

# Halfway Home? Residential Housing and Reincarceration

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March 23, 2022

## Abstract

Every year, hundreds of thousands of people are released from prison. For many, the transition back to society includes a mandatory stay in residential housing. In this research, I estimate the effect of residential housing on reincarceration using administrative data from Iowa. I address selection into residential housing by instrumenting for residential housing assignment with the rate at which randomly assigned case managers recommend it. I find no evidence that Iowa's costly investment in residential housing results in reduced reincarceration rates relative to parole. Instead, assignment to residential housing accelerates the timing of reincarceration. I go on to show that residential housing increases reincarceration due to violent crimes and technical violations. This is partially offset by decreases in drug and public order crimes.

*Keywords:* Reincarceration, Recidivism, Reentry, Prison, Residential Housing

*JEL Classification:* K42, C26

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# 1 Introduction

More than 640,000 prisoners were released from state and federal prisons in 2015 with two-thirds of those individuals, more than 400,000 people, expected to be rearrested within three years (Carson and Anderson, 2016; Durose et al., 2014). This cycle of crime and incarceration imposes enormous costs on society in lost labor hours, legal fees, incarceration costs, and the damage caused by the additional crimes. A recent study from Illinois found that the average cost associated with one recidivism was \$151,662 (Steinfeld et al., 2018).

One possible cause of these disturbingly high reincarceration rates is the difficulty formerly incarcerated individuals face in securing housing (Lutze et al., 2014; Clark, 2016; Leasure and Martin, 2017). Upon release, many former prisoners find themselves in unstable housing situations or high crime neighborhoods, which can perpetuate a cycle of crime and incarceration (Visher and Courtney, 2007; Morenoff and Harding, 2014). This is perhaps best illustrated by recent evidence that prisoners released into areas with high vacancy rates among affordable rental housing units are less likely to recidivate (Young, 2019).<sup>1</sup>

A potential solution, which has been widely adopted in the United States, is to use residential reentry centers for former prisoners after release. Often called halfway houses, these centers offer treatment programs, job placement services, and a place to stay, but also impose strict rules that dramatically limit residents' freedom. While there are a variety of differences in the precise implementation, 32 states and the federal government use some type of transitional work release program or halfway houses between incarceration and parole for some prisoners. In total, state and federal corrections websites list nearly 500 residential reentry centers (often under different names) with the capacity to house 58,000 people. A

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<sup>1</sup>There is also significant qualitative evidence that the search for stable housing represents a significant barrier to successful reentry for recently released prisoners (Western et al., 2015; Keene et al., 2018). Further highlighting the importance of one's economic prospects on criminal behavior, Bell et al. (2018) show that individuals graduating into difficult labor markets are more likely to become career criminals than those individuals who graduate during an economic expansion.

back of the envelope calculation suggests the annual cost of these centers exceeds \$1 billion.<sup>2</sup> Iowa alone spent more than \$15 million on residential housing facilities in 2018 with each person-day of residential housing costing the state nearly 14 times more than one person-day of parole (Iowa Department of Corrections, 2018). Given these staggering costs, residential housing needs to be leading to significantly improved outcomes for the individuals to which it is assigned relative to parole.

Theoretically, the impact of residential housing is ambiguous. Residential housing offers a stable living arrangement, additional programming and other services, and gainful employment, all of which can be expected to reduce reincarceration. These beneficial effects may be particularly large in Iowa as residential housing is intentionally targeted at individuals without stable housing options upon release. Stable housing is a significant barrier to successful reentry. A study in Massachusetts found that nearly 25% of people released from incarceration experienced homelessness within the first year (Bradley et al., 2001). Of course, homelessness is an important risk factor for reincarceration, with homeless individuals 4-6 times more likely to be incarcerated than the general population, even after controlling for age, race, and gender (Greenberg and Rosenheck, 2008). There is also evidence that “Housing First” programs, which prioritize finding individuals stable housing above and before all else, can significantly reduce crime (Somers et al., 2013). Anecdotally, Iowa officials report that it is not uncommon for individuals to resist matriculating from residential housing to parole, often because they have trouble finding anywhere else to go even months after being released from prison. Unsurprisingly, this is particularly common among sex offenders. Given the evidence that difficult housing situations are a key factor in recidivism and that individuals in residential housing in Iowa often have nowhere else to go, Iowa’s targeted approach may be expected to significantly reduce reincarceration rates (Young, 2019). On the other hand, residential housing comes at the cost of individual autonomy with brief peri-

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<sup>2</sup>Not all states report the costs of their residential housing programs. The estimated value is calculating by averaging the cost per bed among reporting states and multiplying that average by total residential housing capacity in the United States.

ods of relative freedom, increased supervision which may imply higher reincarceration rates even in the absence of differences in criminal activity, and extended exposure to potentially criminogenic peers.

In this research, I provide causal estimates of the impact of residential housing on reincarceration by overcoming two key challenges. First, data availability is often a problem. Research in this area requires individual level prisoner data that can be combined with information about post-prison assignments and outcomes. I use administrative data from the Iowa Department of Corrections (IDOC). The data include information about every prisoner released from an Iowa prison between 2011 and 2014. This includes the residential facilities to which prisoners were assigned after release as well as whether each prisoner returned to incarceration within three years of release.

Second, residential housing is targeted towards particular prisoners. While some states assign the prisoners with the highest risk of recidivism to residential housing instead of parole, Iowa specifically targets individuals who do not have alternative stable housing options upon release from prison. Either system creates significant selection bias. As such, even where data is available, a simple comparison of the reincarceration rates across individuals assigned and not assigned to residential housing has limited value in assessing the causal effect of residential housing on reincarceration. I use the frequency with which randomly assigned case managers recommend residential housing to predict individual prisoner assignment to residential housing. The identification strategy is thus similar to papers that use judges' sentencing patