would be enhanced. Based on this argument, blacks may have less recidivism compared to whites when incarcerated due to the cultural experience. However, taking this argument further, blacks may fare better when sentenced to a local county jail where the connections to other known community members would be greater than when sentenced to a prison.

The current study improves upon prior work by exploring these heterogeneous effects that could impact recidivism based on the facility an offender is sentenced to and further explores these differences.

Chapter 3: Data & Methods

3.1 Pennsylvania Context

The current research focuses on Pennsylvania, which offers several advantages. First, the sentencing guidelines in Pennsylvania offer a broad range where offenders can receive either prison or jail, which is not necessarily the case for all guideline systems. Florida, for example, has a small margin on the guidelines where an offender can receive either a state prison sentence or a non-state sentence. However, non-state sentence is not defined specifically as jail (Florida Criminal Code, 2001). As discussed earlier, offenders can be sentenced to the maximum term of 5 years in county jail or less than 1 year in state prison. Pennsylvania also requires judges to adhere to the guidelines and the system falls closer on the mandatory end of the sentencing guideline scale (Kauder and Ostrom, 2008). A mandatory sentencing scheme gives a judge less discretion to diverge from the guidelines, therefore the offenders sentenced in this sample are more likely to receive a sentence based on their prior record and current offense than states with fully advisory guidelines. The sentencing guidelines in Pennsylvania provide ideal conditions in which to analyze recidivism of a comparable group of offenders in prison and jail.

Figure 1 displays the 6th edition of the Pennsylvania Sentencing Guidelines, which was released in 2008 and corresponds more directly to the current data of 2009 and 2012 sentenced offenders. The current study focuses on those in levels 3 and 4, the blue and yellow grid boxes. Within these cells offenders can receive prison, jail, or restrictive intermediate punishments. Since intermediate sanctions, such as house arrest, electronic monitoring, and mandated drug and alcohol treatment, are mostly sanctions served in the

community and not the focus of the current research, those cases were removed from analysis, and only the offenders sentenced to prison or jail were included. Similarly, cases in either the white or green grid cells were not included in analysis.[6] In the green level 5 grid cells, offenders largely receive a prison sentence. Within the white and grey level 1 and 2 cells, almost all offenders could receive jail, intermediate sanctions, or probation (Pennsylvania Commission on Sentencing [PCS], 2013). Since levels 1, 2, and 5 do not have an appreciable overlap between prison and jail, they offer limited, if any, information for the current study.

The guideline itself is comprised of offense gravity score (OGS) and prior record score (PRS). Offenders are assigned an offense gravity score based on the severity of their current conviction offense. This score ranges from 1 to 14, with 14 being the most serious offense. A score of 1, for example, can include a DUI or possession of a small amount of marijuana, a level 8 includes offenses like assault with a firearm or theft greater than $100,000, while a score of 14 includes murder and rape. Prior record score is based on the offender's criminal history and can range from 0 to 5, with 5 being a longer criminal history. Prior record score is based on convictions and adjudications for all past offenses (§ 303.7. Prior Record Score).

[6] The jail sentence group includes split sentences, in which a jail term is followed by probation.

Figure 1. Pennsylvania Sentencing Guidelines 6th Edition[7]

Pennsylvania Commission on Sentencing

§303.16
Basic Sentencing Matrix — **6th Edition, Revised (12/05/2008)**

LEVEL	OGS	Example Offenses	PRIOR RECORD SCORE 0	1	2	3	4	5	RFEL	REVOC	AGG/MIT
LEVEL 5 State Incar	14	Murder 3 Inchoate Murder/SBI Rape (child <13 years)	72-SL	84-SL	96-SL	120-SL	168-SL	192-SL	204-SL	SL	~/- 12
	13	Inchoate Murder/no SBI Weapons (mass destr./injury) PWID Cocaine, etc. (>1,000 gms)	60-78	66-84	72-90	78-96	84-102	96-114	108-126	240	+/- 12
	12	Rape IDSI Robbery (SBI)	48-66	54-72	60-78	66-84	72-90	84-102	96-114	120	+/- 12
	11	Agg Asslt (SBI) Voluntary Manslaughter Sexual Assault PWID Cocaine,etc.(100-1,000 gms)	36-54 BC	42-60	48-66	54-72	60-78	72-90	84-102	120	+/- 12
	10	Kidnapping Agg. Indecent. Asslt Agg Asslt (att. SBI) Arson (person inside) Hom. by veh.(DUI & work zone) PWIDCocaine,etc.(50-<100 gms)	22-36 BC	30-42 BC	36-48 BC	42-54	48-60	60-72	72-84	120	+/- 12
	9	Sexual exploitation of children Robbery (F1/F2) Burglary (home/person) Arson (no person inside)	12-24 BC	18-30 BC	24-36 BC	30-42 BC	36-48 BC	48-60	60-72	120	+/- 12
LEVEL 4 State Incar/ RIP trade	8 [F1]	Agg Asslt (BI w/DW) Theft (firearm) Identity theft (60 yrs., 3rd off.) Hom. by veh.(DUI or work zone) Theft (>$100,000) PWID Cocaine,etc. (10-<50 gms)	9-16 BC	12-18 BC	15-21 BC	18-24 BC	21-27 BC	27-33 BC	40-52	NA	+/- 9
LEVEL 3 State/ Cnty Incar RIP trade	7 [F2]	Robbery (inflicts/threatens BI) Burglary (home/ no person) Statutory Sexual Assault Theft (>$50,000-$100,000) Identity theft (3rd off.) PWID Cocaine,etc.(2.5-<10 gms)	6-14 BC	9-16 BC	12-18 BC	15-21 BC	18-24 BC	24-30 BC	35-45 BC	NA	+/- 6
	6	Agg Asslt (physical menace) Hom. by vehicle Burglary (not home/person) Theft (>$25,000-$50,000) Arson (property) PWID Cocaine,etc.(<2.5 gms)	3-12 BC	6-14 BC	9-16 BC	12-18 BC	15-21 BC	21-27 BC	27-40 BC	NA	+/- 6
LEVEL 2 Cnty Incar RIP RS	5 [F3]	Burglary (not home/no person) Theft (>$2000-$25,000) DUI (M1) PWID (1-<10 lb of marij)	RS-9	1-12 BC	3-14 BC	6-16 BC	9-16 BC	12-18 BC	24-36 BC	NA	+/- 3
	4	Indecent assault Forgery (money, stocks) Weapon on school property Crim Trespass (breaks in)	RS-3	RS-9	RS-<12	3-14 BC	6-16 BC	9-16 BC	21-30 BC	NA	+/- 3
	3 [M1]	Simple Assault Theft ($200-$2000) DUI (M2) Simple Possession	RS-1	RS-6	RS-9	RS-<12	3-14 BC	6-16 BC	12-18 BC	NA	+/- 3
LEVEL 1 RS	2 [M2]	Theft ($50-<$200) Retail Theft (1st.,2nd.) Bad Checks ($500-<$1,000)	RS	RS-2	RS-3	RS-4	RS-6	1-9	6-<12	NA	+/- 3
	1 [M3]	Most Misd. 3's;Theft (<$50) DUI (M) Poss. Small Amount Marij.	RS	RS-1	RS-2	RS-3	RS-4	RS-6	3-6	NA	+/- 3

1. Yellow (Level 4) and Blue (Level 3) shaded areas of the matrix indicate restrictive intermediate punishments may be imposed as a substitute for incarceration.

2. When restrictive intermediate punishments are appropriate, the duration of the restrictive intermediate punishment programs are recommended not to exceed the guideline ranges.

3. When the range is RS through a number of months (e.g. RS-6), RIP may be appropriate.

4. All numbers in sentence recommendations suggest months of minimum confinement pursuant to 42 Pa.C.S. 9755(b) and 9756(b).

5. Statutory classification (e.g., F1, F2, etc.) in brackets reflectthe omnibus OGS assignment for the given grade.

Key: Level 1=Purple, Level 2=White, Level 3=Blue, Level 4=Yellow, Level 5=Green, Agg/Mit=Orange

BC	=	boot camp	RIP	=	restrictive intermediate punishments
CNTY	=	county	RS	=	restorative sanctions
INCAR	=	incarceration	SBI	=	serious bodily injury
PWID	=	possession with intent to deliver	SL	=	statutory limit (longest minimum sentence)
REVOC	=	repeat violent offender category	~	=	no recommendation (aggravated sentence would exceed statutory limit)
RFEL	=	repeat felony 1 and felony 2 offender category	< ; >	=	less than; greater than

Note: *6th Edition, Revised Basic Sentencing Matrix* is the same as the *6th Edition Basic Sentencing Matrix*

URL: http://pasentencing.us
Phone: 814.863.2797

[7] §303.16 Basic Sentencing Matrix

Pennsylvania has a separate state and county corrections system, making it possible to differentiate between county jails and state prisons. Some states have a unified correctional system where jails and prisons are operated by the State Department of Corrections. These states include Alaska, Connecticut, Delaware, Hawaii, Rhode Island, and Vermont (Krauth, 1997). In three of these states, programming and facilities are the same, therefore there would be no true distinction between prisons and jails. In Pennsylvania, as in most states, 63 local jails are funded and operated at the county level, by county government, and prisons are funded and operated at the state level. While in many states, jails are administered by elected sheriffs, in Pennsylvania, jails are administered by wardens who are appointed by the county executive or county commissioner (Brewster and Dammer, 2014). In addition to county government, state law and regulations provide another layer of oversight to the operation of county jails, and the Pennsylvania Department of Corrections (PADOC) conducts inspections of county jails and provides training to jail staff (Zajac and Kowalski, 2012). County jail capacity and population varies significantly across counties. For example, facilities in the largest jail systems in Pennsylvania, Philadelphia and Allegheny, house over 2000 inmates on any given day, larger populations than many Pennsylvania state prisons. In contrast, the average rural county jail population in Pennsylvania is about 170, a smaller population than those housed in a cell block in large state prisons (Zajac and Kowalski, 2012). While large urban jails experience similar overcrowding issues as state prisons, smaller rural jails tend operate below the designed capacity, and they have housed state prisoners in recent years to relieve the population pressure (Zajac and Kowalski, 2012).

The programming offered within a facility varies across different county jails, while there is a standard set of programming offered in each state prison. Allegheny County has demonstrated a strong commitment to improve reentry (Willison et al., 2014). In 1997, Allegheny County established the Allegheny County Jail (ACJ) Collaborative that leverages existing resources of multiple county agencies to provide in-jail human services and transitional community services (Yamatani, 2008). There is also a recent effort to provide reentry programs with partnership between the ACJ and community-based service providers, which has been shown to be effective in reducing recidivism (Willison et al., 2014). The jail offers an extensive list of programs, including, drug and alcohol treatment, cognitive-behavioral therapy, and education and vocational programs, including GED classes, and programs focusing on parenting skills (ACJ, n.d.). There is less documentation about programming offered in the other four county jails. The programming provided by Lackawanna County jail as well as community in-reach include substance abuse programs, anger management, cognitive behavioral and parenting, and life skill classes, educational and employment reentry programs, such as GED tutoring and job search support groups (Pennsylvania Mental Health and Justice Center of Excellence, 2014). Lehigh County offers drug and alcohol treatment, educational programs, life skills courses, and religious services (Lehigh County, n.d.). Northampton provides therapeutic community life skills program, Alcoholics and Narcotics Anonymous groups, parenting courses, and reentry assistance program that focuses on post-release education and employment (Pennsylvania Mental Health and Justice Center of Excellence, 2013). While there is little public information about programming in the Westmoreland county, mental health re-entry case management is

provided through a contract with Westmoreland Case management & Supports (Pennsylvania Mental Health and Justice Center of Excellence, 2010).

As evident from the few evaluations that exist on jail programs (e.g., Braga et al., 2009) and the descriptions of Pennsylvania jail programs, due to limited resources, budget, and staff, many jails take advantage of and depend on in-reach services provided by local community-based organizations. Therefore, it is likely that jails will pale in regards to programming in comparison to prisons.

At the state level, the Pennsylvania Department of Corrections offers standardized programming in all state prisons. The state offers many treatment options, educational and vocational programming, reentry programs, including cognitive behavioral therapy, alcohol and drug treatment programs, violence prevention, sex offender programs, as well as education and vocational programming (PADOC, 2017). The PADOC also recently launched the Transitional Housing Unit in select facilities that offer various reentry-focused workshops on employment, life skills, vocational certification, parenting, mental health, and parole supervision. The level of resources for rehabilitation and reentry at PADOC cannot be matched by county jails. PADOC has specialized bureaus, including Treatment Services, Reentry and Transitional Services, Correctional Industries, Correction Education, which are dedicated to providing various treatment and programs.

3.2 Data

The data for this study came from multiple sources.[8] The Pennsylvania Commission on Sentencing (PCS) provided data on all offenders sentenced within the state in 2009 and 2012. First, a sentencing cohort was chosen over a release cohort to ensure that any selection effects including historical changes, judge differences, or courtroom cultural shifts would not impact the results. The purpose of this research is to look at the effects of the sentence an offender receives on recidivism by comparing two offenders with similar propensities to be assigned to prison; a sentence cohort reduces biases within the sentencing decision by eliminating differences in sentencing laws or courtroom 'going rates' that may change from year to year. Also, many of these offenders sentenced within the same year will also have similar sentence lengths given the nature of the current study and therefore average time served would not compromise the generalizability of the results. If a release cohort were examined, offenders would be sentenced over varying years, therefore there would be inherent differences between the sentences and types of offenders as well as a possible large discrepancy in the time served of each offender. A sentencing cohort allows for comparisons of judicial trends in sentencing that would not be impacted by temporal differences. Second, these two years were selected to account for key changes in sentencing laws involving assigned place of confinement. Starting in November, 2011, all counties in Pennsylvania were enforcing a law where offenders sentenced to the maximum term of 2 years or more but less than 5 years would be sentenced to state prison, instead of county jail, unless specific conditions

[8] This data was compiled through a collaboration with researchers in state agencies and other organizations, including the Pennsylvania Department of Corrections, Pennsylvania Commission on Sentencing, Pennsylvania Commission on Crime and Delinquency, and the Council of State Governments.

are met (42 PA.C.S. §9762, 2008).[9] Running the analysis both before and after this rule change ensures that any resultant findings are robust to the change in legislation. Any deviations between the two distinct years must be interpreted in light of this shift in both law and policy. Both these years also allow a minimum follow up period for recidivism of at least 1 year after the incarceration term is completed, therefore allowing the inclusion of most offenders in the analysis; if someone is not release before the end of the data collection period, there would be no recidivism information for that offender.

The Pennsylvania Department of Corrections provided information on offenders sentenced to prison. The Pennsylvania State Police provided Rap Sheet data that was accessed through the Department of Corrections, specifically any prior arrests and rearrests of these offenders sentenced in 2009 and 2012. County jail admission and release data were obtained from a select group of counties. There is no centralized data system for jails in Pennsylvania, thus several counties were selected and contacted for data request based on the population size and location. The final dataset includes offenders sentenced to jail in Allegheny, Lackawanna, Lehigh, Northampton, and Westmoreland counties.[10] County jail data were linked to the Department of Corrections

[9] The prison placement is the default except when the jail population is less than 110% of its rated capacity and the district attorney and the sentencing judge agree to the jail placement. Offenders with sentence lengths outside of the 2-5-year range are not affected by the law change. Offenders sentenced to less than 2 years are committed to county jail, and those sentenced to 5 years or more are committed to state prison.

[10] Allegheny County lies in Western Pennsylvania and is large urban county that includes Pittsburgh. Westmoreland is a smaller county in the west adjacent to Allegheny. Lehigh and Northampton are counties in Eastern Pennsylvania. Lackawanna County is in the northeast. Philadelphia, the most populous county, was contacted, but data quality issues prevented its data inclusion. For similar reasons, data from Cumberland (in Central Pennsylvania) were obtained but not used for analysis.

and Sentencing Commission data via State Identification Number (SID) that is unique to each individual sentenced.

3.3 Case Selection

Originally, the data from PCS was organized by sentence, thus for offenders with multiple sentences, the first sentence during 2009 and 2012 was selected. If multiple sentences are recorded on the same date, first the sentence with the highest offense gravity score (offense severity) was selected. If there was no difference in this score, then the sentence with the highest statutory maximum was included since this sentence would indicate the most severe sentence. Judges are likely biased by the severity of the current offense and will likely sentence the more culpable offenders to more severe sentences, therefore it is important to minimize this potential judicial bias.

Initial analyses utilized a sample of offenders sentenced during these two years throughout the state. Analyses based on this state-wide sample use rearrest as the recidivism outcome, while a smaller subsample was examined looking at data from only the five aforementioned counties. These analyses included multiple measures of recidivism, including reincarceration, rearrest, and overall recidivism.

The analysis incorporated the Pennsylvania sentencing guidelines, therefore data was limited to those sentenced in level 3[11] and level 4 grids. Within these two levels, prison and jail are both possible sentences, therefore using the two levels allowed for a comparative sample and offenders sentenced to both types of confinement. Using these levels provides greater leverage into a unique sentencing scheme where jail inmates could

[11] Final analyses were limited to level 3 offenders only, which is discussed in further in detail.

be incarcerated for terms of up to five years and prison inmates could be incarcerated for less than one year, addressing the limitation found in other sentencing schemes where jail inmates only receive sentences of a year or less and prison inmates only receive sentences greater than one year.

Initially, the sample was collected separately for 2009 and 2012 and eventually combined into one dataset. The initial sample included all offenders sentenced in Pennsylvania under the sentencing guidelines. However, only levels 3 and 4 on the grids are of interest to this study, therefore those not sentenced in those grid cells were removed from the analysis; this step included removing levels 1, 2, and 5 offenders who could not have received both prison and jail. Of those sentenced in levels 3 and 4 of the guidelines, 4,281 in 2009 and 4,771 in 2012 were offenders not sentenced to either prison or jail. These offenders received some form of intermediate sanction or probation, therefore were removed from the study since they were not assigned to either the treatment or control group.

In 2009, 120 offenders received boot camp while 137 did so in 2012. These offenders were removed from the sample in order to ensure that the true prison experience is captured. Boot camp, while a prison sentence, acts differently than a prison. The typical offender in Pennsylvania's boot camp system is young, male, and a drug offender. A requirement of the program is that the offender is under 35, and also must apply for the program (Kempinen and Tinik, 2009). There are specific selection biases for offenders within this program that differentiate them from the other prison and jail inmates. The boot camp itself is also run differently than a state prison. The day is very structured similar to a military boot camp and consists of a large amount of rehabilitation

programming (Dermody et al, 2009). Based on these differences between boot camp and prisons, it is likely that the two facilities would act differently and therefore should not be combined as one type of sentence.

Offenders with mandatory minimum sentences were also removed from the sample as they created a small group of offenders with sentence lengths that did not have contingent matches within the grid s/he was sentenced. Mandatory minimums in Pennsylvania are created by the state legislature, not the sentencing commission, and take priority over the sentencing guidelines. In other words, the judge must abide by the mandatory minimum requirement instead of the sentencing guidelines (Robina Institute, 2015). A large portion of these mandatory minimums in levels 3 and 4 include offenders sentenced for a first or second time DUI violation. These mandatory minimum sentences required a 48-hour jail sentence, placing several DUI offenders in jail for a very short period of time.[12] These offenders likely would not receive jail time without the mandatory minimum. There are also not individuals sentenced to prison with this short DUI sanction, therefore removing these cases likely helps ensure comparability between the prison and jail samples.

Similar to mandatory minimums, judges can enhance or reduce sentences using aggravated or mitigated circumstances. These non-conformity ranges can add or subtract anywhere from 3 to 6 months from the standard sentencing range. These sentencing departures, like mandatory minimum sentences, place the offenders sentencing range outside of the grid s/he was sentenced to, thus reducing the comparability within the sample of prison and jail offenders within each grid. Therefore, in order to ensure that a

[12] Almost 50% of the mandatory minimums were for a 5 day or less sentence for a DUI conviction.

comparable sample or prison and jail inmates are created, only those with standard sentences were including in the final dataset. Table 1 shows a comparison within each grid cell of the average minimum sentences for prison and jail inmates sentenced within each grid by months after removing non-compatible cases including non-standard sentences, mandatory minimum sentences, and sentences that do not results in prison or jail. While the average sentence length is not displayed prior to removing non-standard cases, the minimum sentence lengths are much more similar after removing these cases. While it is apparent from these differences in length that judges tend to sentence inmates to prison with longer minimum sentences on average than jail inmates.

An important piece to this current study is that prison and jail sentences look as similar to possible, including the amount of time each inmate serves in the facility. A comparison would not be meaningful if it compares someone sentenced to a short term of jail confinement to someone serving a much longer term in prison because the experience within the facility would vary the longer someone stays incarcerated[13]. Judges sentencing decisions in Pennsylvania seem to be most impacted by current offense severity and prior record score. Research indicates that judges in Pennsylvania first make a decision to incarcerate, followed by what type of incarceration, and then finally the sentence length. These decisions have been shown largely to be influenced by current offense and prior record score, above and beyond demographics such as race (Kramer and Steffensmeier, 1993). While the grids in the Pennsylvania Sentencing Guidelines account for prior record score and current offense gravity score, these are scores built on multiple factors as indicated by the sentencing commission. According to the guidelines, prior record

[13] For example, longer stays could mean less visitation, more learning from other criminals, greater detached from society, etc. Refer to Chapter 2 for a greater discussion regarding these differences.

score is calculated by assigning a point to each type of prior conviction and adjudication. These points are tallied to create a score of the matrix. However, using only this score as well as the offense gravity score does not fully account for similarities or differences in the current offense or prior record history. It is likely that these differences not accounted for in the grids impact the differences in sentence length assigned by the judge, therefore it is important to include alternative measures of the current offense and prior record score to improve comparability between the prison and jail samples and to mitigate selection bias.

Table 1. Average Minimum Sentence Length in Months By Grid (after removing incompatible cases)

	1		2		3		4		5	
	Jail	Prison	Jail	Prison	Jail	Prion	Jail	Prison	Jail	Prison
8	12.9	14.43	9.30	17.89	20	20.40	10.50	23.98	23.00	28.76
7	9.94	12.79	12.45	14.17	15.75	17.2	16.00	20.78	20.40	25.12
6	7.27	11.54	9.87	12.68	11.82	13.88	16.50	17.22	21.11	22.94
5	3.73	9.32	5.57	10.03	7.48	11.41	9.39	12.41	12.24	13.89
4					4.95	9.38	7.09	11.13	9.71	12.14
3							4.40	8.93	7.05	10.74
									2.47	5.53

The 2009 and 2012 samples were combined to create the final sample of 5,602 jail-sentenced offenders and 3,492 prison-sentenced offenders. While a sizeable portion of the initial sample was removed from analysis, this selective process of removing non-comparable cases allows for a more accurate measure of the treatment effect and improves upon prior research that does not account for these differences that may result in poor estimates of sentencing effects.

3.4 Variables

3.4.1 Dependent Variable

The dependent variable in the current study is a binary variable of whether or not an offender experienced recidivism after release. The recidivism outcomes are measured in multiple ways, including rearrest, reincarceration, and overall recidivism, which is defined as the first instance of either reincarceration or rearrest. First, for the statewide sample, whether or not the offender was rearrested for a follow up period of one year after release is used. [14] Longer follow-up lengths of two, three, and four years after release are also examined, although the primary focus across various analyses for the statewide sample is on the rearrest outcome within one year. The subset of offenders who do not have a sufficiently long follow-up period for longer-term recidivism outcomes are removed from the analyses. For the county samples, three primary outcomes are examined: whether or not an offender was reincarcerated into a state or county facility, whether or not they experienced a rearrest, and an indicator for overall recidivism that includes rearrest and reincarceration within one year from release.

For the statewide sample, the actual release date is not available for the jail population, thus the recidivism clock begins at the release date for the prison sample, and at the minimum sentence for the jail sample.[15] For the county sample, the recidivism clock begins at the actual release date for all offenders. A total of 623 offenders were not

[14] RAP sheet data may not include arrests for minor crimes, including summary offenses, that do not result in fingerprints (Carpenter, 2008). Thus, minor crimes may not be captured in the rearrest measure if they are not reported to PSP.

[15] Discussions with the sentencing commission confirms that jail inmates are typically released close to the minimum sentence date.

released by the end of data collection (July, 2016), therefore these offenders were removed from analysis.

3.4.2 Independent (Treatment) Variable

The independent variable or the treatment of this research is a binary indicator of whether an offender was sentenced to prison, instead of jail. Prison is designated as the treatment indicator since current sentencing practices in Pennsylvania are such that jail sentences are the more common incarceration sentencing option within the sentencing grids utilized in this study. According to the Pennsylvania sentencing commission (Chanenson and Woods-Skipper, 2013), approximately 71% of those incarcerated within levels 3 and 4 of the sentencing guidelines were sentenced to jail compared to 29% sentenced to prison.[16] Since jail is used as the default incarceration option for the majority of incarceration-bound offenders within these sentencing levels, the jail-sentenced offenders are considered the control group and the prison-sentenced offenders are defined as the treatment group.

3.4.3 Covariates

To ensure that similarity of offenders being compared between the prison and jail samples, an array of variables that could impact sentencing as well as recidivism outcomes are considered. First, dummy variables were created to indicate which cell on the sentencing guidelines within levels 3 and 4 an offender belongs to, based on the

[16] The removal of mandatory minimum and non-standard cases has resulted in a difference in percentage of cases sentenced to prison and jail within levels 3 and 4 within the current data compared to the sentencing commission report.

offense gravity score (OGS) and the prior record score (PRS). Table 2 displays the number of inmates assigned to prison and jail or each of the grids included in the sample. Blue cells indicate level 3 grid cells, while yellow indicates level 4 grid cells. Grids one to sixteen indicate the blue grid cells for level three offenders. Grids seventeen to twenty-nine indicate level four grid cells. For example, grid one includes offenders with an OGS of two and a PRS of 5. Grid seventeen indicates an offender with an OGS of five and PRS of five. No offenders were sentenced in grids 11, 14, or 16, which all indicate a PRS of 0. Many of these offenders likely received a non-incarceration sentence and were previously removed from analysis, therefore leaving no prison or jail sentences in these grids.

Table 2. Statewide Sample Sizes (Jail and Prison) Across Grid Cells

OGS/PRS	1		2		3		4		5	
	Jail	Prison	Jail	Prison	Jail	Prison	Jail	Prison	Jail	Prison
8	10	74	10	44	3	50	2	51	4	70
7	177	85	20	157	8	95	9	102	5	213
6	268	74	276	117	11	121	10	147	9	313
5	668	102	561	114	322	125	207	138	51	467
4					139	29	77	16	122	65
3							741	151	1318	492
2									574	80

The key to this study is that offenders could be sentenced to either prison or jail within the cells utilized in this sample. Controlling for which sentencing grid the offender was sentenced under should help create a comparable sample of offenders based on OGS and PRS. In other words, on average the study is not comparing an offender with a higher prior record score to an offender with a low prior record score and not comparing an

offender with a serious current conviction crime with an offender with a relatively minor conviction crime, as these offenders would not be similarly situated in terms of their propensities to be sentenced to prison.

In addition to incorporating grid indicators as covariates, several key individual level differences known to impact sentencing and recidivism are accounted for to help comparability between the prison and jail groups. These covariates include the offender's sex, age at sentence and age at first arrest, race, current offense type, disposition type, and sentencing county. Also included in the model is a covariate indicating whether or not a person has a prior record for specific crime types, which is based on prior arrest data. Four binary variables were included for whether an offender had a drug arrest, property arrest, public order arrest, and violent arrest, prior to the date of sentence. The indicator is based on the most serious charge per arrest and does not account for all charges associated with one arrest.

Sex is measured as a binary variable where 1 is male and 0 is female. Age at sentence is a continuous variable representing the age of the offender when s/he was sentenced. Age at first arrest account for the age when the offender was first arrested and not the arrest that led to the current sentence. Race is broken down into binary variables for white, black, Hispanic, and other. In order to account for the type of current offense, five binary variables were created indicating if the offense was a violent, property, drug, dui, or other crime.

Disposition was broken into three dichotomous variables indicating whether the case went to trial (bench, or jury), was plead guilty, or fell into an alternative 'other' category which included cases that were labelled as other or were *nolo contendere*.

A binary variable was created for each county to indicate which county the offender was sentenced in. These variables allow for differences that perhaps would influence the judge's decision to sentence. Sentencing can vary across counties based on factors such as budgets, bed capacity, courtroom cultures, and community level factors such as crime rates (Johnson, 2005; Johnson, 2006; Ulmer and Kramer, 1996).

Table 3 shows the descriptive statistics for each of the covariates in the full sample model for prison and jail separately. There are many differences between the prison and jail samples. First, current offense and prior arrests vary significantly across the two groups. Drug offenders are more likely to be sentenced to jail while violent and property offenders are more likely to be sentenced to prison. Similarly, having a prior drug arrest leads to a greater chance of being sentenced to jail while having a prior property arrest is more likely to result in prison. There are also significant differences between the prison and jail groups in terms of sentencing county and grid. For example, in certain counties prison sentences are much more common than jail sentences while in others jail sentences are utilized more frequently. Additionally, certain grids result in more jail sentences compared to others where prison sentences are more common. Higher level grids, those in level 4, disproportionately result in prison sentences than those grids in level 3. It is important to account for these county level variations because they could have an effect of sentencing and recidivism. For example, if there is a county crime epidemic, judges may sentence more harshly and therefore use prison more frequently. Similarly, upon release, inmates will return to these higher crime communities where the likelihood of recidivism if greater.

It is important to include each of these covariates in the model in order to account for differences in the sentencing decision. Literature has shown that these various factors impact sentence severity.

Table 3. Statewide Sample Descriptive Statistics and Sample Comparisons

		Jail N=5,602		Prison N=3,492		Full Sample Comparisons	
	Variable Name	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**T-Statistic**	**SBS**
Demographics	White	0.5769	0.4941	0.5868	0.4925	-0.9242	1.9934
	Black	0.3558	0.4788	0.3345	0.4719	2.0735*	-4.4782
	Hispanic	0.0277	0.0022	0.0458	0.0035	-4.6084***	9.6577
	Other Race	0.0396	0.0026	0.0329	0.0030	1.6442	-3.5813
	Male	0.8743	0.0044	0.9026	0.0050	-4.1214***	9.0000
	Age at Sentence	34.2508	0.1374	34.1678	0.1635	0.3832	-0.8340
	Age at First Arrest	21.8656	0.1005	22.0366	0.1297	-1.0471	2.2577
	Year	2010.43	0.0200	2010.44	0.0253	-0.4260	0.9185
Current Offense	Drug Crime	0.1985	0.0053	0.3187	0.0079	-13.0914***	27.7164[i]
	Other Crime	0.2606	0.0059	0.2082	0.0069	5.6994***	-12.3991[i]
	Property Crime	0.3802	0.0065	0.3030	0.0078	7.5308***	-16.3400[i]
	Violent Crime	0.1596	0.0049	0.1667	0.0063	-0.8906	1.9163
	DUI Crime	0.0011	0.0004	0.0034	0.0010	-2.4689*	4.9890
Prior Arrests	Prior Drug	0.6059	0.0065	0.6478	0.0081	-4.0119***	8.6727
	Prior Property	0.8181	0.0052	0.7637	0.0072	6.2830***	-13.3949[i]
	Prior Public Order	0.7005	0.0061	0.6893	0.0078	1.1268	-2.4267
	Prior Violent	0.6014	0.0065	0.6082	0.0083	-0.6500	1.4020
Case Factors	Trial	0.0341	0.0024	0.0673	0.0042	-7.3081***	15.1763[i]
	Plea	0.9413	0.0031	0.9089	0.0049	5.8444***	-12.3064[i]
	Other Disposition	0.0246	0.0021	0.0238	0.0026	0.2606	-0.5631
Sentencing Level	Grid 1	0.1025	0.0041	0.0229	0.0025	14.4433***	-33.2672[i]
	Grid 2	0.1323	0.0045	0.0432	0.0034	14.0313***	-31.8602[i]
	Grid 3	0.2353	0.0057	0.1409	0.0059	11.0352***	-24.3270[i]
	Grid 4	0.0248	0.0021	0.0083	0.0015	5.6953***	-12.9619[i]
	Grid 5	0.0137	0.0016	0.0046	0.0011	4.2279***	-9.6266
	Grid 6	0.0218	0.0020	0.0186	0.0023	1.0340	-2.2491
	Grid 7	0.1192	0.0043	0.0292	0.0029	15.1870***	-34.8601[i]
	Grid 8	0.1001	0.0040	0.0326	0.0030	12.0357***	-27.3601[i]
	Grid 9	0.0575	0.0031	0.0358	0.0031	4.6569***	-10.2957[i]
	Grid 10	0.0370	0.0025	0.0395	0.0033	-0.6233	1.3389

	Grid 12	0.0478	0.0029	0.0212	0.0024	6.5112***	-14.6356[i]
	Grid 13	0.0493	0.0029	0.0335	0.0030	3.5975***	-7.9191
	Grid 15	0.0316	0.0023	0.0243	0.0026	2.0117*	-4.4003
	Grid 17	0.0091	0.0013	0.1337	0.0058	-25.8369***	49.8711[i]
	Grid 18	0.0020	0.0006	0.0347	0.0031	-12.7878***	24.5623[i]
	Grid 19	0.0018	0.0006	0.0421	0.0034	-14.5176***	27.7784[i]
	Grid 20	0.0016	0.0005	0.0896	0.0048	-22.7067***	433.1517[i]
	Grid 21	0.0036	0.0008	0.0450	0.0035	-14.0442***	27.1419[i]
	Grid 22	0.0014	0.0005	0.0272	0.0028	-11.3767***	21.8250[i]
	Grid 23	0.0016	0.0005	0.0292	0.0029	-11.7461***	22.5495[i]
	Grid 24	0.0009	0.0004	0.0610	0.0041	-18.5645***	35.2384[i]
	Grid 25	0.0018	0.0006	0.0212	0.0024	-9.4537***	18.2840[i]
	Grid 26	0.0018	0.0006	0.0126	0.0019	-6.5435***	12.8229[i]
	Grid 27	0.0005	0.0003	0.0143	0.0020	-8.4299***	16.1026[i]
	Grid 28	0.0004	0.0003	0.0146	0.0020	-8.7166***	16.5893[i]
	Grid 29	0.0007	0.0004	0.0200	0.0024	-10.0342***	19.1586[i]
Sentencing County	Adams	0.0050	0.0009	0.0115	0.0018	-3.4780***	7.1517
	Allegheny	0.0419	0.0027	0.0266	0.0027	3.8126	-8.4236
	Armstrong	0.0057	0.0010	0.0046	0.0011	0.7235	-1.5795
	Beaver	0.0193	0.0018	0.0069	0.0014	4.8165***	-10.9360[i]
	Bedford	0.0025	0.0007	0.0057	0.0013	-2.4539*	5.0449
	Berks	0.0391	0.0026	0.0493	0.0037	-2.3240*	4.9465
	Blair	0.0120	0.0015	0.0149	0.0020	-1.1963	2.5468
	Bradford	0.0046	0.0009	0.0123	0.0019	-4.1043***	8.3750
	Bucks	0.0484	0.0029	0.0281	0.0028	4.7800***	-10.60[i]
	Butler	0.0155	0.0017	0.0123	0.0019	1.2566	-2.7450
	Cambria	0.0227	0.0020	0.0146	0.0020	2.7012**	-5.9659
	Cameron	0.0002	0.0002	0.0003	0.0003	-0.3373	0.7075
	Carbon	0.0082	0.0012	0.0052	0.0012	1.6960	-3.7519
	Centre	0.0046	0.0009	0.0046	0.0011	0.0406	-0.0875
	Chester	0.0389	0.0026	0.0198	0.0024	5.0885***	-11.3684[i]
	Clarion	0.0039	0.0008	0.0060	0.0013	-1.4107	2.9670
	Clearfield	0.0025	0.0007	0.0095	0.0016	-4.5006***	9.0278
	Clinton	0.0023	0.0006	0.0069	0.0014	-3.3184***	6.7327
	Columbia	0.0052	0.0010	0.0060	0.0013	-0.5249	1.1220

Crawford	0.0082	0.0012	0.0092	0.0016	-0.4790	1.0262
Cumberland	0.0250	0.0021	0.0143	0.0020	3.4628***	-7.6935
Dauphin	0.0277	0.0022	0.0301	0.0029	-0.6679	1.4333
Delaware	0.0753	0.0035	0.0355	0.0031	7.7995***	-17.4686[i]
Elk	0.0018	0.0006	0.0029	0.0009	-1.0679	2.2397
Erie	0.0146	0.0016	0.0447	0.0035	-8.7619***	17.7737[i]
Fayette	0.0086	0.0012	0.0252	0.0027	-6.3691***	12.9346[i]
Forest	0.0005	0.0003	0.0009	0.0005	-0.5844	1.2257
Franklin	0.0127	0.0015	0.0189	0.0023	-2.3712*	4.9959
Fulton	0.0012	0.0005	0.0020	0.0008	-0.8931	1.8732
Greene	0.0039	0.0008	0.0054	0.0012	-1.0480	2.2170
Huntingdon	0.0020	0.0006	0.0020	0.0008	-0.0428	0.0921
Indiana	0.0046	0.0009	0.0046	0.0011	0.0406	-0.0875
Jefferson	0.0025	0.0007	0.0046	0.0011	-1.6847	3.5067
Juniata	0.0011	0.0004	0.0011	0.0006	-0.1041	0.2237
Lackawanna	0.0105	0.0014	0.0527	0.0038	-12.2230***	24.2698[i]
Lancaster	0.0193	0.0018	0.0120	0.0018	2.6413**	-5.8436
Lawrence	0.0080	0.0012	0.0077	0.0015	0.1574	-0.3402
Lebanon	0.0173	0.0017	0.0169	0.0022	0.1498	-0.3235
Lehigh	0.0462	0.0028	0.0530	0.0038	-1.4516	3.1063
Luzerne	0.0298	0.0023	0.0315	0.0030	-0.4560	0.9802
Lycoming	0.0046	0.0009	0.0232	0.0025	-8.0079***	15.8858[i]
McKean	0.0029	0.0007	0.0077	0.0015	-3.2981***	6.7220
Mercer	0.0109	0.0014	0.0158	0.0021	-2.0094*	4.2410
Mifflin	0.0050	0.0009	0.0060	0.0013	-0.6433	1.3723
Monroe	0.0073	0.0011	0.0152	0.0021	-3.6059***	7.4562
Montgomery	0.0727	0.0035	0.0301	0.0029	8.6023***	-19.3804[i]
Montour	0.0014	0.0005	0.0009	0.0005	0.7591	-1.6833
Northampton	0.0336	0.0024	0.0281	0.0028	1.4604	-3.1801
Northumberland	0.0091	0.0013	0.0106	0.0017	-0.7067	1.5104
Perry	0.0036	0.0008	0.0046	0.0011	-0.7472	1.5878
Philadelphia	0.1048	0.0041	0.0908	0.0049	2.1713*	-4.7160
Pike	0.0029	0.0007	0.0103	0.0017	-4.5893***	9.2252
Potter	0.0016	0.0005	0.0017	0.0007	-0.1276	0.2740
Schuylkill	0.0148	0.0016	0.0180	0.0023	-1.1901	2.5370

Snyder	0.0021	0.0006	0.0072	0.0014	-3.6578***	7.3782
Somerset	0.0037	0.0008	0.0106	0.0017	-3.9922***	8.1197
Sullivan	0	0	0.0014	0.0006	-2.8339**	5.3544
Susquehanna	0.0034	0.0008	0.0026	0.0009	0.6816	-1.4927
Tioga	0.0005	0.0003	0.0032	0.0009	-3.0942**	6.0982
Union	0.0016	0.0005	0.0049	0.0012	-2.8342**	5.7434
Venango	0.0086	0.0012	0.0103	0.0017	-0.8440	1.8003
Warren	0.0029	0.0007	0.0089	0.0016	-3.8975***	7.8895
Washington	0.0027	0.0007	0.0029	0.0009	-0.1648	0.3540
Wayne	0.0032	0.0008	0.0112	0.0018	-4.6802***	9.4245
Westmoreland	0.0250	0.0021	0.0074	0.0015	6.0906***	-13.9225[i]
Wyoming	0.0007	0.0004	0.0046	0.0011	-3.8322***	7.5308
York	0.0669	0.0033	0.0421	0.0034	4.9599***	-10.9580[i]

p<.05* SBS>10 [i]
p<.01**
p<.001***

3.5 Methods

3.5.1 Propensity score matching

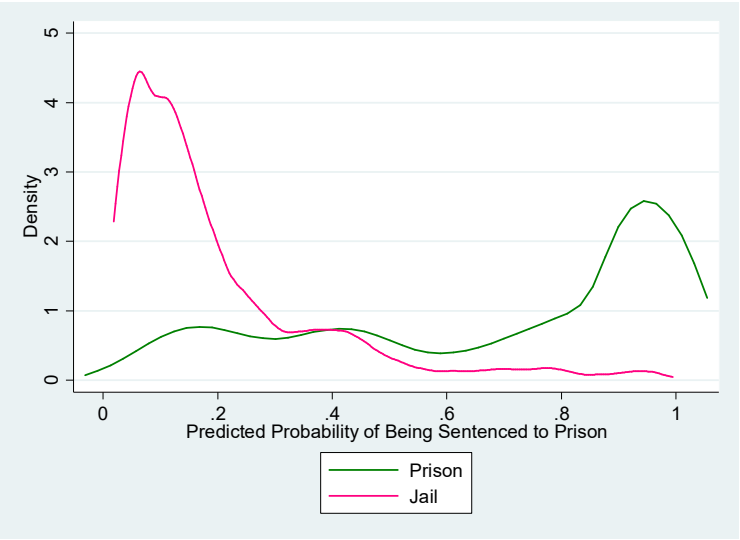
The current study utilizes a propensity score matching to determine if prisons or jails have a differential effect on recidivism; in other words, does the facility an individual is sentenced to effect recidivism. Propensity scores allow for a comparison between prison- and jail-sentenced offenders, which, as the sentencing literature review shows, are likely different on many respects. This method accounts for selection bias based on the observed covariates involved with individual sentencing outcomes (Rosenbaum and Rubin, 1983). Traditional regression methods would risk comparing prison and jail offenders who are very different in terms of their probability to be sentenced to prison.

Matching techniques can be used to match individuals on their propensity to be assigned to treatment based on a large number of characteristics, such as those mentioned previously. However, sample sizes are severely diminished, and issues of bias arise when individuals from the treatment and control groups are matched exactly on the values of each of these covariates, thus propensity scores matching will be utilized, which assigns a propensity score to each individual (Rosenbaum and Rubin, 1985). This score predicts their propensity to be assigned to treatment based on the covariates included in the model. Offenders with the same, or very similar, propensity scores are then compared based on whether they are assigned to the treatment (Rosenbaum and Rubin, 1983). Matching attempts to create a counterfactual for an offender sentenced to treatment that could have also be assigned to the control group.

This study uses the sentencing guidelines to enhance the propensity score analysis. The guidelines act as a factor to ensure individuals being compared could have been sentenced to either prison or jail. One can assume that individuals within a grid cell have similar offending patterns as they will have the same offense gravity score and prior record history. The propensity score will use this grid along with other offender characteristics to predict the probability that an offender will be sentenced to prison.

Figure 2 displays the common support between the prison and jail groups. Common support indicates offenders with propensity scores that are comparable within each group. The area under the curves that overlap between the prison and jail sample indicate this group of offenders who can be matched using propensity scores. Based on the common support graph in Figure 2, it is clear that despite the decent overlap of propensities between the prison jail samples, the shapes of the distributions are nearly opposite between the samples.

Figure 2. Initial common Support for Statewide Sample, including levels 3 and 4



Once the sample was divided into level 3 and level 4 offenders, more coherent common support distributions emerged. Figure 3 shows that within level 3 there are a greater number of individuals in both the treatment and control groups that have a lower predicted probability of being sentenced to prison. In contrast, Figure 4 shows that within the level 4 sample, there are close to no individuals with a low predicted probability of being sentenced to prison for both the treatment and control groups. The highest displayed propensity score is just about 0.6 in Figure 4, showing a lower probability of being sentenced to jail if a person is sentenced in the level 4 grids of the sentencing guidelines. An examination of the data revealed that only 152 offenders were sentenced to jail in level 4.

Figure 3. Common Support in Level 3

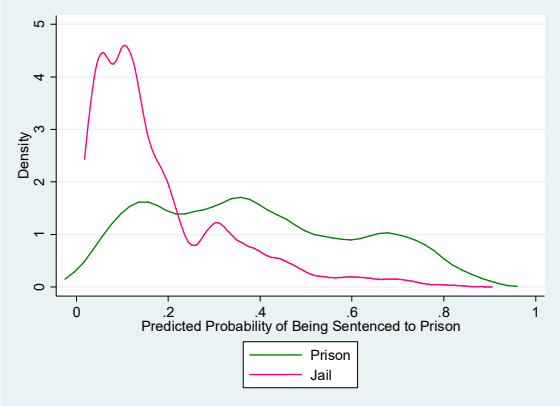
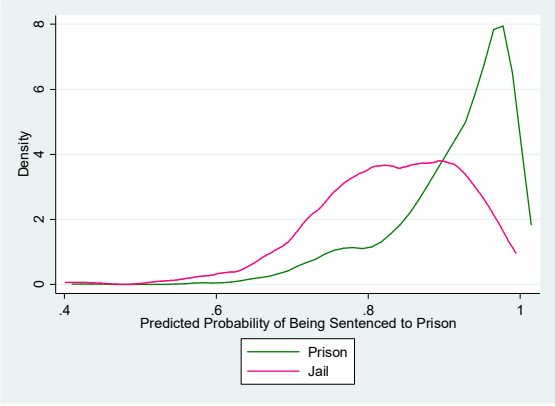


Figure 4. Common Support in Level 4



Based on these common support results, the subsequent analyses will be based on those sentenced to level 3 grids. Within level 3, 79% of the sample is in jail, indicating that there is a higher probability of being sentenced to jail if an offender is sentenced within those grids. Table 4 displays the summary statistics for the prison and jail groups

within the level 3 sample only. By removing level 4 offenders from the sample, balance across several covariates in the model are improved. When including level 4 offenders, current offense and prior arrests varied significantly between the prison and jail sample. After removing level 4, there is balance across these difference indicators. Race remains unbalanced across both samples, whether or not level 4 is included. Several sentencing grids as well as several counties also remain out of balance in the level 3 only sample.

Prior to matching, base recidivism comparisons reveal that within one year from release among the statewide level 3 offenders, 23% of jail inmates are rearrested while 20% of prison inmates are rearrested. Within two years from release, the percent of inmates who are rearrested increases to 36% and 32%, respectively. Within three years from release 44% of jail inmates and 40% of prison inmates are rearrested[17]. Finally, within four years from release the rearrest percentages are 49% and 43%, respectively. These differences reveal that a greater percentage of jail inmates are rearrested post release compared to prison inmates. A t-test for each of these follow up periods reveals that jail inmates are significantly more likely than prison inmates to experience rearrest. For both prison and jail groups, the longer-term base recidivism rates are lower than the existing recidivism statistics for jails and prisons we described earlier. This disparity is likely a result of samples consisting of increasingly lower-risk offenders as the follow-up length increases.

[17] While these numbers are lower than average recidivism reports, it is likely due to removing more serious offenders and those with longer criminal histories.

Table 4: Full Sample Descriptive Statistics and Sample Comparisons

		Jail N=5,450		Prison N=1,588		Full Sample Comparisons	
	Variable Name	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**T-Statistic**	**SBS**
Demographics	White	0.5791	0.4938	0.6625	0.4730	-5.9779***	17.2465[i]
	Black	0.3536	0.4781	0.2632	0.4405	6.7427***	-19.6546[i]
	Hispanic	0.0277	0.1641	0.0435	0.2039	-3.1746**	8.5054
	Other Race	0.0396	0.1951	0.0309	0.1730	1.6169	-4.7600
	Male	0.8738	0.3321	0.8778	0.3276	-0.4313	1.2345
	Age at Sentence	34.2432	10.2853	34.1916	9.7843	0.1776	-0.5142
	Age at First Arrest	21.9035	7.5470	22.5025	8.0169	-2.7397**	7.6943
	Year	2010.4380	1.4989	2010.4870	1.5004	-1.1327	3.2292
Current Offense	Drug Crime	0.1947	0.3960	0.1977	0.3984	-0.2701	0.7689
	Other Crime	0.2618	0.4397	0.2450	0.4302	1.3522	-3.8791
	Property Crime	0.3842	0.4865	0.3873	0.4873	-0.2205	0.6284
	Violent Crime	0.1583	0.3651	0.1675	0.3735	-0.8750	2.4794
	DUI Crime	0.0009	0.0303	0.0025	0.0501	-1.5715	3.8666
Prior Arrests	Prior Drug	0.6042	0.4891	0.5737	0.4947	2.1843*	-6.2093
	Prior Property	0.8194	0.3847	0.8111	0.3916	0.7596	-2.1555
	Prior Public Order	0.6998	0.4584	0.6795	0.4668	1.5500	-4.3979
	Prior Violent	0.6002	0.4899	0.5875	0.4924	0.9046	-2.5759
Case Factors	Trial	0.0336	0.1802	0.0542	0.2264	-3.7670***	10.0584[i]
	Plea	0.9417	0.2344	0.9225	0.2674	2.7659**	-7.5988
	Other Disposition	0.0248	0.1554	0.0233	0.1509	0.3340	-0.9602
Sentencing Level	Grid 1	0.1053	0.3070	0.0504	0.2188	6.6562***	-20.6114[i]
	Grid 2	0.1360	0.3428	0.0951	0.2934	4.3136***	-12.8111[i]
	Grid 3	0.2418	0.4282	0.3098	0.4626	-5.4656***	15.2533[i]
	Grid 4	0.0255	0.1577	0.0183	0.1339	1.6639	-4.9510
	Grid 5	0.0141	0.1180	0.0101	0.0999	1.2446	-3.7066
	Grid 6	0.0224	0.1479	0.0409	0.1982	-4.0482***	10.6051[i]
	Grid 7	0.1226	0.3280	0.0642	0.2452	6.5728***	-20.1456[i]

	Grid 8	0.1029	0.3039	0.0718	0.2582	3.7124***	-11.0457[i]
	Grid 9	0.0591	0.2358	0.0787	0.2694	-2.8241**	7.7555
	Grid 10	0.0380	0.1912	0.0869	0.2818	-7.9801***	20.3177[i]
	Grid 12	0.0492	0.2163	0.0466	0.2108	0.4199	-1.2056
	Grid 13	0.0506	0.2193	0.0737	0.2613	-3.5206***	9.5494
	Grid 15	0.0325	0.1773	0.0535	0.2252	-3.9026***	10.3879[i]
Sentencing County	Adams	0.0051	0.0715	0.0120	0.1088	-2.9408**	7.4179
	Allegheny	0.0406	0.1973	0.0151	0.1220	4.8739***	-15.5082[i]
	Armstrong	0.0053	0.0728	0.0063	0.0791	-0.4611	1.2842
	Beaver	0.0196	0.1387	0.0063	0.0791	3.6605***	-11.8075[i]
	Bedford	0.0026	0.0506	0.0076	0.0866	-2.8844**	7.0304
	Berks	0.0394	0.1947	0.0699	0.2551	-5.0890***	13.4207[i]
	Blair	0.0121	0.1094	0.0107	0.1029	0.4563	-1.3226
	Bradford	0.0046	0.0676	0.0208	0.1427	-6.2981***	14.5048[i]
	Bucks	0.0468	0.2112	0.0170	0.1293	5.3360***	-17.0095[i]
	Butler	0.0160	0.1253	0.0107	0.1029	1.5282	-4.5844
	Cambria	0.0224	0.1479	0.0164	0.1269	1.4695	-4.3618
	Cameron	0.0002	0.0135	0.0000	0.0000	0.5398	-1.9157
	Carbon	0.0081	0.0895	0.0038	0.0614	1.7935	-5.5974
	Centre	0.0046	0.0676	0.0069	0.0830	-1.1501	3.0923
	Chester	0.0391	0.1938	0.0157	0.1245	4.5339***	-14.3283[i]
	Clarion	0.0039	0.0620	0.0076	0.0866	-1.9013	4.9176
	Clearfield	0.0026	0.0506	0.0145	0.1195	-5.7906***	12.9826[i]
	Clinton	0.0024	0.0488	0.0113	0.1059	-4.7462***	10.8556[i]
	Columbia	0.0051	0.0715	0.0076	0.0866	-1.1284	3.0457
	Crawford	0.0083	0.0905	0.0088	0.0935	-0.2151	0.6078
	Cumberland	0.0253	0.1571	0.0151	0.1220	2.3876**	-7.2563
	Dauphin	0.0281	0.1652	0.0283	0.1660	-0.0560	0.1595
	Delaware	0.0756	0.2644	0.0252	0.1567	7.2362***	-23.1940[i]
	Elk	0.0018	0.0428	0.0025	0.0501	-0.5383	1.4674
	Erie	0.0150	0.1217	0.0630	0.2430	-10.6728***	24.9383[i]
	Fayette	0.0088	0.0934	0.0365	0.1876	-8.0153***	18.6985[i]

Forest	0.0006	0.0235	0.0013	0.0355	-0.9330	2.3575
Franklin	0.0127	0.1118	0.0170	0.1293	-1.3126	3.5918
Fulton	0.0013	0.0358	0.0006	0.0251	0.6813	-2.1170
Greene	0.0040	0.0634	0.0044	0.0663	-0.2033	0.5726
Huntingdon	0.0020	0.0449	0.0019	0.0434	0.1017	-0.2925
Indiana	0.0048	0.0689	0.0057	0.0751	-0.4470	1.2445
Jefferson	0.0024	0.0488	0.0050	0.0708	-1.7055	4.3619
Juniata	0.0011	0.0332	0.0019	0.0434	-0.7734	2.0398
Lackawanna	0.0108	0.1035	0.0617	0.2407	-12.2087***	27.4662[i]
Lancaster	0.0198	0.1394	0.0170	0.1293	0.7193	-2.0930
Lawrence	0.0083	0.0905	0.0094	0.0968	-0.4534	1.2691
Lebanon	0.0178	0.1322	0.0189	0.1362	-0.2880	0.8147
Lehigh	0.0472	0.2120	0.0529	0.2239	-0.9375	2.6331
Luzerne	0.0281	0.1652	0.0220	0.1469	1.3121	-3.8600
Lycoming	0.0048	0.0689	0.0214	0.1448	-6.3642***	14.6751[i]
McKean	0.0029	0.0541	0.0101	0.0999	-3.7247***	8.8873
Mercer	0.0112	0.1052	0.0189	0.1362	-2.3904*	6.3269
Mifflin	0.0051	0.0715	0.0057	0.0751	-0.2569	0.7227
Monroe	0.0075	0.0864	0.0227	0.1489	-5.1149***	12.4429[i]
Montgomery	0.0717	0.2581	0.0170	0.1293	8.1587***	-26.8175[i]
Montour	0.0015	0.0383	0.0013	0.0355	0.1940	-0.5647
Northampton	0.0332	0.1792	0.0246	0.1548	1.7436	-5.1665
Northumberland	0.0088	0.0934	0.0120	0.1088	-1.1402	3.1141
Perry	0.0037	0.0605	0.0050	0.0708	-0.7620	2.0775
Philadelphia	0.1022	0.3029	0.0353	0.1845	8.3644***	-26.6880[i]
Pike	0.0028	0.0524	0.0132	0.1143	-5.1567***	11.7808[i]
Potter	0.0017	0.0406	0.0025	0.0501	-0.7084	1.9014
Schuylkill	0.0152	0.1225	0.0239	0.1529	-2.3476*	6.2811
Snyder	0.0022	0.0469	0.0107	0.1029	-4.6615***	10.6315[i]
Somerset	0.0037	0.0605	0.0164	0.1269	-5.5394***	12.7762[i]
Sullivan	0.0000	0.0000	0.0019	0.0434	-3.2113***	6.1507
Susquehanna	0.0035	0.0589	0.0031	0.0560	0.2031	-0.5870

Tioga	0.0006	0.0235	0.0063	0.0791	-4.7000***	9.8471
Union	0.0017	0.0406	0.0063	0.0791	-3.1415**	7.3872
Venango	0.0088	0.0934	0.0113	0.1059	-0.9196	2.5312
Warren	0.0029	0.0541	0.0151	0.1220	-5.6928***	12.9002[i]
Washington	0.0028	0.0524	0.0031	0.0560	-0.2610	0.7306
Wayne	0.0029	0.0541	0.0183	0.1339	-6.7638***	15.0042[i]
Westmoreland	0.0255	0.1577	0.0050	0.0708	5.0271***	-16.7462[i]
Wyoming	0.0007	0.0271	0.0069	0.0830	-4.7159***	10.0353[i]
York	0.0684	0.2525	0.0227	0.1489	6.8824***	-22.0804[i]

p<.05* SBS>10 [i]
p<.01**
p<.001***

Upon determining the prison sentence as the treatment, a propensity score is estimated using a logistic regression model. The logistic regression estimates an individual's propensity to be assigned to prison. After matching on the estimated propensity score, covariates should be balanced to minimize selection bias that may exist in the assignment to prison and jail. The model initially included all covariates that were out of balance. Any covariates that remain out of balance after initial matching will be included in the model. Through multiple iterations of this approach, balance on the covariates should be achieved to the same degree expected from true randomization, less than 10%.

In order to determine the out of balance covariates, t-tests and standardized bias statistics (SBS) were calculated for each of the covariates. The SBS formula is computed as a difference in the means of the treatment and control groups based on a pooled standard deviation, where $\bar{x}_1$ is the mean of the treatment group and $\bar{x}_0$ is the mean of the control group. s_1^2 refers to the variance of treatment group while s_0^2 is the variance and of control group:

$$100\left(\frac{\bar{x}_1 - \bar{x}_0)}{\frac{(s_1^2 + s_0^2)}{2}^{1/2}}\right)$$

According to Rosenbaum and Rubin (1985) a SBS value smaller than 20 shows balance across covariates, although for the purposes of this research a cut-off of 10 will be utilized to ensure maximum balance (Austin, 2009). T-tests are also used as a supplemental quality control across covariate balance since t-tests are impacted too heavily by sample size, while the SBS is not (Stewart, 2006). The final columns of table 4 shows the initial covariate balance for the level 3 sample. Initially 35 out of 100 covariates are out of balance as indicated by an SBS greater than 10. Eight grid indicators

and 24 counties are out of balance, as well as race indicators for white and black and whether the case went to trial[18].

Initially, two types of matching methods were used to ensure robustness and reliability of results. A nearest neighbor model with replacement using three neighbors (NN3) and a nearest neighbor model with no replacement (NR) were tested. A model using three neighbors assigns three treatment cases to each control based on the predicted propensity score from the logistic regression equation.[19] This technique allows for a larger treatment pool and reduces bias in the estimates by ensuring controls are sufficiently matched to treatment cases. If there are a limited number of comparable treatment cases, using a multiple neighbor technique allows these individuals to be used more than once, thus increasing the sample size. 3 neighbors were chosen to ensure a large sample of prison sentenced inmates could be utilized. However, this method does cause a loss of efficiency in the model as indicated by typically larger standard errors since a few individuals may be used multiple times and therefore have a larger influence on the findings.

A nearest neighbor with no replacement method matches one control with one treatment and removes a treatment case from selection after it is matched. Since no treatment case can be used twice the results will be more efficient as they rely less on certain individuals being used multiple times. The model can increase bias, however, since control cases who would have been able to be matched are removed from analysis if the treatment case is already matched to another control.

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[18] Compared to the initial sample including level 4 offenders, the initial balance for level 3 is better and includes more balanced offender characteristics that could impact sentencing and recidivism.
[19] Three neighbor matching was chosen since the prison sample is approximately 1/3 the size of the jail group allowing for an even sample size.

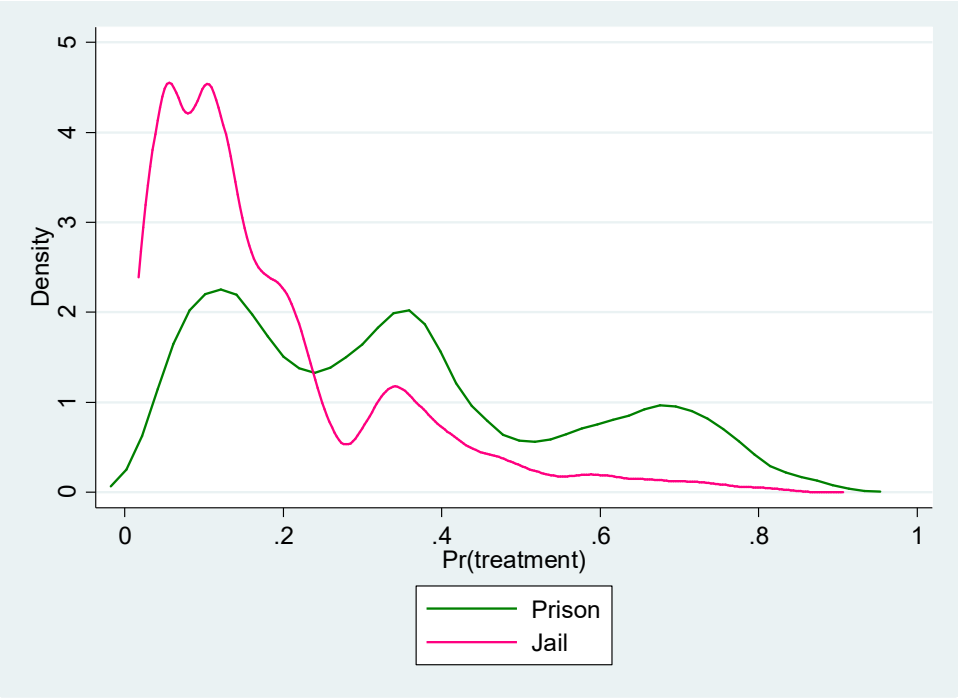
In both models a caliper was included in the analysis to ensure that matches are based on individuals who have very close propensities to be treated so that comparisons are made between a more homogenous pair. The caliper determines the point at which two propensity scores are too far apart to compare and must be determined prior to matching. While there is debate in the literature as to the appropriate caliper, the standard set forth has been to multiply the standard deviation of the predicted propensity score by 0.25 (Rosenbaum & Rubin, 1985). However, recently a more conservative estimate of 0.2 has been suggested (Austin, 2010), therefore the caliper chosen for the analyses presented in this paper will be the more conservative estimate since this number will ensure a closer matched sample.

After predicting the propensity score using both these methods, balance can be examined. Multiple logistic regression equations were required to achieve a level of balance that is acceptable under randomization. Following a NN3 model only one covariate, prior property arrest record, was out of balance. Using a NR method resulted in no covariates out of balance post matching. Both models provide balance better than expected by randomization, implying that the sample is well balanced on the covariates included in the model.

In addition to achieving proper balance, common support across treatment and control groups can show the degree to which cases can be matched. Figure 5 shows the common support for the level 3 sample using the predicted propensity score from the matching model. The area under the curves that overlap include the sample of offenders who can be matched given a common propensity score. Those outside of the overlapped areas will not have a comparable case in the alternative group in which they can be

matched. As expected, the jail group has a larger portion of individuals with lower predicted propensities to be assigned to treatment (prison) while the prison group has a larger share of offenders with a higher predicted propensity to be assigned to treatment compared to the jail group. Although there is some area off common support, there is still a large overlap indicating a large group of offenders who have sufficient matches.

Figure 5. Common Support in Level 3



Given a high degree of common support and balance across covariates, propensity score analysis can be used to compare those sentenced to prison to those sentenced to jail in terms of recidivism. A propensity score analysis predicts the average treatment effect on the treated (ATT), which is the effect of being sent to prison instead of jail for the treated individuals in the sample. This equation is estimated as:

$$E(y_i^1 - y_i^0) | \, T_i = 1$$

where y_i^1 is the expected outcome for individual y given that they were treated, while y_i^0 is their expected outcome given that they were untreated, and T_i indicates the actual treatment assignment for that individual (Apel and Sweeten, 2010).

3.5.2 Heterogenous Effects

As indicated in chapter 2, there is reason to believe that prison and jail may impact certain individuals differently. Analyses were conducted to measure possible differences in the treatment effect across several dimensions. First, subsamples of offenders were broken down by the grid they were sentenced to based on the OGS and PRS. Comparisons within each of these subsamples can be made to increase the homogeneity within the sample. Additionally, a sub-group of offenders was created indicating if they were sentenced to a one year or less minimum sentence. Prison and jail inmates who received these shorter sentences were matched to account for differences in initial sentencing decisions. Since research shows that judges view prison as more punitive (May *et al*, 2008) and likely reserve this sentence for more serious offenders, a comparison of these shorter sentences can help reduce judicial bias inherent in the initial sentencing decision.

Additionally, subsamples of offenders were broken down by the type of crime they committed. Matches were created based on each subsample to determine if certain types of offenders are differentially impacted by the prison experience compared to the jail experience. Violent, drug, and property offenders were each matched and analyzed. Finally, two samples were created based on race: white and black. Based on previous

literature, it is expected that blacks and whites would be differentially impacted by a prison stay compared to a jail stay, therefore both groups were examined. Urban and rural distinctions were also made within the race sample; the location of the facility is expected to play a critical role in the experience an offender has while incarcerated, therefore comparisons were also made across urban and rural sentencing counties.

Within the state of Pennsylvania, all prisons are required to offer a large amount of programming, including educational services, mental health treatment, and substance abuse treatment as well as preparation for reentry, while jails are likely to have much more variation in the levels and types of programming and assistance offered[20]. In some instances, certain jails will offer a wide array or programming, such as in Allegheny County, while others like Westmoreland County jail appear more limited in their services offered for inmates. In order to test for these heterogeneous differences within facilities, an analysis will be conducted comparing differences across jails to see if any particular jails fare better in terms of recidivism of inmates. Due to the high levels of programming available in Allegheny County, those sentenced to jail in Allegheny County will be assigned as treatment while those sentenced to jail in the other four counties will be considered the control groups. Propensity scores will be conducted comparing Allegheny to all the other counties, as well as to each county separately. While these results will not indicate actual differences in programming or other facility level variations, they will help determine if individual facilities, as opposed to prison versus jail, have an effect on recidivism. In other words, this analysis will be used to determine if the facility experience is more important than the differences between prisons and jails.

[20] Refer to section 3.1 for more discussion on programming between prisons and jails

Chapter 4. Results

This chapter presents results of the effects of the sentence between prison and jail on recidivism using level 3 offenders from the Pennsylvania Sentencing Guidelines. First results from the statewide sample are analyzed. Initially the entire sample of level 3 offenders are examined regarding the predicted probability of rearrest within one year. Longer follow-up periods are also analyzed. Additional analyses are discussed looking at potential heterogeneity effects such as time served, crime type, and race. The next section examines the county sample using rearrest, reincarceration, and recidivism as outcomes. Heterogeneity effects could not be examined with the county sample due to the small sample size, however one test was conducted to determine possible differences across facilities that could impact recidivism.

4.1 Statewide Analysis

Prior to reporting results of the propensity score matching methodology, naïve estimates of the effects of treatment on recidivism, as measured by whether an offender was rearrested within one year, were predicted using a logistic regression. A simple model including treatment as the only predictor of recidivism shows that being assigned to prison reduces the probability of rearrest by 18% compared to being sentenced to jail. The finding is statistically significant at an alpha of 0.01, although when other controls are added to the model, the effect diminishes. Including the demographic and case characteristics reduces the degree of statistical significant to an alpha of 0.05, although the odds ratio remains at 0.84 lower odds of recidivism for those sentenced to prison. Adding in grid indicators does not alter the results; however including controls for

counties reduces the effect of treatment on recidivism to a non-significant level. These naïve estimates provide a base understanding of the effects of prison and jail sentences on recidivism; however the analysis is including all the offenders who fall out of common support and may not have comparable matches in the alternative group. These naïve estimates cannot completely account for the differences in covariates across treatment and control conditions. Propensity score methods allow only those who lie within the common support region to be matched, providing more reliable estimates of the effects of treatment on recidivism.

Propensity score matching was conducted using the *psmatch2* package in Stata. A caliper of 0.04 was set meaning that individuals could not be matched if the propensity score difference was greater than 0.04.[21] Table 5 shows the results for the final balanced model using multiple matching techniques. First a nearest neighbor with no replacement matching (NR) model was analyzed. No covariates were out of balance post matching. The ATT reveals that there is no difference in recidivism regardless of treatment assignment. The individuals who received a prison sentence had an average probability of re-arrest within one year of release of 0.2067, while those who received a jail sentence had an average probability of re-arrest within one year of release of 0.2059. The difference of 0.007 is not significant, indicating no difference in recidivism based on sentence. A nearest neighbor with replacement matching technique was also tested using three neighbors (NN3). Balance was achievable where only one covariate remained out of balance post matching. Although the ATT is now negative, the results reveal that this

[21] The standard deviation of the predicted propensity score was 0.2076. The caliper for each model changed depending on the standard deviation of the propensity score in that particular model.

treatment effect is not significantly different than 0, indicating no significant difference between prison and jail conditions of confinement on recidivism.

Table 5. Full Level 3 Model Predicting Probability of Rearrest within One Year from Approximate Release Date

	Treatment Effect (Reported Difference)	**Standard Error**	**T-Statistic**	**Total Matched Pairs**	**Covariates Remaining Out of Balance**
NR Model	0.0007	0.0155	0.05	1,350	0
NN3	-0.0053	0.0160	-0.33	4,744	1
Stratification Matching	-0.0240	0.0130	-1.599	1,588	2

A stratification matching technique was also implemented to account for the variation in propensity scores between the prison and jail groups. The distribution of propensity scores within the level 3 sample give reason to believe that those with a lower predicted propensity to be assigned to prison look different than those with a higher predicted propensity to be treated. Stratification matching divides the propensity scores into a designated number of quintiles and compares individuals within each quintile. Those within each quintile will have similar propensities to be assigned to treatment. The results from each quintile are combined to provide an average treatment effect across all quintiles. A stratification technique using five quintiles was tested, leaving approximately 1,403 within each stratum. Results from this model are consistent with the other two matching techniques; according to the NR and NN3 models, there is a 0% point difference in the predicted probability of recidivism and a 2% lower probability of recidivism for jail inmates according to the stratification method.

4.2 Heterogeneity Effects within the Statewide Sample

4.2.1 Grid Heterogeneity

A series of propensity score analyses were conducted to look more specifically at various factors that could have a direct impact on recidivism. A propensity score was run within each grid to compare offenders sentenced only within the specific grid. A critical advantage to this study is the use grid indicators as a control in order to compare individuals sentenced within the same grid. Previous research has been unable to compare prison and jail samples because these two groups tend to look very different. By looking within each grid, the sample becomes even more homogenous. Results of a NN3[22] matching technique within each grid in level 3 are presented in table 6. Counties were not included in the logistic regressions for these analyses since there were very few cases within each county per each grid making it nearly impossible to achieve balance across counties.[23]

In three grids, grid 2, 9 and 13,[24] results are statistically significant, indicating a significant difference in one year post rearrest probabilities for prison and jail sentenced inmates. In each of these grids, those sentenced to jail have a higher probability of recidivating compared to those sentenced to prison. Grid 2 refers to those who have an OGS of 3 and PRS of 4 in the sentencing guidelines. In grid 2, those sentenced to prison have a probability of rearrest within one year of 0.18, while those sentenced to jail have a probability of rearrest 0.31 within one year from release. The difference of -0.13 indicates that if a prison inmate had been sentence to jail instead of prison, s/he would have had a

[22] Results were consistent across NN3 and NR matching models
[23] Common Support Graphs for all sub-analyses are included in Appendix A
[24] Grid numbers are not an inclination of severity but rather an order created based on the lowest grid cell. More important to the grid binary indicators are the prior record score and offense gravity score for each.

13 percentage point greater probability of being rearrested. Within grid 9, jail inmates have a 10 percentage point greater probability of being rearrested while in grid 13 jail inmates have an 11 percentage point greater chance of being rearrested. While the results are non-significant in other cells which could be an artifact of sample size, 6 out of the 8 grids reveal a negative treatment effect indicating that within one year from release, jails tend to be associated with increased rearrest probability.

Table 6. Treatment Effects within Grids on Rearrest within One Year (NN3)[25]

	OGS/PRS	Treatment Effect (Reported Difference)	Standard Error	T-Statistic	Sample Size (Prison/Jail)	Total Matched Pairs	Remaining Out of Balance Covariates
Grid 1	2, 5	-0.0190	0.0591	-0.31	80/574	79	1
Grid 2	3, 4	-0.1293	0.0445	-2.90***	151/741	147	1
Grid 3	3, 5	0.0294	0.0260	1.13	492/1,318	487	0
Grid 4	4, 3	--	--	--	29/139	--	--
Grid 5	4, 4	--	--	--	16/77	--	--
Grid 6	4, 5	--	--	--	65/122	--	--
Grid 7	5, 1	-0.0612	0.0440	-1.39	102/668	98	0
Grid 8	5, 2	-0.0428	0.0487	-0.88	114/561	113	1
Grid 9	5, 3	-0.0983	0.0480	-2.05**	125/322	117	0
Grid 10	5, 4	0.0354	0.0542	0.65	138/207	132	2
Grid 12	5, 1	--	--	--	74/268	--	--
Grid 13	6, 2	-0.1089	0.0509	-2.13*	117/276	115	0
Grid 15	7, 1	--	--	--	85/177	--	--

p<.05*
p<.01**
p<.001***

[25] Balance was unachievable in several of the grids, which was due to small sample sizes making balance and matching difficult. For example, grid 4 only had 22 prison inmates, while grid 5 only had 7 prison sentenced inmates. Results from these models were not reported as they are unreliable using a propensity score match.

Rosenbaum (2002) developed a sensitivity test to determine the extent of possible hidden bias in a propensity score model. Using the *mhbounds*[26] package in Stata, a sensitivity analysis indicated that the model is sensitive to unobserved bias. This test indicates how two matched individuals could differ in the propensity to be assigned to the treatment group based on unobserved traits. More specifically, the gamma reveals that unobserved confounders increase the odds of prison assignment of treated (i.e prison) offenders compared to untreated (i.e jail) offenders by an additional 5%, therefore the prison effects may lose statistical significance. This sensitivity analysis may imply that overall there is no strong evidence that being assigned to prison instead of jail changes recidivism. While this sensitivity analysis indicates a vulnerability to the possibility of unobserved confounding variables, it does not mean that the results are invalid, only that they should be taken with caution (Loughran et al, 2015).

4.2.2 Sentence Length Differences in Treatment Effect

In order to explore the heterogeneous treatment effects further, additional analysis was conducted using sentence length as a matching indicator. In Pennsylvania there are a group of sentenced prisoners who are referred to as 'short min' offenders. This group of offenders are those who are sentenced to prison but have been given a sentence of one year or less to their minimum sentence term. While there are few jail inmates who fall within the sample who have a sentence greater than one year, there is a large number of

[26] Sensitivity analyses can only determine hidden bias if results are significant, therefore it could not be used to test initial results. A sensitivity analysis was run on significant findings from all analyses and revealed similar results indicating hidden bias.

prison inmates who are designated as short mins.[27] This group of prisoners represents an important policy challenge as their short stay in prison makes programming and parole release decisions difficult.

A propensity score match analysis for the sub-samples of offenders who received minimum sentences of one year or less revealed no significant differences between prison and jail sentences. Those who are sentenced to prison for one year or less have an average probability of rearrest within one year of release of 0.21. Jailed offenders who received similar short sentences have an average probability of rearrest within one year of their assumed release date (minimum sentence date) of 0.22. The difference between the two groups is non-significant.

Related to the sentence length analysis, an additional analysis comparing offenders in 2009 and 2012 was conducted to explore whether the results are sensitive to the 2-5 year legislation. As discussed earlier, starting in 2011, all counties in Pennsylvania were enforcing a law where offenders sentenced to the maximum term of 2 years or more but less than 5 years would be sentenced to state prison. This law could potentially change the mix of offenders who are sent to prison and jail. Matching results indicate that among level 3 offenders, the estimates were similar in 2009 and 2012, before and after the law went into effect, with an ATT of -0.02 and -0.03 respectively. Neither year revealed statistically significant differences in one-year rearrest between the prison and jail groups.

[27] Within the sample 5,439 of the jail group and 1,315 of the prison group were sentenced to a minimum sentence of less than one year within level 3. Only 13 jail inmates in level 3 were sentenced to a minimum term greater than one year.

With the exception of three grid cells, results have largely indicated that there is no difference in recidivism as measured by rearrest within one year between prison and jail. However, recidivism patterns can vary by time spent in the community post release. Therefore, longer follow up periods were examined to determine if the type of incarceration sentence has long-term effects on recidivism. Analyses were run with a two, three, and four-year follow-up period for rearrest. Each of these samples only include people who were released for a minimum of 2, 3, and 4 years, respectively, to reduce the likelihood that someone in the sample was still incarcerated when rearrest was measured.

Table 7. Long Term Treatment Effects on Rearrest (NN3)

Follow-Up Periods	Treatment Effect (Reported Difference)	Standard Error	T-Statistic	Total Matched Pairs	Remaining Out of Balance Covariates
2 Years	0.0057	0.0197	0.29	4,030	0
3 Years	0.0621	0.0233	2.66***	2,915	1
4 Years	0.0593	0.0298	1.99*	1,936	0

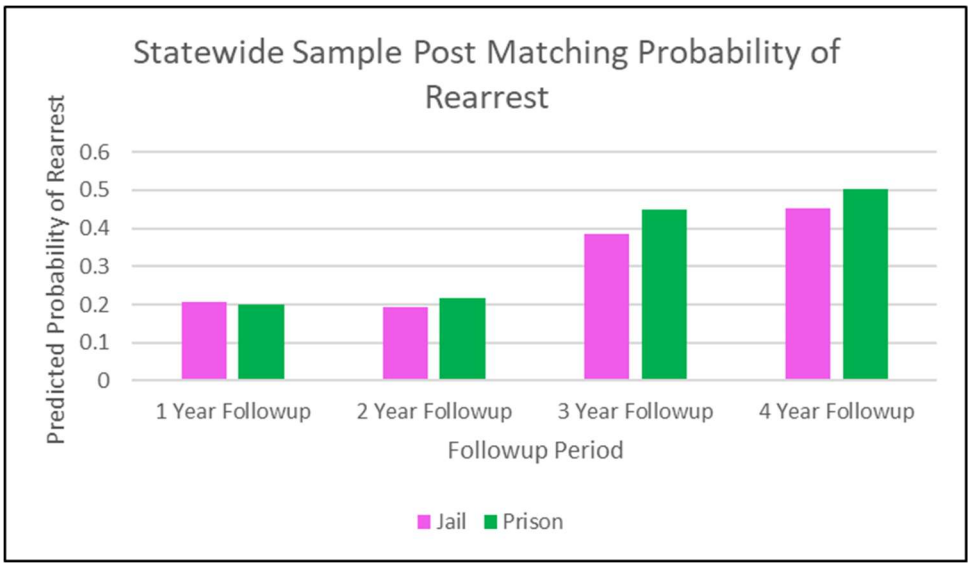
p<.05*
p<.01**
p<.001***

Table 7 reveals that increasing follow-up time can lead to statistically significant differences in the probability of rearrest across prison and jail groups.[28] One and two year follow up periods show no significant difference between prison and jail sentences, however a three and four year follow-up period indicate that those sentenced to prison have significantly higher probabilities of rearrest than those sentenced to jail. Those

[28] Results presented are for NN3 matching, however NR matching revealed comparable findings.

sentenced to prison have a statistically higher probability of rearrest by six percentage points both within three years and four years from release. While the prison sentence is associated with a similar increase in rearrest probability for longer follow-up periods, it is important to recognize different samples used and thus different base recidivism rates across follow-up lengths. Figure 6 displays the differences in the predicted probability of recidivism for the prison and jail groups after matching. As seen in the one-year and two-year follow-up analyses, the predicted rearrest probabilities do not necessarily increase as the length of follow-up increases due to the different samples used. While in general the longer the follow-up length, the higher the rearrest probability becomes, offenders used in longer follow-up analyses likely had shorter sentences and a lower recidivism risk. It is clear from the graph, however, that higher rearrest probabilities and larger difference in the rearrest probability are greater within the three and four-year follow-ups.

Figure 6. Statewide Probability of Rearrest



Additional analyses were conducted to determine if the long-term findings held consistent for only the short-min offenders. Table 8 reveals consistent findings for this group of offenders. While the one-year follow-up analysis shows non-significant negative results, increasing the length to 2, 3, and 4 years leads to an increased risk of recidivism for prison inmates. The 3 and 4-year findings are statistically significant indicating offenders sentenced in level 3 and assigned a one year or less to the minimum sentence date are more likely to be rearrested when sentenced to prison in the long term. Those sentences to prison have a 5% greater risk of being rearrested than if they were sentenced to jail.

Table 8. Long Term Treatment Effects on Rearrest for Short Mins

Follow-Up Periods	Treatment Effect (Reported Difference)	Standard Error	T-Statistic	Total Matched Pairs	Remaining Out of Balance Covariates
1 Year	-0.0184	0.0166	-1.11	3,927	0
2 Years	0.0268	0.0204	1.32	3,355	0
3 Years	0.0573	0.0243	2.36**	2,444	0
4 Years	0.0595	0.0305	1.96*	1,629	0

p<.05*
p<.01**
p<.001***

These longer follow-up analyses focus on the length of time an offender spends in the community after release; however, they do not account for post release supervision. It is possible that those sentenced to prison receive longer periods of community supervision compared to those released from jail. These increases in community supervision can lead to a higher likelihood of probation and parole violations being

detected and higher recidivism overall. Although post release supervision cannot be directly tested given whether an offender is placed on post-release supervision is determined after the treatment assignment of sentencing, an analysis was conducted on a subsample of offenders who may have received some form of post-release supervision.

First, a parole indicator was created using the difference between the maximum sentence and actual release date for the prison sample. If the prison inmate did not complete the maximum sentence, it is likely they were released under parole supervision. This sample was compared to jail inmates to determine if the parole supervision had a direct effect on the probability of recidivism. Similarly, an analysis was conducted on those who were assigned a split sentence of probation following prison or jail, which is determined by the judge at sentence. These results were compared with a group of offenders who did not received a split sentence. Table 9 displays the results from a propensity score matching model for the parole sample as well as the split-sentence groups. The findings are non-significant indicating that after controlling for post-release supervision, the effects of treatment assignment diminish. These findings reveal that post release supervision is likely having a direct effect on recidivism, specifically for those sentenced to prison; when post-release supervision is included in the model, the ATT is statistically significant.

Table 9. Post Release Supervision Treatment Effects[29]

Follow-Up Periods	Sample	Treatment Effect (Reported Difference)	Standard Error	T-Statistic	Total Matched Pairs	Remaining Out of Balance Covariates
1 Year	Parole	-0.0198	0.0251	-0.79	3,630	2
2 Years	Parole	0.0029	0.0296	0.10	3,304	2
3 Years	Parole	0.0605	0.0358	1.69	2,387	4
4 Years	Parole	--	--	--	--	--
1 Year	Split	-0.0468	0.0320	-1.46	894	0
2 Years	Split	0.0114	0.0392	0.29	779	1
3 Years	Split	--	--	--	--	--
4 Years	Split	--	--	--	--	--
1 Year	Non-Split	-0.0158	0.0206	-0.77	3,279	0
2 Years	Non-Split	0.0106	0.0249	0.43	3,192	2
3 Years	Non-Split	0.0407	0.0287	1.42	2,338	3
4 Years	Non-Split	--	--	--	--	--

p<.05*
p<.01**
p<.001***

4.2.3 Individual Differences in Treatment Effect

Additionally, analyses were also run by crime type. Subsamples were analyzed by each of the major crime categories examined in the dataset, included property crimes, drug crimes, and violent crimes[30]. It is reasonable to believe that those convicted of a violent offense differ from those convicted of a drug offense. Judges may also treat offenders differently based on the type of crime. If prison is seen as more punitive, violent offenders may have a greater probability of being sentenced to prison compared to drug offenders who may be deemed as less culpable and dangerous and therefore more

[29] Balance was unachievable at longer follow-up periods, specifically the 4 year follow-up for all groups, likely due to a small sample size.
[30] DUI was not examined due to a small sample size.

likely to be sentenced to jail. While propensity score matching takes these covariates into account, using these subsamples allows for an examination of potentially varying effects across crime types.

Table 10. Treatment Effects on Rearrest within One Year by Crime Type

Crime Type	Treatment Effect (Reported Difference)	Standard Error	T-Statistic	Total Matched Pairs	Remaining Out of Balance Covariates
Drug	-0.0193	0.0332	-0.58	259	2
Property	-0.0208	.0277	-0.75	480	1
Violent	-0.0203	0.0398	-0.51	197	2

p<.05*
p<.01**
p<.001***

Table 10 shows the results for a no replacement[31] matching method based on subsamples of crime types. None of the findings are significant and indicate no difference in rearrest for prison or jail sentences, regardless of crime type. The results are consistent with the main analysis that includes controls for crime type, maintaining the finding that there is no effect of sentence on rearrest; prison and jail experiences do not impact recidivism.

Lastly, an analysis was conducted by race, specifically a white subsample and black subsample. Hispanic and other races were not examined due to a small sample size for these two groups. Incarceration experiences may vary by race. For example, black

[31] Nearest neighbor no replacement matching was shown due to better balance achieved post matching than using nearest neighbor with 3 neighbors. Results from both models were consistent.

offenders may be from more impoverished communities where visitation is difficult for family members, especially if the facility is farther away. If a black offender is sentenced to a prison his or her family may not be able to visit as regularly as if they were sentenced to jail.

There are notable differences in racial population patterns across counties within Pennsylvania; blacks tend to disproportionately be sentenced in urban counties such as Philadelphia and Allegheny whereas whites are more evenly distributed across the counties. Philadelphia County for example, sentenced 576 black offenders compared to 232 white offenders. Allegheny County sentenced 204 black offenders and 111 white offenders, while more rural counties such as Elk sentenced 0 black offenders and 19 white offenders and Columbia county which sentenced 3 black offenders and 46 white offenders. Given the importance of race in both sentencing and recidivism and reentry literatures, it is important to test if there are different effects of facility by race given reason to believe experiences may be different for individuals.

Table 11. Treatment Effects on Rearrest by Race

Crime Type	Follow Up	Treatment Effect (Reported Difference)	Standard Error	T-Statistic	Total Matched Pairs	Remaining Out of Balance Covariates
Black	1 Year	0.0609	0.0325	1.88+	1,246	4
White	1 Year	-0.0399	0.0202	-1.98*	3,132	0
Black	2 Year	0.3392	0.0755	1.90+	1,009	2
White	2 Year	-0.0088	0.0245	-0.36	2,717	0
Black	3 Year	0.1250	0.0464	2.69**	727	3
White	3 Year	0.0258	0.0293	0.88	1,976	1
Black	4 Year	--	--	--	--	--
White	4 Year	0.0642	0.0379	1.69	1,319	2

p<.10+
p<.05*
p<.01**
p<.001***

Results in table 11 indicate racial differences in the prison effects on recidivism. Blacks have a higher probability of rearrest within one year when sentenced to prison where as whites have a higher probability of rearrest within one year when sentenced to jail. Within one year from release blacks sentenced to prison have a probability of rearrest of 0.26, while blacks sentenced to jail have a probability of rearrest of 0.20. These findings indicate that blacks sentenced to prison have a 6% greater risk of being rearrested than if they were sentence to jail. Within one year from release whites sentenced to prison have a probability of rearrest of 0.18, while whites sentenced to jail have a probability of rearrest of 0.22, meaning that whites have a 4% greater probability of being rearrested when sentenced to jail instead of prison. The results for the white sample are similar to that of the entire sample, however, the treatment effect for blacks is opposite many of the initial findings. Longer follow-up periods were also analyzed to

further test racial differences. Results for the black subsample are consistent across longer follow up periods revealing a positive and significant effect of prison on recidivism for blacks. Within two years from release blacks have a 33 percentage point greater risk of recidivism and 12 percentage point greater risk of recidivism within three years from release when sentenced to prison compared to if they were sentenced to jail. For whites, there is a 0% difference in recidivism within two years from release and a 2 percentage point greater risk of recidivism for prison sentenced offenders within three years. The magnitude of these different risks of recidivism is very large when comparing the effects of prison and jail sentences by race.

These findings were examined further to determine reasons for differences in recidivism by race. It is important to note that whites make up a larger portion of the sample; 418 blacks were sentenced to prison (17%) compared to 1,052 whites (25%) in level 3. While these numbers imply similar sentencing practices based on race, a t-test reveals a significant difference in level 3 sentencing based on race: whites are significantly more likely to be sentenced in level 3 grids compared to blacks. There may be some initial differences at sentencing for whites and blacks that could impact the probability of receiving treatment, although analysis of the predicted propensities to be treated reveal that whites on average have a higher predicted probability of being sentenced to prison compared to blacks (t=-10.38).

Additionally, based on the county urban/rural distribution, there may also be important county level effects that impact recidivism. Blacks are more typically sentenced in urban counties compared to whites. These urban jails may provide better inmate reentry services than in small rural jails due to budgetary constraints and the fact

that urban jails serve a larger population which incentivizes the need for programming for inmates. However, blacks may fair better in urban jails because of the culture within the urban jails. Incarceration is fairly common in urban areas, particularly those areas with a high concentration of minorities. Therefore, these jails will have more connections from the community that may help enhance the incarceration experience through increased social support for blacks in these urban jails. It is important to note that facility location is not necessarily a confounder of the prison/jail experience, but rather a key factor of the experience within the facility which may impact recidivism. An analysis was conducted comparing urban and rural counties, particularly across the white and black samples of offenders. The Center for Rural Pennsylvania provided a list of counties classified as rural and urban based on population density; this classification scheme was utilized in this study.[32]

Table 12 reveals the results from a propensity score analysis of urban and rural counties, as well as race differences across these two types of counties. Results reveal support for the notion that blacks fare better in jails when sentenced in an urban county. The ATT reveals that blacks sentenced to prison in an urban county have a probability of rearrest of 0.26 while whites sentenced to prison in an urban county have a probability of rearrest of 0.20. The difference of .06 is not statistically significant, however the results for this analysis are the only ATT in the positive direction. For all other analyses, regardless of race, offenders sentenced to jail in urban and rural counties have a higher probability of rearrest compared to those sentenced to prison. These results support the

[32] Urban Counties: Erie, Beaver, Allegheny, Westmoreland, Luzurne, Lackawanna, Northampton, Lehigh, Berks, Lebanon, Dauphin, Cumberland, York, Lancaster, Chester, Bucks, Montgomery, Philadelphia, Delaware (http://www.rural.palegislature.us/ruralcounties.html)

notion that urban jails provide a different experience for black inmates, which may explain the difference in treatment effects for whites and blacks.

Table 12. Treatment Effect by County Type and Race

County Type	Race	Treatment Effect (Reported Difference)	Standard Error	T-Statistic	Total Matched Pairs	Remaining Out of Balance Covariates
Urban	--	-0.0179	0.0188	-0.95	2,419	0
Rural	--	-0.0199	0.0213	-0.93	2,311	0
Urban	Black	0.0506	0.0315	1.60	864	0
Rural	Black	-0.0188	0.0608	-0.31	342	2
Urban	White	-0.0504	0.0260	-1.94+	1,266	0
Rural	White	-0.0481	0.0233	-2.06*	1,849	0

p<.10+
p<.05*
p<.01**
p<.001***

Considering the possibility that sentencing may be impacted by race, additional covariates were compared by race using t-tests to determine if there are any significant differences across the two groups. Several key covariates were significantly different across the white and black sample. Specifically, blacks in the sample were more likely to be male, older at first arrest, convicted of drug and violent crimes, have a higher prior record score, have a prior drug arrest, violent arrest and public order arrest, and go to trial. Whites on the other hand were more likely to be convicted of a property offense or DUI, have a higher current offense gravity score, have a prior property crime arrest, and plea. While crime type seems to be different across the races, it is not likely a probable explanation for recidivism differences by race as there is no difference by crime type in

respect to recidivism. More details about the incarceration experience itself are likely needed to further understand this relationship.

4.3 Statewide Summary of Findings

Several analyses were conducted with the statewide sample of level 3 offenders. Taken as a whole, results indicate that within one year from release, there is a slightly negative effect of prisons on recidivism. Those sentenced to prison would have a greater risk of rearrest had they been sentenced to jail immediately after release. However, longer follow-up periods reveal that the risk of rearrest is greater for those sentenced to prison. The magnitude of the difference in the probability of rearrest also increases as time since release increases. These results are consistent when looking all standard level 3 cases as well as subgroups of offenders such as those receiving shorter prison sentences.

Although, in one instance, results are not consistent with these general conclusions. For black offenders, the pattern of risk of recidivism is different than that of other offenders in level 3. Black offenders, particularly those sentenced in urban jails, have a large and consistent greater probability of rearrest when sentenced to prison compared to if they were sentenced to jail.[33]

4.4 County Level Analysis

Using the county sample and direct data from jails brings two advantages. First, the actual date of release form jails becomes available. In the statewide sample, release

[33] Given the large number of analyses that were conducted, it is important to note that results may be subject to the multiple comparisons problem where some findings may be significant due chance based on the large number of hypotheses being tested.

data for jail inmates was based on the minimum sentence given under the sentencing guidelines. According to the Sentencing Commission a large portion of jail inmates are released after the minimum sentence is served; however results may be biased by some of these inmates not actually being released at the minimum.[34] Second, recidivism measures other than rearrest can be explored. Data from county jails provide measures of return to jail for the jail group, analogous to the measure of return to prison for the prison group. The county data were based on five counties: Allegheny, Lackawanna, Lehigh, Northampton, and Westmoreland.

The same methods were used for the county analysis for removing non-comparable offenders as the statewide analysis; those with mandatory minimums and other non-standard sentences were excluded.[35] Additionally, only level 3 offenders were analyzed given the even smaller level 4 overlap within the county sample.[36] Table 13 reveals the descriptive statistics for the county only sample. The prison group in this sample includes only those who were sentenced in the five counties to account for county level variations in sentencing. Including the entire sample of prison offenders could bias results if there is a county level effect on recidivism.

Table 13 also shows the initial balance of covariates; according to the standardized bias statistic 15 out of 37 covariates were initially out of balance. After

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[34] The statewide arrest variable was compared with the county that used actual release for jail inmates. 130 out of 881 rearrest indicators changed. 58 jail inmates had not recidivated under the actual release date but had marked as a rearrest when using the minimum release date. On the other hand 72 were rearrested within one year when using the actual release date but were not rearrested within one year when using the minimum. 15% of the jail sample had release dates largely different from the minimum release date.

[35] DUI as a crime type was not included in the table because there were no DUI offenders in the prison sample and only 6 in the jail sample.

[36]Only level 3 sample was used at the county level in order to provide comparable results to statewide analysis. Level 4 also posed similar matching and balance problems within the county sample as it did for the statewide sample.

multiple logistic regression iterations, balance was achieved in all but one covariate, a grid indicator. The common support for the county level analysis is presented in figure 7, which shows the predicted probability of being sentenced to prison for both those sentenced to prison and jail. There is a large amount of overlap between the two curves. Although there are a larger number of jail offenders with lower propensity scores than prison offenders, there is still a large amount of common support between the two groups.

Table 13. County Sample Descriptive Statistics and Sample Comparisons

		Jail N=857		Prison N=253		Full Sample Comparisons	
	Variable Name	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**T-Statistic**	**SBS**
Demographics	**White**	0.5228	0.4998	0.5257	0.5003	-0.0821	0.5875
	Black	0.3547	0.4787	0.3043	0.4610	1.4831	-10.7196[i]
	Hispanic	0.0793	0.2704	0.1344	0.3417	-2.6691**	17.8611[i]
	Other Race	0.0432	0.2034	0.0356	0.1856	0.5326	-3.9042
	Male	0.8775	0.3281	0.9289	0.2576	-2.2908*	17.4184[i]
	Age at Sentence	34.0944	10.0445	33.2696	9.4992	1.1617	-8.4374
	Age at First Arrest	22.2322	7.6890	22.7479	7.7393	-0.9360	6.6853
Current Offense	**Drug Crime**	0.2264	0.4187	0.2411	0.4286	-0.4892	3.4779
	Other Crime	0.2917	0.4548	0.2411	0.4286	1.5753	-11.4524[i]
	Property Crime	0.3174	0.4657	0.3202	0.4675	-0.0831	0.5941
	Violent Crime	0.1645	0.3710	0.1897	0.3929	-0.9364	6.5946
Prior Arrests	**Prior Drug Count**	0.6499	0.4773	0.6126	0.4881	1.0864	-7.7257
	Prior Property Count	0.8121	0.3908	0.7194	0.4502	3.2006***	-22.0057[i]
	Prior Public Order Count	0.7281	0.4452	0.7075	0.4558	0.6436	-4.5749
	Prior Violent Count	0.5974	0.4907	0.5850	0.4937	0.3542	-2.5300
Case Factors	**Trial**	0.0140	0.1176	0.0277	0.1643	-1.4726	9.5642
	Plea	0.9382	0.2410	0.9407	0.2366	-0.1488	1.0698
	Other Disposition	0.0478	0.2136	0.0316	0.1753	1.1033	-8.3021
Sentencing Level	**Offense Gravity Score**	3.3477	1.6077	3.3834	1.5299	-0.3135	2.2734
	Prior Record Score	4.0362	1.3534	4.2767	1.3753	-2.4745*	17.6277[i]
	Grid 1	0.1062	0.3083	0.0435	0.2043	3.0437**	-23.9786[i]
	Grid 2	0.1319	0.3385	0.1225	0.3285	0.3876	-2.7957
	Grid 3	0.2497	0.4331	0.2727	0.4462	-0.7377	5.2349
	Grid 4	0.0233	0.1511	0.0198	0.1395	0.3364	-2.4587
	Grid 5	0.0117	0.1075	0.0040	0.0629	1.0883	-8.7653
	Grid 6	0.0222	0.1473	0.0356	0.1856	-1.1943	7.9991
	Grid 7	0.1202	0.3254	0.0593	0.2366	2.7684**	-21.4067[i]
	Grid 8	0.1015	0.3022	0.0830	0.2764	0.8726	-6.3926
	Grid 9	0.0455	0.2085	0.0909	0.2880	-2.7702**	18.0555[i]
	Grid 10	0.0350	0.1839	0.0711	0.2576	-2.4879**	16.1490[i]

	Grid 12	0.0700	0.2553	0.0593	0.2366	0.5966	-4.3563
	Grid 13	0.0607	0.2389	0.0791	0.2704	-1.0423	7.2029
	Grid 15	0.0222	0.1473	0.0593	0.2366	-3.0202**	18.8319[i]
Sentencing County	**Allegheny**	0.2579	0.4377	0.0949	0.2936	5.5647***	-43.7394[i]
	Lackawanna	0.0688	0.2533	0.3874	0.4881	-13.8188***	81.9068[i]
	Lehigh	0.2999	0.4585	0.3320	0.4719	-0.9730	6.9069
	Northampton	0.2112	0.4084	0.1542	0.3618	2.0020*	-14.7876[i]
	Westmoreland	0.1622	0.3688	0.0316	0.1753	5.4507***	-45.2154[i]
Year	**2012**	2010.4740	1.5006	2010.4350	1.5016	0.3628	-2.5956

p<.05* SBS>10[i]
p<.01**
p<.001***

Figure 7. Common Support for County Sample

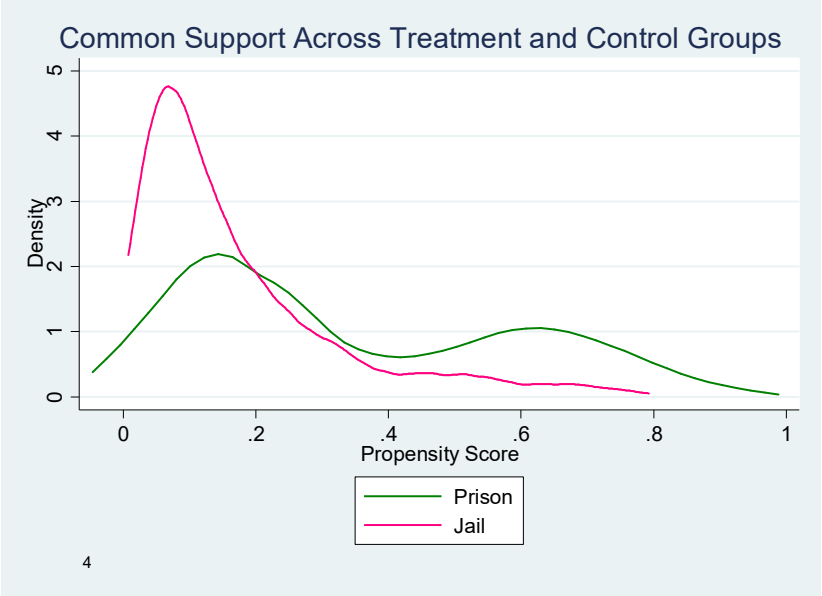


Table 14 displays the initial differences in the percent of the prison and jail groups who recidivated at the county level. The three-year follow up period only includes those who were at risk of recidivism for a full three years from the time of release to the end of the data collection period, therefore the sample sizes are smaller for longer follow-up periods. The base recidivism differences reveal that initially a larger portion of jail inmates are rearrested, however given longer times in the community, a larger portion of prison inmates are rearrested. However, the differences in the percentage who are reincarcerated between the two groups is fairly similar across all time periods.

Table 14. Baseline Percent of Recidivists within the County Sample

Outcome	Follow-Up	Jail	Prison
Arrest	1 Year	25%	18%
Arrest	2 Year	57%	65%
Arrest	3 Year	47%	52%
Reincarcerated	1 Year	39%	40%
Reincarcerated	2 Year	45%	44%
Reincarcerated	3 Year	37%	34%
Recidivated	1 Year	45%	43%
Recidivated	2 Year	63%	70%
Recidivated	3 Year	55%	58%

Based on the county sample, results from a NN3[37] model are presented in Table 15. Findings reveal a negative ATT across all models and measures of recidivism, indicating that those in jails are more likely to recidivate within one year from release. Within one year from release those sentenced to prison have a probability of rearrest of 0.18, while those sentenced to jail have a probability of rearrest 0.27 within one year from release. The difference of -0.09 is statistically significant at an alpha of 0.05.[38] Results were consistent with the county arrest indicator that accounts for actual release date from jail.[39] Within one year from release those sentenced to prison have a probability of reincarceration of 0.40, while those sentenced to jail have a probability of reincarceration of 0.45. The difference of -0.05 is not statistically significant. Within one year from release those sentenced to prison have an overall recidivism (either rearrest or return to prison or jail) probability of 0.43, while those sentenced to jail have a recidivism probability of 0.49. The difference of -0.06 is not statistically significant.

[37] Results were consistent with a NR model.
[38] An analysis was conducted using the arrest indicator from the statewide sample that measured jail release as the minimum time served from the date of sentence to check the reliability of the statewide outcome.
[39] The ATT for the statewide arrest indicator was -.0951 with a standard error of 0.0410. The T-statistic was -2.32.

Table 15. County Level Treatment Effects on Recidivism (NN3)

Recidivism Type (Outcome)	Treatment Effect (Reported Difference)	Standard Error	T-Statistic	Total Matched Pairs	Remaining Out of Balance Covariates
Arrested within 1 Year	-0.0882	0.0414	-2.13***	753	1
Reincarcerated within 1 Year	-0.0472	.0490	-0.96	753	1
Recidivated within 1 Year	-0.0611	0.0495	-1.23	753	1

p<.05*
p<.01**
p<.001***

Results from the county analysis reveal different findings compared to using the statewide sample. Initial results within the state sample reveal null findings, whereas rearrest within the county sample indicate significant differences in recidivism measured as rearrest. Within the county sample, those sentenced to jail are more likely to be rearrested within one year from release than those sentenced to prison. When reincarceration is taken into account in the overall recidivism outcome, the ATT decreases from when only rearrest is measured. These results may imply that prison inmates may be at a greater risk of reincarceration than rearrest, possibly due to technical violations from parole.

Similar to the statewide analysis, longer recidivism follow-up lengths were examined. Arrest, reincarceration, and overall recidivism were tested at a 2 and 3-year

follow-up period.[40] These analyses only included individuals in the sample who were released long enough to have these respective follow-up periods to measure recidivism. The results in Table 16 reveals non-significant estimates across longer follow-up periods. Within 2 years from release, the estimates are marginally significant at the 0.10 level of for rearrest and overall recidivism.

Table 16. Long Term Treatment Effects on Recidivism (NN3)

Follow-Up Periods	Outcome	Treatment Effect (Reported Difference)	Standard Error	T-Statistic	Total Matched Pairs	Remaining Out of Balance Covariates
2 Years	Arrested	0.0888	0.0504	1.76+	636	2
2 Years	Reincarcerated	0.0016	0.0512	0.03	636	2
2 Years	Recidivated	0.0888	0.0486	1.83+	636	2
3 Years	Arrested	0.0447	0.0613	0.73	443	2
3 Years	Reincarcerated	-0.0313	0.0590	-0.53	443	2
3 Years	Recidivated	0.0470	0.0606	0.77	443	2

p<.10+
p<.05*
p<.01**
p<.001***

These long-term follow-up findings at the county level are consistent with the statewide results in terms of a positive ATT; however, results at the county level are not statistically significant and therefore cannot be interpreted as a non-zero effect of prison or jail on recidivism. Interestingly, the 3-year follow up period for reincarceration has a negative ATT, which is in contrast to the other recidivism analyses presented in table 17.

[40] The 4-year follow-up analysis is included due to a lack of covariate balance in this sample.

It is possible that technical violations that would increase reincarceration would be less likely given a longer follow-up period because post-release supervision would have ended. Additionally, null effects may be found for these analyses as a result of a small sample size compared to the statewide analysis. Figures 8 and 9 show indicate the magnitude of the differences in the predicted probabilities of rearrest and reincarceration, respectively, for the prison and jail samples within one, two, and three years from release. Within one year from release the predicted probability of both rearrest and reincarceration are larger for the jail group compared to the prison group; if inmates sentenced to prison were sentenced to jail instead, the risk of rearrest increased by 9 percentage points and the risk of reincarceration increases by 5 percentage points. Within two years from release, those sentenced to prison have a 9 percentage point greater risk of rearrest than if they were sentenced to jail, but a 0 percentage point difference in the risk of reincarceration. Additionally, within three years from release those sentenced to prison have a 4-percentage point greater risk of rearrest but a 3 percentage point lower risk of reincarceration.

Figure 8. Predicted Probability of Rearrest for the County Sample

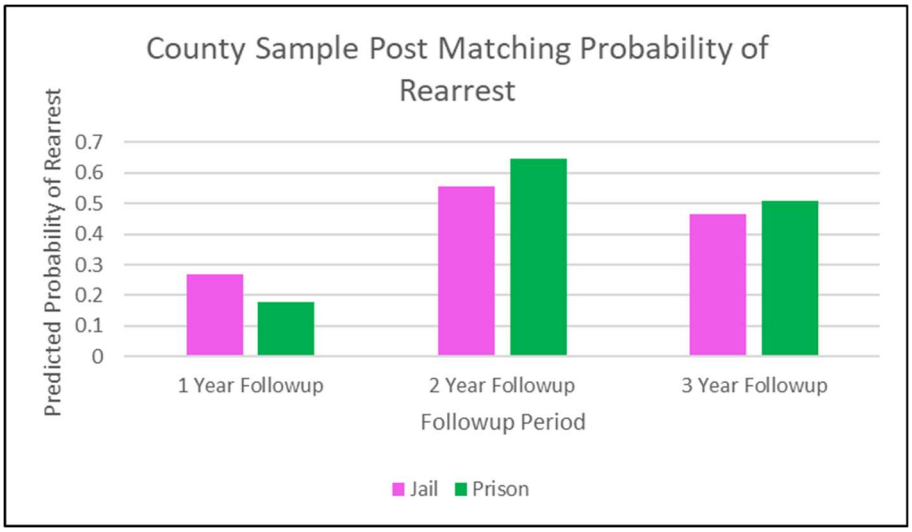
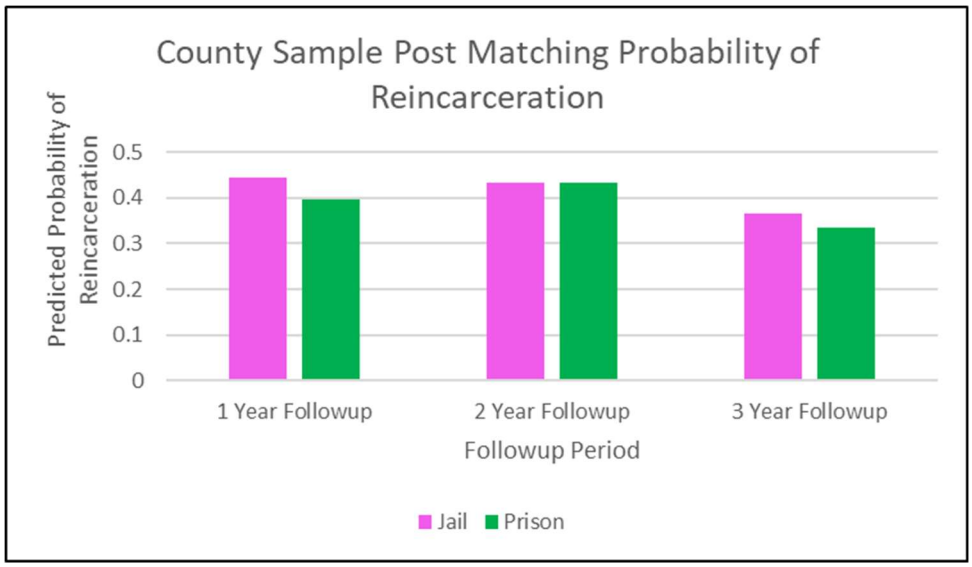


Figure 9. Predicted Probability of Reincarceration for the County Sample



The current study cannot account for facility level differences between prisons and jails, which could greatly impact recidivism. One way to attempt to capture some facility level variation is to compare recidivism across jails. Based on Pennsylvania jail information online, Allegheny county jail tends to provide a higher level and more variety of correctional programming and reentry services than jails in other counties. Thus, Allegheny can be compared to the other jails to tap into the programming effects. It should be noted, however, that aside from programming, Allegheny county differs from the other counties in size, as it is home to Pittsburgh, a major metropolitan area. Thus, results will not tell whether programming itself has an effect on recidivism but may highlight what types of facilities are likely to reduce recidivism.

A treatment variable was created to indicate whether an offender was sentenced to Allegheny jail (treatment) or the other four county jails (control)[41]. Initially 20 out of 37 covariates are out of balance showing that Allegheny county if quite different from the other counties. Allegheny was also compared to each of the other counties individually, however results again reveal non-significant findings regardless of the recidivism measure. Northampton and Westmoreland could not be matched with efficient balance and therefore results are not displayed in table 17 for these two counties[42].

Table 17. Treatment Effects Comparing Across Counties

Allegheny Comparisons	Outcome	Treatment Effect	Standard Error	T-Statistic	Total Matched Pairs	Remaining Out of Balance Covariates
All Counties	Arrest	0.0580	0.0440	1.32	657	0
	Incarceration	-0.0290	0.0490	-0.59	657	0
	Total	-0.0145	0.0498	-0.29	657	0
Lehigh	Arrest	0.0391	0.0553	0.71	427	2
	Incarceration	-0.0697	0.0629	-1.11	427	2
	Total	-0.0349	0.0633	-0.55	427	2
Lackawanna[43]	Arrest	0.1224	0.0593	2.07*	98	1
	Incarceration	0.0204	0.0706	0.29	98	1
	Total	0.0408	0.0712	0.57	98	1
Northampton		--	--	--	--	--
Westmoreland		--	--	--	--	--

p<.05*
p<.01**
p<.001***

[41] The prison sample is not included for these analyses in order to compare individual facilities.
[42] Due to a small sample size, a propensity score analysis could not be conducted within Allegheny county comparing prison and jail sentenced offenders. Only 24 inmates were sentenced to prison in level 3 within Allegheny County.
[43] Results presented for NR matching model; balance could not be achieved using NN3.

The results in table 17 reveal non-significant ATT estimates, suggesting no statistically distinguishable recidivism differences between those sentenced to Alleghany jail compared to the other five counties. There are several caveats in place. First, the sample is only limited to level 3 offenders, which does not include more severe sentences for higher-risk offenders. While Allegheny may have more treatment resources, rehabilitative programming may be reserved to higher-risk offenders are not well represented in the current sample. Similarly, while programming is said to be available in jails, the current analysis does not account for how much programming is utilized within the facility; while programming may be available, only a small portion of offenders may qualify or receive treatment. Comparing Lackawanna county sentences to Alleghany reveals the only statistically significant difference in the treatment effects of county jail, but only in terms of rearrest within one year from release.

4.4.1 County Sample Conclusions

Results from the county analysis involving rearrest within one year from release reveal robust conclusions to the statewide sample. Within one year from release, jail sentences will increase the probability of rearrest, however, as time in the community increases, prison increases the probability of rearrest. When looking at reincarceration instead of rearrest, the probability of reincarceration is fairly similar for both groups, however the jail groups is at a slightly greater risk of reincarceration. Although not statistically significant, the analyses for one and three year follow-up periods reveal a 3-4% increased risk of reincarceration for offenders sentenced to jail. Accounting for any measure of recidivism, rearrest or reincarceration, reveals findings consistent with the

statewide results and county rearrest results. It is apparent from these findings that when accounting for reincarceration, the results differ. It is possible that those who are arrested on a technical violation do not get accounted for in the arrest outcome as they are not reported in RAP sheets as arrests. Therefore technical violations, which make up a large portion of the criminal justice population, would only show up as reincarcerations and therefore not be counted in the statewide recidivism measure of rearrest. According to the Bureau of Justice Statistics, approximately 26% of offenders return to prison due to a technical violation (Langan & Levin, 2002). The statewide results may differ when accounting for reincarceration based on results from the county sample that account for reincarcerations.

Chapter 5. Discussion & Conclusions

Pennsylvania sentencing guidelines provide a sentencing structure where prison and jail are both available sentences for certain offenders. This research has used this unique sentencing structure to examine the impacts of prison compared to jail on recidivism and to provide an alternative to using the total incarceration variable to determine the effects of incarceration on recidivism. Pennsylvania is unique in that it provides a sentencing structure that allows prison and jail sentences for a large overlap in offenders, unlike many states where jail is reserved for shorter incarceration terms of less than one year and prison is reserved for those with sentences longer than one year. Many of these findings provide important policy implications for Pennsylvania and offers key caveats for studying incarceration in the future.

Initial tests reveal a key finding to this study; propensity score analysis must be used very carefully to ensure that the sample being analyzed is actually comparable. The intent of this research was to look at both level 3 and level 4 offenders within the sentencing guidelines and compare prison and jail sentences. However, analysis proved difficult within level 4. These more serious offenders were much less likely to be sentenced to jail, and of those who did receive jail there was little overlap across covariates between the prison and jail groups. The lack of balance and common support at level 4 indicates that jail and prison sentences are applied differently, which may mean that judges view these sentences as very different in level 4. On the other hand, within level 3 there was significant overlap between the two groups revealing a more comparable sample that could be matched.

Additionally, there are many sentencing options that allow a judge to depart from the initial sentence proposed in the sentencing guidelines. The judge can account for both aggravating and mitigating circumstances, which enhances or reduces the sentence length assigned to an offender that is outside the one s/he would be sentenced to initially based on prior record and offense gravity scores. There are several mandatory minimums that also result in sentence lengths outside the sentence initially determined by the sentencing grid. These sentences are influenced by factors beyond the sentencing guidelines, which would alter the probability of treatment based on sentencing grid, making the matching questionable[44]. While Pennsylvania provides an opportunity, although more limited than initially believed, to compare prison and jail sentences, this comparability across groups must be considered in future work. Previous work looking at the differences between prison and jail reveal a large percentage of cases not falling along within the common support range between prison and jail groups. When jail was compared to prison of less than one year over 38% of cases fell off common support, indicating a lack of comparability across samples (Cochran *et al*, 2014).

5.1 Summary of Findings

Initial findings for the statewide sample show that assignment to prison has no impact on recidivism. In other words, given the choice between a prison or jail sentence, the judge could assign an offender to either with little concern about the differential impacts of the sentence on recidivism. Regardless of the judges' decision, recidivism will

[44] A propensity score analysis was conducted including non-standard sentences in the model while controlling for whether someone received an aggravated or mitigate sentence. Results were consistent with the model presented in this paper, however, common support and balance were far less ideal.

not differ due to the sentence s/he applied. However, additional tests were run to increase the precision of matching by looking at various subsamples of individuals and offenders sentenced comparing within these samples.

One unique structure to the Pennsylvania Sentencing Guidelines that allowed for an analysis across prison and jail was the fact that offenders sentenced to a maximum sentence between two and five years could be sentenced to jail instead of prison. Similarly, in California, many non-violent offenders are being sentenced to jails instead of prison in order to reduce prison capacity. Like Pennsylvania, California had begun to incarcerate individuals in jail with sentences longer than one year. Ideally, an analysis of these longer sentences could help guide policies not only in Pennsylvania but in places like California. However, these lengthier jail stays do not seem to be commonly practiced in Pennsylvania[45]. Instead, there are many prison sentences applied to individuals serving a minimum sentence of less than one-year. These so-called short-minimums provided an alternative unique opportunity to examine similarly situated individuals sentenced to prison or jail. Results for this subgroup of offenders revealed no significant differences in prison or jail on recidivism.

Contrary to the main findings, there were several indications that under certain circumstances, sentence assignment to prison may matter in terms of recidivism. The sample was broken down into individual grid assignments to compare offenders with the same offense gravity scores and prior record scores. These analyses provided a more precise match across offenders by comparing within each grid separately, ensuring

[45] Including level 4 and non-standard sentences increased the number of two to five-year maximum sentences by 249 individuals sentenced to jail, which would not likely impact the results. In a supplemental analysis, a propensity score match was conducted on the non-standard cases, revealing consistent findings with the level 3 only analysis, although balance was unachievable to a level expected under randomization.

matches based on offense gravity score and prior record score. While many of these grids revealed null findings, in three cases, it was shown that a prison sentence would reduce the likelihood of recidivism compared to a jail sentence. In other words, there is reason to believe that under certain circumstances judges may consider sentencing an offender to prison when both options are available. However, many of these results were consistently null or balance was unachievable, implying some caution in interpreting the significant findings.

Within the grids that revealed a significant difference in recidivism between those sentenced to prison and jail, there is some heterogeneity present in the sample. The covariates across each grid vary. For example, whites were much more likely to be sentenced in grids 2 and 9, while blacks make up a larger portion of grid13. Grid 2 has a fairly even number of different types of crimes sentenced within the cell, while grid 9 is 46% property crimes, and grid 13 is 68% drug crimes. Due to the differences across each grid, it is not clear whether these results are due to differences in the types of offenders or the type of sentence an offender received. Additionally, since the other grid cells found null effects or were unable to achieve balance, the results presented here should be taken with caution.

Using longer follow-up periods revealed that prison sentences lead to greater probabilities of recidivism in terms of being rearrested post release. While a one year and two-year follow up showed no effects of treatment, the three and four-year follow up periods show that prison sentences in the long run lead to greater chances of being rearrested. These results held consistent when looking only at the short-minimum sentences as well. Deterrence has been shown to have a decaying effect (Petersilia, 2003),

which may be more pronounced in prisons. Offenders assigned to prison in level 3 are less serious offenders, but upon entering prison, will find themselves surrounded by more serious offenders. The shock of being in prison surrounded by people who have committed severe offenses may provide a strong initial deterrent effect, which eventually wears away. Inmates in jail may not experience this same level of shock and therefore the initially deterrent effect is not as strong and therefore does not dissipate to the same extent as prison inmates.

It is also possible that there is a discrepancy between supervision within communities for prison and jail sentences. While the current study cannot account for post release supervision exactly, prison inmates may receive longer periods of parole compared to jail inmates who receive probation. In order to capture a post-release effect, an estimation of prisoners who received parole was included using a group of prison inmates who were released before their maximum sentence concluded. The results show a weaker effect of prison on recidivism when only looking at parolees compared to jail offenders, implying that post release supervision is not likely the driving force behind the long term positive effects of prison on recidivism. Similarly, a subsample of offenders who fell in this parole group and those assigned a split sentenced that required probation post release were examined. Results from this analysis were weaker than using the entire sample indicating that post release supervision has a direct effect on treatment.

Additionally, results reveal a negative, albeit non-significant, result for a 1-year follow-up but a positive treatment effect for longer follow-up periods, which may be explained via deterrence. As previously mentioned, there may be an initial deterrent effect post release, which explains the null findings within one year from release,

however, as the follow-up period increases, the deterrent effect will diminish, results in greater probabilities of rearrest for those under supervision.

An alternative explanation is that those in jail remain closer to home and are able to maintain ties to the community and the family, while those in prison are sent further from home during incarceration, where family may be unable to visit frequently. Maintaining strong bonds has been shown to help reduce recidivism and is important for successful reintegration (Friedman, 2014). Since many of these sentences are shorter, ties may not have as great an impact on these individuals compared to those sentenced for much longer periods of time.

Additionally, there could be the stigma associated with prisons. Since judges view prison as a more punitive sentence, community members may also see prison as a more severe sentence. Despite the increased prevalence of prison experience, especially in certain disadvantaged communities, community members on average may still see a prison stay as an indication of the offender's criminal propensity, and view these individuals as more dangerous, thus treating them differently in the community. Research has also indicated that when offenders anticipate a negative stigma of incarceration, they will be less likely to succeed in the community after release either through community exclusion or a sense of hopelessness that the offender will not be accepted and will give up without trying to succeed (Moore et al., 2013; Moore et al., 2016). Since local jails house more known community members, inmates in jails may anticipate less stigma since many others in the community are similarly situated. This reduced anticipated stigma would result in lower recidivism rates compared to prison sentences where less

community members would be present and the anticipated stigma would be more pronounced.

Analyses were also conducted by type of crime type. According to a Bureau of Justice Statistics report, there are variations in recidivism based on the crime an offender was sentenced for. The report indicated that violent offenders were less likely to recidivate within one year from release compared to drug and property offenders, while property offenders were most likely to recidivate compare to other offenders. (Durose *et* al, 2014). Looking at each crime type separately examines the effects of facility on these different recidivism rates and whether the facility itself matters in predicting recidivism. However, results showed no difference between prison and jail for any crime type. Initial research that claims criminal learning would be greater for inmates who are surrounded by other inmates who had committed similar crimes, therefore the similar probabilities of recidivism for prison and jail inmates may be that there is a large amount of heterogeneity based on crime types within these facilities where most inmates are exposed to some level of criminal learning.

Despite the null findings across crime types, there seems to be heterogeneity in the effects of prison on recidivism by race. An analysis was conducted on only white offenders and only black offenders in the sample. The results indicate opposite results: whites sentenced to jail are at a greater probability of recidivating while blacks sentenced to prison are at a greater probability of recidivating. Thus far it is unclear what may be causing the differences in recidivism by sentencing facility due to race. The major differences across race seem to be due to crime type, criminal history, and sentencing

county. The county seems to be a driving force behind the racial differences in recidivism based on which facility the offender was sentenced to.

Due to demographic patterns in Pennsylvania, blacks are much more likely to be sentenced in urban counties compared to whites who are more evenly spread across urban and rural areas. Blacks sentenced to jail in urban counties were less likely to recidivate compared to those sentenced in urban counties to prison. Blacks sentenced to rural jails were more likely to recidivate compared to blacks sentenced in rural counties to state prisons. Whites were at a greater risk of recidivating when sentenced to jail in either urban or rural counties, indicating that the jail experience in urban counties is unique to black inmates. Theoretically, there are several possible reasons for these differences. Urban jails tend to house more offenders than rural jails and likely have a larger budget and need to rehabilitation and reentry programming. Blacks in urban communities tend to reside in more impoverished neighborhoods where these types of programs would be unavailable outside of the facility, thus making the effects of increased programming greater for blacks. Consistently, blacks have been shown to be disproportionately involved in the criminal justice system, therefore the programming within the jails may be more applied towards minorities, explaining why white offenders may not benefit as greatly from these resources.

Similarly, since blacks are more likely to be sentenced in urban areas, being sentenced to an urban jail will also reduce the anticipated stigma since jails would include a large population of known community relations. Moore and colleagues (2016) found that blacks were less affected by the stigma of incarceration compared to whites due to the differential involvement in the criminal justice system and the normative nature of

incarceration. While blacks may be less subjected to anticipating stigma due to the normative nature of incarceration, blacks sentenced to urban jails will have an even further reduce anticipated stigma compared to those sentenced to prison given that the urban jail would be comprised largely of other black inmates from the local community making the experience normalized. The assignment to a prison would reduce these community ties and connections, making the anticipated stigma greater for blacks.

An additional explanation for racial differences in treatment effects could be due to post-release supervision. While the data cannot account for an individual placed under parole post release, the sentencing guidelines include an indicator for a split-sentenced where an offender will be placed on probation post release. Using this indicator shows that blacks are significantly much more likely to be assigned probation post release. This supervision increases the odds of being rearrested simply by increasing the level of surveillance making it more likely to be caught for a technical violation or new crime. Ideally, the type of arrest, whether for a new crime or a technical violation, should be examined in future research.

Results from the statewide sample reveal that in the short-term, there is no difference in recidivism based on the facility an offender was sentenced to, however long-term follow-up periods reveal a more criminogenic effect of prison. The statewide analyses are limited though; the release date is not completely accurate for jail offenders[46] and only rearrest was measured as an indicator of recidivism. The county wide analysis accounted for actual release date and allowed for multiple measures of recidivism. Using this sample reveals statistically significant findings regarding the

[46] 94 individuals sentenced to jail (10%) in the county sample had a different rearrest result in the county sample based on the actual release date than in the statewide.

probability of arrest within one year: those sentenced to jail instead of prison are at a much greater likelihood to be rearrested. On the other hand, there is no significant difference between reincarceration based on sentence. It seems that those sentenced to jail instead of prison are more likely to be rearrested but no more likely to be reincarcerated implying some process is taking place post release that impacts arrest. Based on these findings, it is possible that those released from jail are more likely to commit lower level offenses post release that do not result in reincarceration.

It is also possible that prison itself has a deterrent effect that keeps prison releasees from recidivating. On the other hand, prisons could possibly offer more in terms of rehabilitation that keep those released from prison away from crime. However, although not statistically significant, results from a longer follow up period for recidivism reveal either a null or positive effect of prison on recidivism, specifically rearrest and overall recidivism within two years from release. Again, it is possible that prison has an initial deterrent effect that eventually wears off the longer a person has been released. While it is unclear what mechanisms are causing these differences in recidivism, there are many reasons that should be examined in the future on post-release life for prison and jail inmates.

It is important to note that differences across the statewide and county samples may indicate a lack of generalizability across the county sample. Each of these counties are considered urban counties based on the population density within each county, and therefore is not fully representative of rural counties within the state. Lackawanna and Westmoreland Counties' are much smaller than Allegheny and Lehigh County, however they are still classified as urban. Although results revealed that there is no difference in

recidivism between urban and rural counties, there were race effects that differed by county, which could impact the overall findings.

Although programming could not be tested directly given the invariability across prisons, a test was done comparing Allegheny County jail to the other jails used in this sample. Allegheny jail offers programming similar to the state, therefore comparing it to jails with less programming could shine some light on differences in facilities. However, there were no significant differences in recidivism between Allegheny sentences and the other counties. There was one reported difference between Lackawanna County and Allegheny in terms of rearrest, where those sentenced to Lackawanna Jail were less likely to recidivate within one year from release compared to these sentenced from Allegheny Jail. Results here are based on a small sample and should be interpreted cautiously.

These findings do not indicate that level of programming available increases recidivism, but instead reveals that the facility itself may matter. Lackawanna Jail offers substance abuse treatment, parenting courses, anger management and alcohol dependency classes (PREA Audit Report, 2017). While the programming is not as extensive as Allegheny, it is possible more is available to inmates given the location of the jail. Similarly, Allegheny jail supports a much larger and more urban population, which could reduce resources available per inmate leading to better recidivism outcomes in Lackawanna which serves a less dense area. This finding supports to the notion that facilities should be examined to determine which aspects of the facility could reduce recidivism.

In summary of the key findings, chapter 2 predicted that jails would result in a higher probability of recidivism ‘given that jails in general have less focus on

rehabilitation and reentry.' Although it was hypothesized that jails would be closer in proximity to family and friends, likely increasing visitation, the lack of reintegration and rehabilitation would outweigh the benefits of proximity. However, results indicate that prisons have a long term positive impact of recidivism when measured as arrests, which is more likely due to post release supervision. Overall, recidivism may not be significantly affected by the place of confinement once reincarcerations are accounted for. In certain circumstances, specifically for blacks sentenced in urban counties, the proximity as well as increased jail programming supports the notion that these two factors help reduce recidivism. Urban jails have more programming available than rural jails and are closer to home for those living in these communities. However, these results do not hold for white offenders in this sample and alternative explanations must be explored in future research.

5.2 Policy Implications

The current study has examined the effects of being sentenced to prison or jail on recidivism. Although analyses cannot account for differences in what offenders experience in prisons and jails, findings can be used to understand how the sentence assignment to prison or jail, with its consequences on confinement experiences as well as post-release experiences in the community, affects recidivism. Results from this research, thus, can be used to inform sentencing policy.

The initial one-year findings across multiple samples reveal that jails increase the risk of recidivism, however, given longer follow-up periods, prisons results in a higher risk of recidivism at least in terms of rearrest. Although, once accounting for

reincarceration, the long-term effects disappear. Given the indication that there is no difference between the two sentencing facilities on reincarceration and a positive effect of prison on rearrest, jail should continue to be used as the normative sentence for level 3 offenders in Pennsylvania.

Budgetary concerns may play a role in a judges' sentence to prison or jail since the jail budget comes from the county and the prison budget comes from the state. Based on the sentencing distribution in level 3 grids in Pennsylvania for 2009 and 2012, jail is more commonly assigned than prison; 77% of the statewide sample was sentenced to jail. Jail sentences tend to cost less than prison sentences. In a budgetary report by Allegheny county, a prison sentence in a state facility costs on average $116 per day while a jail sentence in Allegheny Jail costs on average $64.41 per day (Collins *et al*, 2014). Based on the lower costs of jails, it would make sense for the judges to continue to use jail more regularly for level 3 offenders in order to reduce the amount of money being spent within the state on corrections. Reduced rearrest rates and comparable reincarceration rates also indicate that the public safety of the community would not be compromised by continuing to use jail for level 3 offenders. It is important to note that these policy implications only apply to those sentenced in level 3 and are designated for lower-level offenders. Level 4 sentences could not be examined due to a lack of common support and balance across groups, therefore policies should not be applied to level 4 offenders within the sentencing grids.

Findings also tend to reveal that post-release supervision increases the probability of arrest for those sentenced to prison compared to those sentenced to jails. These results imply that regardless of differences in facilities and experiences in prison and jail that

could affect recidivism, post release supervision may play its own role in impacting recidivism. The state may consider post-release policies that reduce the amount of supervision placed on offenders to reduce the probability of rearrest. Simply by being under supervision in the community, the odds of being caught for a technical violation or new crime increase, therefore altering supervision practices may result in less recidivism. If, for example, technical violations make up a large number of these arrests, reducing the use of arrest as a response to probation or parole violations will reduce recidivism.

While results cannot be generalized beyond Pennsylvania, initial findings can provide context for other states. As Justice Reinvestment continues to develop and changes in sentencing practices grow, it will be important to continue to evaluate these changes and in doing so. Some states have begun to use jail as an alternative to prison and these results provide a foundation that these sentencing changes may be beneficial to the states, especially given the long-term findings that prison may be more criminogenic than jail. As previously mentioned, California began to use jail sentences more frequently for non-violent offenders. While more research is needed before any firm conclusions can be met, it would seem that in states like California, using jail for non-violent offenders is a practice that could continue; recidivism is not likely to increase based on this sentencing change. However, results from this analysis using Pennsylvania data reveals that even lower level violent offenders could be sentenced to jails, further reducing prison capacity. Research should be conducted within California and other states that are beginning to use jail to non-violent offenders to ensure the findings are generalizable beyond Pennsylvania.

There is reason to believe that jail has differential effects on recidivism. Findings within grid cells indicate a negative effect of prison on recidivism while long term findings reveal a positive effect of prison on recidivism. Although these effects are in opposite directions, they confirm the notion that the total incarceration variable may limit research in corrections and future research should disentangle prison and jail. The results from the race analysis also reveal differences in recidivism based on the race of the offender and where s/he was sentenced. Many studies have examined the impact of incarceration and alternative sentences on recidivism based on race, but none have differentiated prison and jail which could impact results significantly. Future risk analyses may need to account for these differences between sentencing facility and risk factors in order to guide judges on whom to sentence to which facility in order to best reduce recidivism. There may be an individual differential effects of facility on recidivism.

5.3. Limitations & Future Directions

The conclusions of this study are only a first step in an area of research that is severely lacking. The results reveal several interesting findings, though there are several limitations to this study. First, the study takes place in Pennsylvania, which provides a unique sentencing structure that allows a large overlap in prison and jail sentences and therefore is not generalizable to other states. Although California allows non-violent offenders with sentences longer than one year to be assigned to jail, it is different from Pennsylvania that does not distinguish between violent and non-violent offenders in the overlap area on the sentencing grids. In other words, in Pennsylvania both violent and

non-violent offenders can be assigned to jail with sentences longer than one year. This research needs to be replicated in other states that allow some overlap between prison and jail.

The current data cannot disentangle the effects of prison and jail completely. Some prison sentenced offenders may have spent a period of confinement in jail while awaiting trial or sentencing. These individuals may have been impacted by the time spent in the jail, which could range from a few days to much longer stays. Some of the short minimum prison sentences (those with a minimum of less than one year) may actually spend more time in jail than prison before they were transferred to a prison facility. There is likely some contamination between treatment and control groups that cannot be accounted for in this study. Based on the level 3 offenders, nearly all inmates sentenced had some period of time between their arrest data and sentence. If an offender does not receive some form of presentence release (bail or release on own recognizance), s/he will be held in jail during this time period, however the data does not account for whether or not an offender was released on some form of bail. 74% of the level 3 offenders analyzed in the statewide sample had under a year between arrest and sentencing date, while 26% had more than a year between the arrest and sentencing dates. There is a staggering number of individuals who spend time in jail prior to their trial date in Pennsylvania; in 2013 over 20,000 people in jail in Pennsylvania were being held pre-trial compared to approximately 14,000 who are actually serving jail sentences (Aiken, 2017). Ideally, future research would capture amount of time spent in jail prior to trial or before being sentenced and transferred to prison as a large number of offenders spend time in jail prior to trial.

Additionally, this data cannot account for post-release supervision in the community which will have a direct effect on recidivism. Those who are under community supervision are subject to greater control by the criminal justice system and at a greater risk of being caught for a technical violation or new crime. Alternative methods would also need to be implemented to account for this post release supervision; propensity scores cannot account for probation or parole since the supervision is assigned post sentencing and therefore would not predict treatment. Regarding post release supervision, arrests would ideally be measured in terms of a new crime or a technical violation, however RAP sheet data does not include this information. A more in-depth measure of arrest will indicate differences in recidivism based on community supervision or criminal behavior.

Another limitation to this research is the notion of unobserved heterogeneity. Initial sentencing decisions between prison and jail are not likely completely random. There are likely offender and offense characteristics that influence judicial sentencing. Based on the distribution of sentences in across levels 3 and 4 of the sentencing guidelines, it is apparent that judges use prison for more serious offenders and jails for less serious offenders. According to May and colleagues (2008) judges view jail as more severe than prison. Sentence lengths assigned by judges also vary across these sentences, revealing that prison sentences are assigned longer sentences, on average, compared to jail sentences. These initial differences in sentencing make reduce the comparability of prison and jail sentences as these two groups may be qualitatively different.

The results from a sensitivity analysis reveal bias in the estimation effects due to unobserved variables. One way to address this selection process by judges and the

unobserved variable bias would be to include an instrumental variable analysis. Nagin and Snodgrass (2013) used judge random assignment as an instrument to predict the effects of incarceration on recidivism with data from PSC. Utilizing this method to compare prison and jail sentences on recidivism would reduce the affects of unobserved heterogeneity influencing judges' decisions. An instrumental variable analysis was initially tested using the statewide sample, however only 7 counties met the assumptions required for the analysis. The extent that only 10% of the counties could be included in the analysis enhances selection bias that the instrument was attempting to minimize. There is potentially unique characteristics about these specific counties that would not be generalizable to the remaining counties that did not meet the instrumental variable assumptions. While this type of analysis was not utilized with the data presented in the current research, it should be examined further in the future to account for selection effects between prison and jail sentences.

Future research will also need to include more factors that could predict treatment and recidivism to build a stronger model. For example, more specific information about the crime type could be included to account for differences within each category of crime. An offender convicted of an armed assault will likely be treated more punitively than a person convicted of a minor assault, although both would be included as violent offenders in the sample. These specific details may provide a stronger model and better matched sample, reducing the impacts of unobserved heterogeneity.

The current study only included details on reincarceration for five counties, which is not representative of the entire state of Pennsylvania. Despite this weakness, no study has previously looked at the effect of prison and jail on reincarceration. This study

provided a unique examination of the impacts of sentencing facility on recidivism by providing multiple measures of recidivism. Additional work will seek to obtain information on reincarceration from other counties. This study cannot account for individuals convicted and sentenced to jail in other counties in Pennsylvania. Including a county level analysis was intended to further support results from the statewide analysis, but the results for reincarceration are still limited by this lack of data and could be further supplemented by improving data collection within other counties. There is significant variation across counties in terms of demographics and sentencing, therefore including more county level information will only improve the validity of these results.

Data is also limited to only 2 years of sentencing, which may not account for changes in sentencing practices. In 2008, the 2-5 sentencing rule was imposed in Pennsylvania, but it was not until 2011 that the rule was applied across all counties. Judges may take time before changing individual sentencing practices to reflect sentencing laws. 2009 and 2012 were chosen to ensure adequate follow up periods for recidivism, however, more recent years may reflect these sentencing structure changes[47]. It is imperative to continue this study using more recent sentencing years that may include more offenders sentenced to jail under the 2-5 law. If results from the long-term follow-up periods are consistent across high level offenders than sentencing offenders to jail under this law will likely reduce recidivism in the long-run.

The current study sheds light on the extent to which prisons and jails can result in differences in recidivism. However, this research cannot account for facility level differences and individual experiences within each facility. First, prison inmates in

[47] In a supplemental analysis, a propensity score matching technique was applied to each year, 2009 and 2012, separately. The results from these analyses revealed no differences in the ATT across the two years.

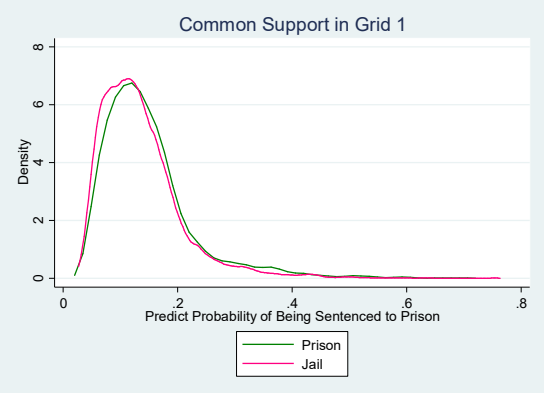
Pennsylvania can transfer facilities during their incarceration sentence, and may transfer multiple times, making it difficult to capture their experience within a specific facility. In addition, more data is needed on theoretical constructs that explain differences in facility experiences. For example, data should include types of programs available within a facility as well as how much programming an offender received to control for differences in the exposure and dosage of treatment. Limited information is currently available on jail specific programming compared to state facility reports that indicate the types of programs available within state prisons. Additional data is needed within jails to account for differences in programming. Another important aspect that should be included would be the amount of visitation allowed within a facility and how much an offender is visited. Accounting for these differences will help further clarify the aspects of prison and jail that are responsible for recidivism differences. A multilevel model approach can be used to look at the effects of prisons and jails by comparing individuals within these facilities and comparing effects between facility types. Similarly, variations in the prison and jail experiences can help explain the relationship between race and recidivism based on the assigned sentencing facility.

Future research should also utilize a mixed-methods approach by conducting qualitative interviews with judges to determine what factors influence their sentencing decisions. The qualitative component can reveal more details relating to the mechanisms that effect sentencing that cannot be accounted for with numbers. For example, asking judges their perceptions of prison and jail to determine which they believe to be more punitive and/or more rehabilitative can inform the sentencing commission and guide policy to determine why judges tend to use jail more than prison for lower level

offenders. Similarly, determining reasons judges may choose one sentence over the other will help explain differences in treatment assignment and provide insight into the question of whether prison and jail sentences are actually comparable or if prison is reserved for more serious offenders.

Additional qualitative pieces should also be included. Interviews with corrections officers and inmates within prisons and jails can provide informative details regarding the experiences within these facilities. Corrections officers can offer an inside perspective on the daily operations of both these facilities and offer a different perspective than the inmates on life within the facility. Inmates can provide information regarding their own experiences within these facilities and comparisons across facilities can be examined for inmates who may have served time in both prison and jail at different points. For example, while quantity of treatment can be analyzed quantitatively, the quality of the services can only be explored qualitatively. Using a mixed method approach can supplement the quantitative findings with qualitative insight.

Appendix A


Common Support in Grid 1
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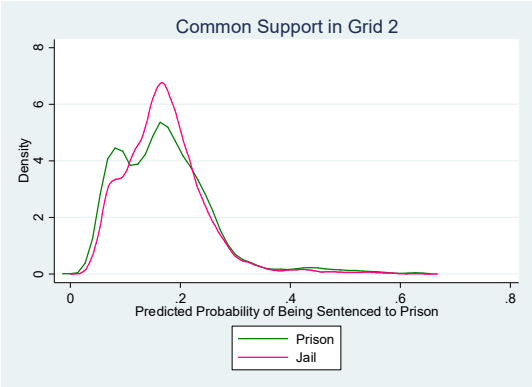
Predict Probability of Being Sentenced to Prison
Prison
Jail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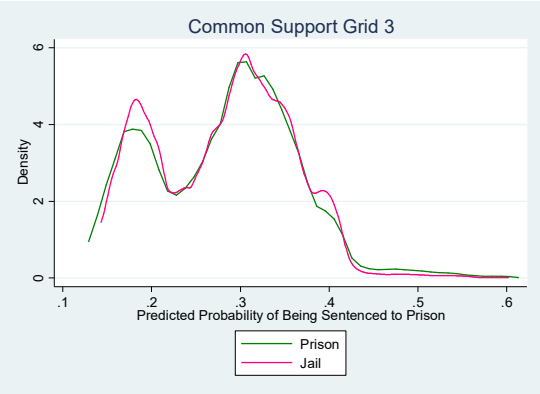
Prison
Jail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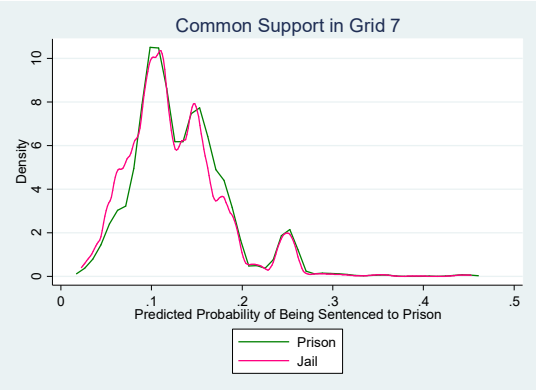
Prison
Jail


Common Support in Grid 7
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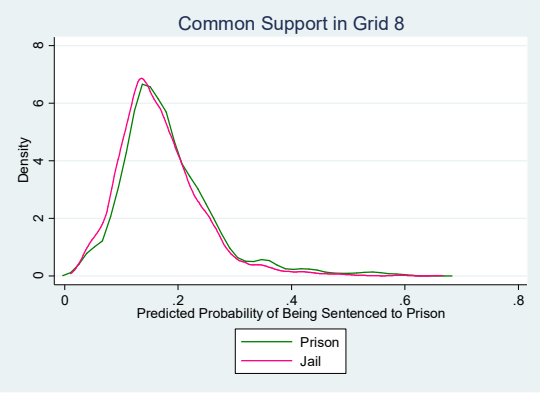
Predicted Probability of Being Sentenced to Prison
Prison
Jail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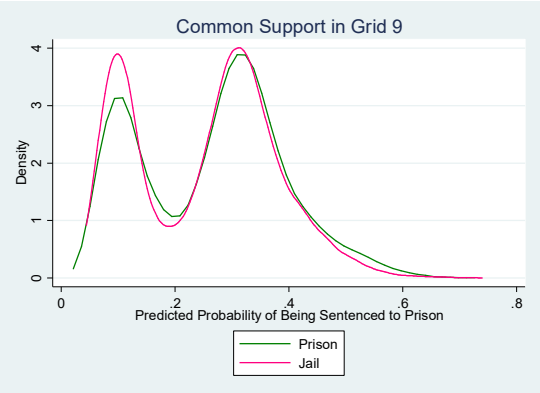
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support in Grid 9
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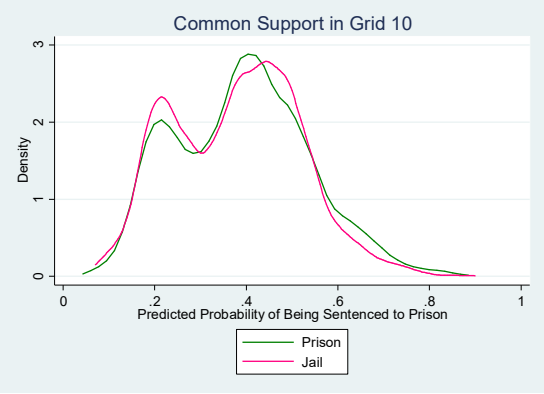
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support in Grid 10
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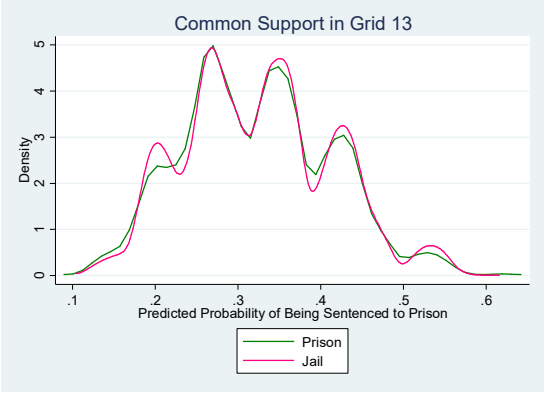
Predicted Probability of Being Sentenced to Prison
Prison
Jail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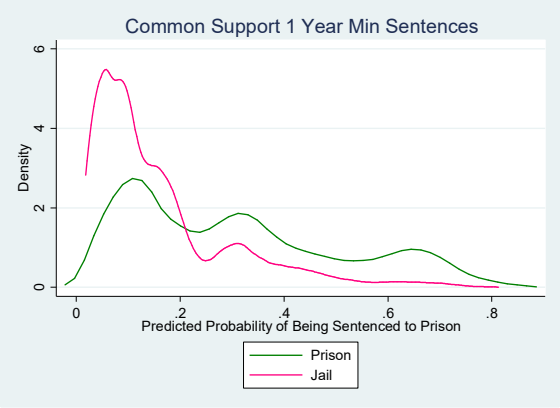
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support 1 Year Min Sentences
Density
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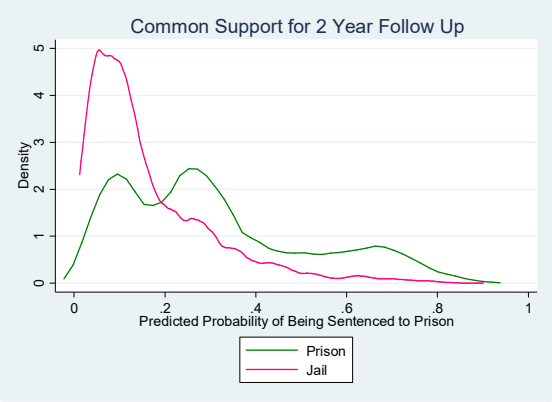
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support for 2 Year Follow Up
Density
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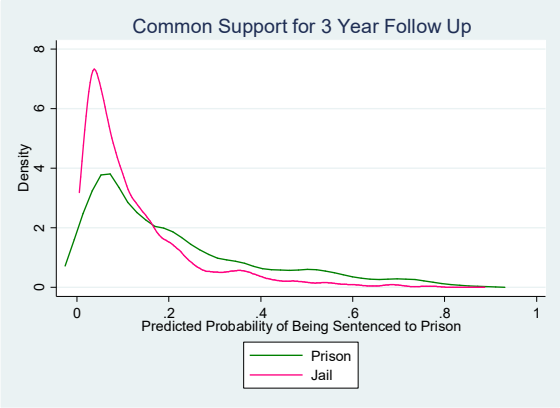
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support for 3 Year Follow Up
Density
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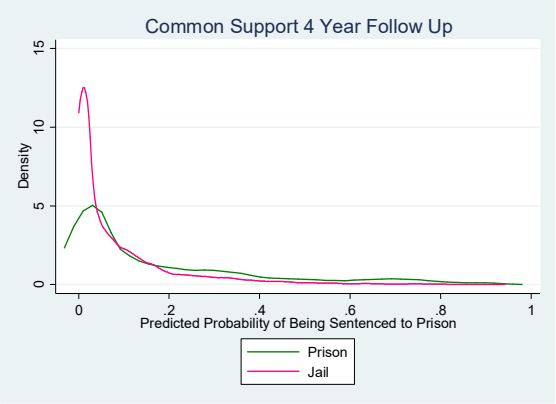
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support 4 Year Follow Up
Density
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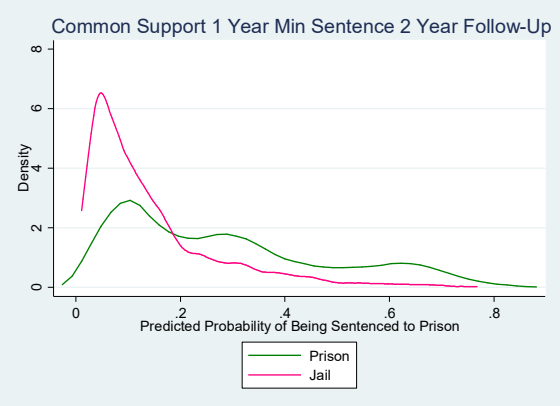
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support 1 Year Min Sentence 2 Year Follow-Up
Density
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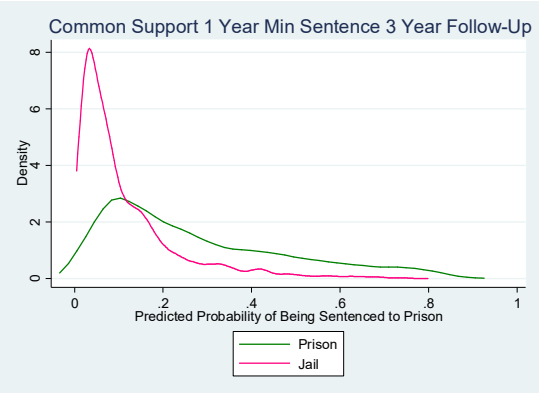
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support 1 Year Min Sentence 3 Year Follow-Up
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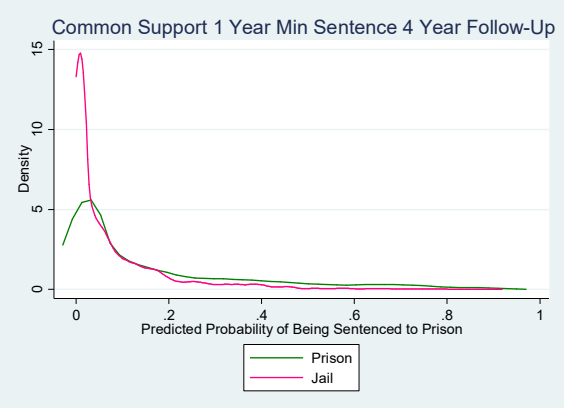
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support 1 Year Min Sentence 4 Year Follow-Up
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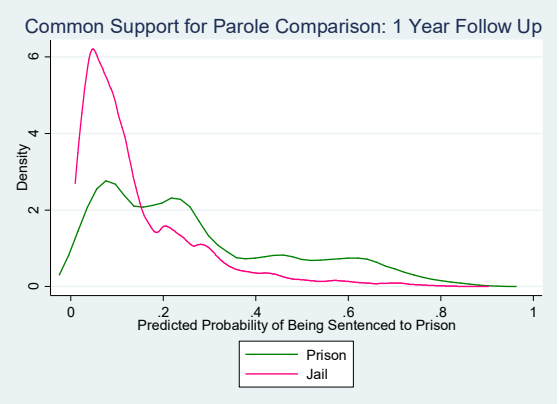
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support for Parole Comparison: 1 Year Follow Up
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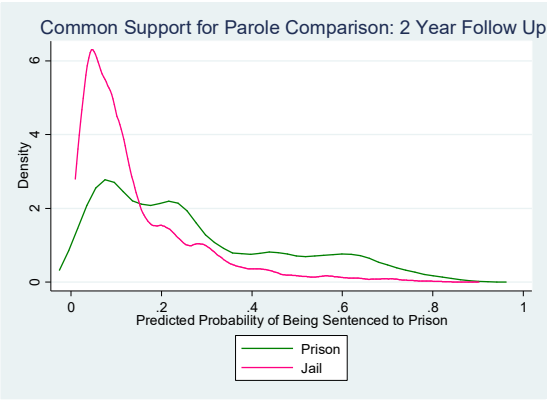
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support for Parole Comparison: 2 Year Follow Up
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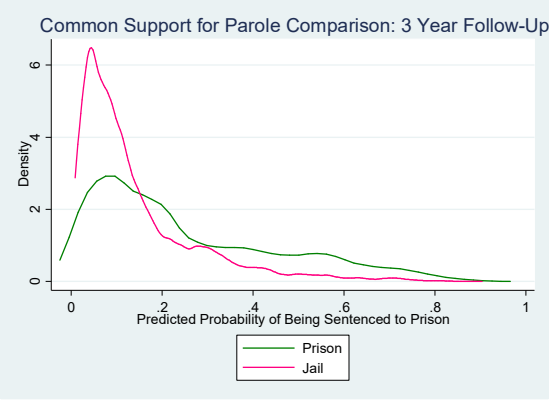
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support for Parole Comparison: 3 Year Follow-Up
Density
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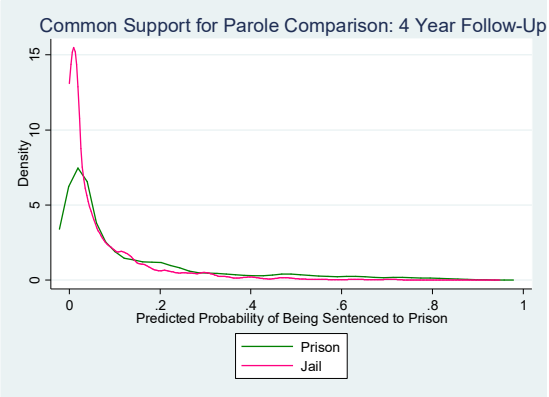
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support for Parole Comparison: 4 Year Follow-Up
Density
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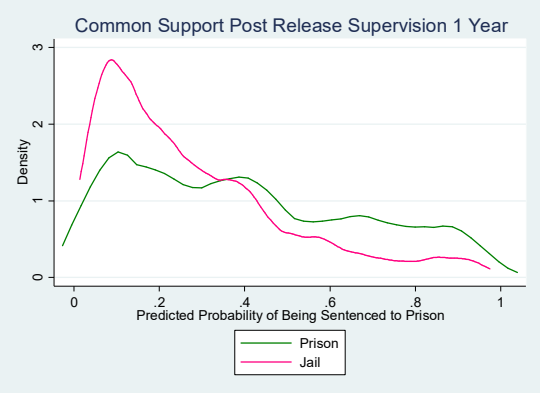
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support Post Release Supervision 1 Year
Density
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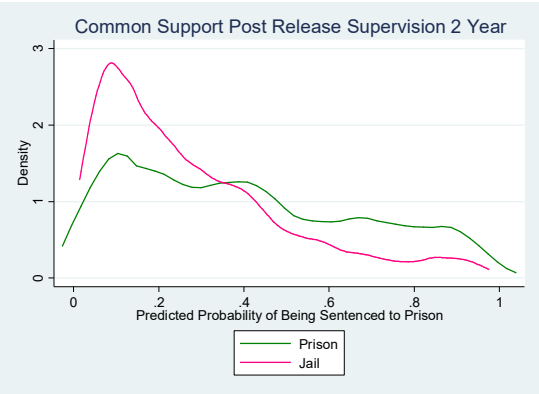
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support Post Release Supervision 2 Year
Density
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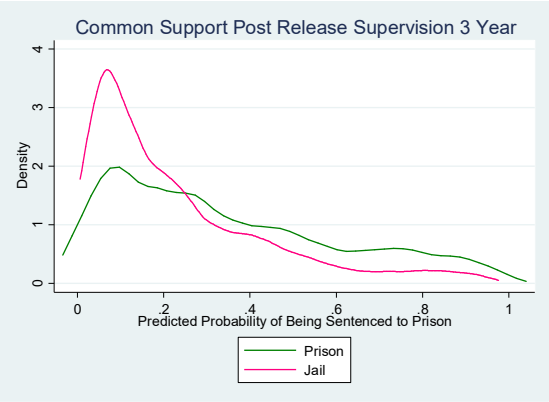
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support Post Release Supervision 3 Year
Density
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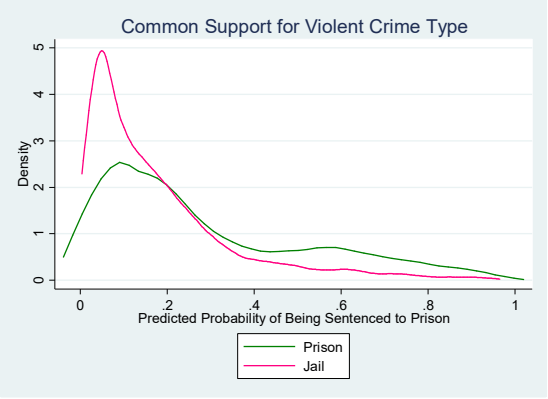
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support for Violent Crime Type
Density
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.6
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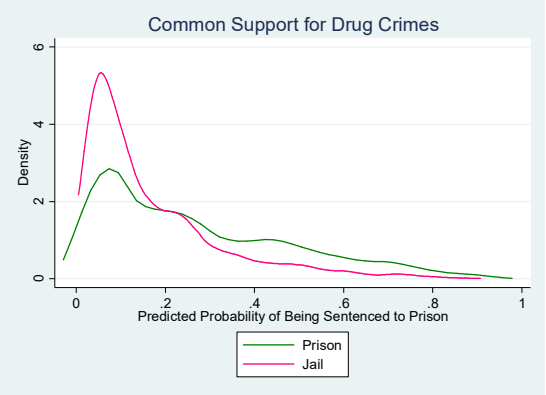
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support for Drug Crimes
Density
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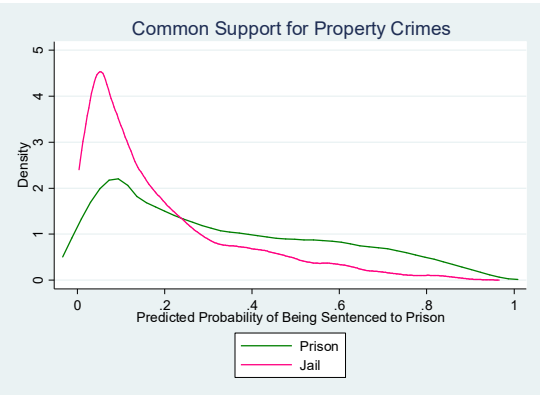
.4
.6
.8
1
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support for Property Crimes
Density
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.6
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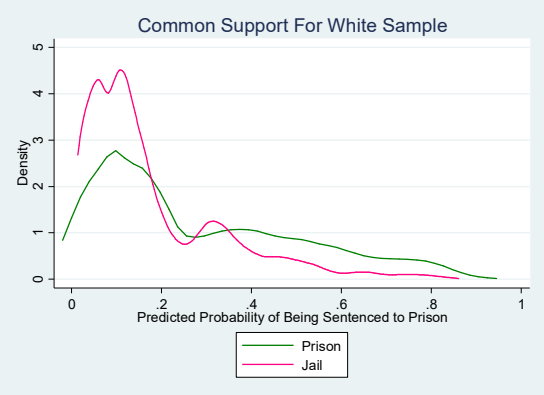
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support For White Sample
Density
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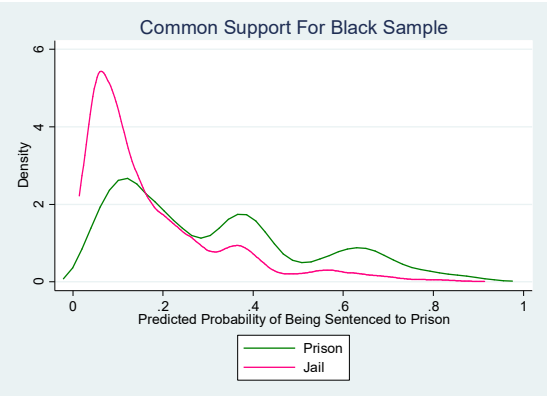
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support For Black Sample
Density
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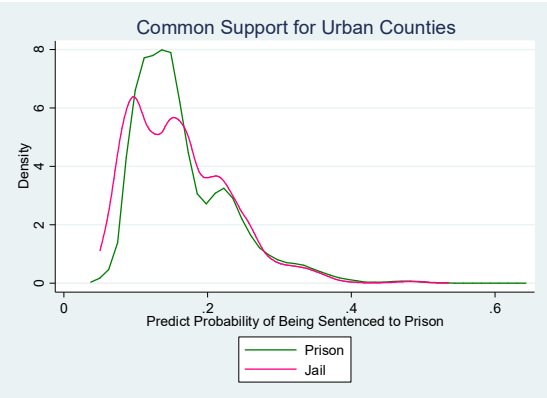
.6
.8
1
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support for Urban Counties
Density
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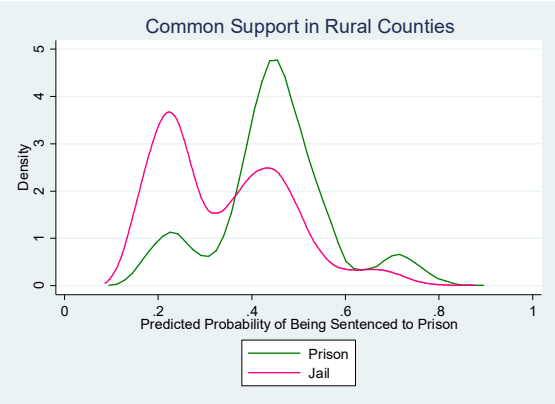
.4
.6
Predict Probability of Being Sentenced to Prison
Prison
Jail


Common Support in Rural Counties
Density
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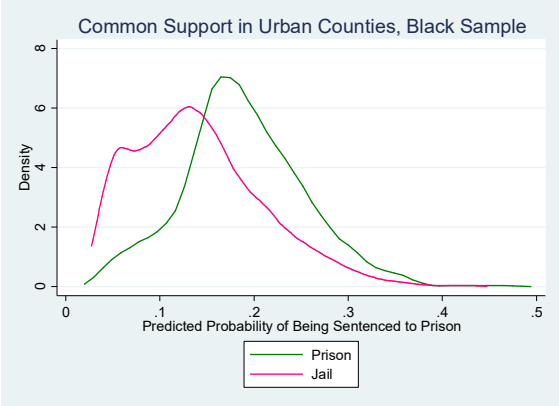
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support in Urban Counties, Black Sample
Density
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.3
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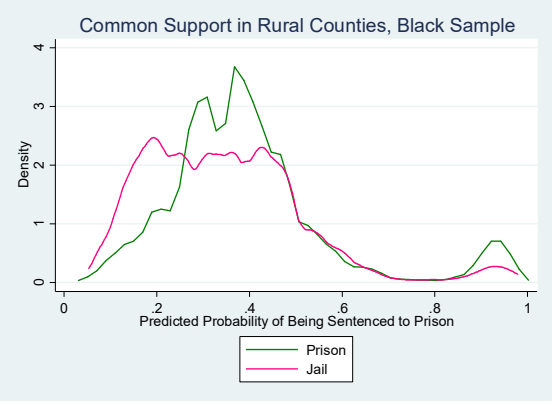
.5
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support in Rural Counties, Black Sample
Density
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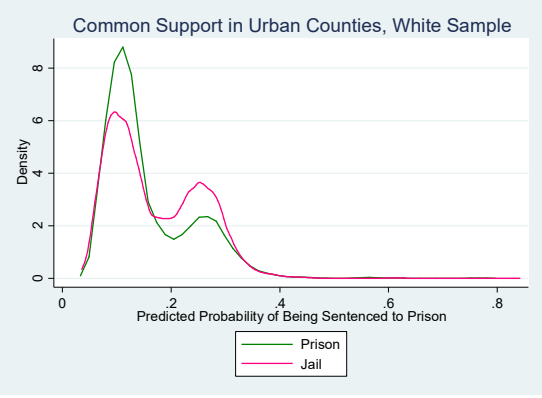
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support in Urban Counties, White Sample
Density
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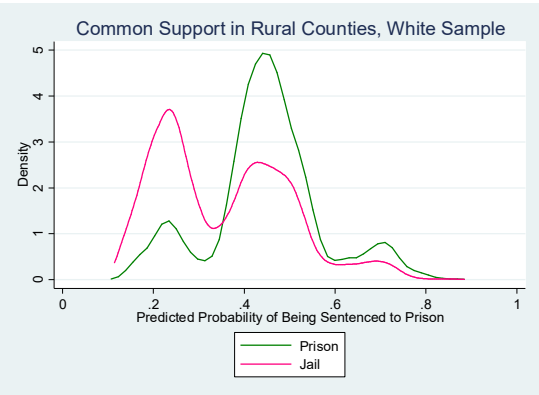
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support in Rural Counties, White Sample
Density
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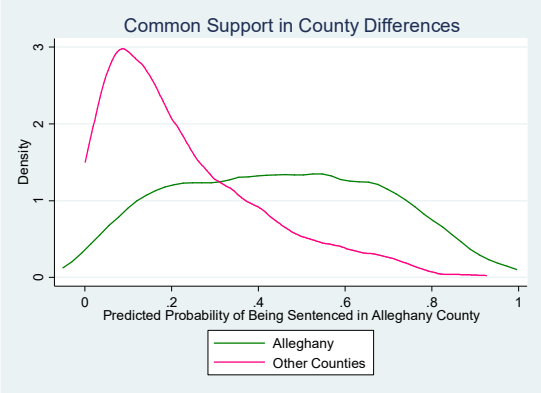
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support in County Differences
Density
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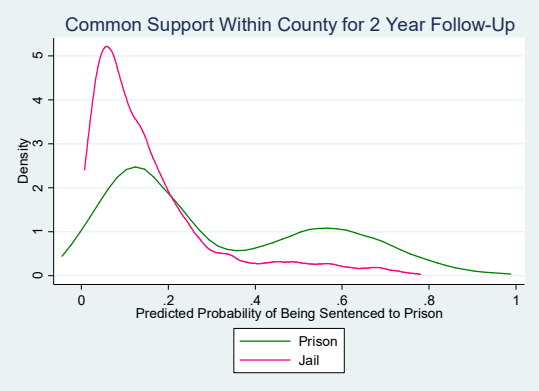
Predicted Probability of Being Sentenced in Alleghany County
Alleghany
Other Counties


Common Support Within County for 2 Year Follow-Up
Density
0
1
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4
5
0
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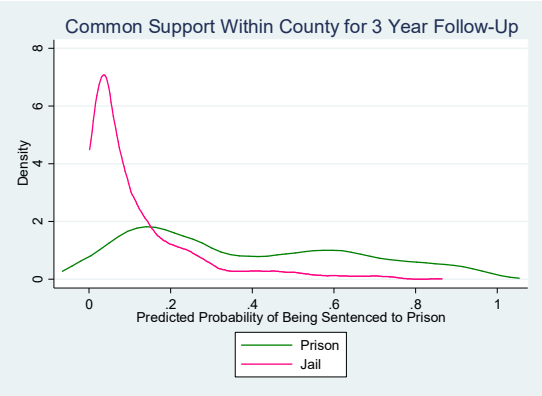
.4
.6
.8
1
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support Within County for 3 Year Follow-Up
Density
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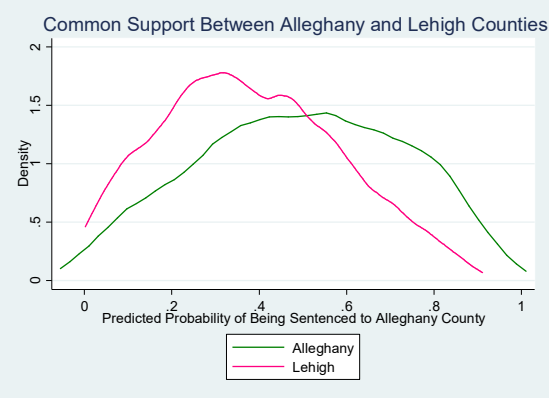
.6
.8
1
Predicted Probability of Being Sentenced to Prison
Prison
Jail


Common Support Between Alleghany and Lehigh Counties
Density
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.4
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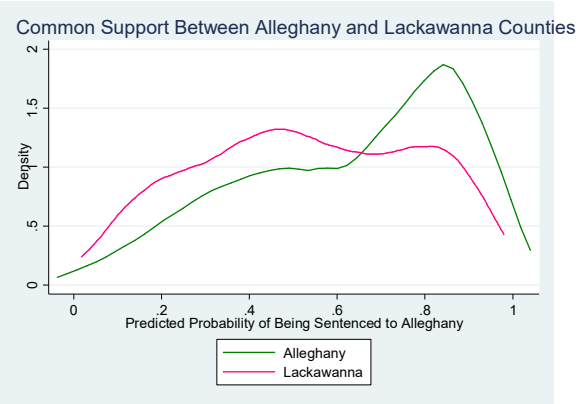
.8
1
Predicted Probability of Being Sentenced to Alleghany County
Alleghany
Lehigh


Common Support Between Alleghany and Lackawanna Counties
Density
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1
1.5
2
0
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1
Predicted Probability of Being Sentenced to Alleghany
Alleghany
Lackawanna

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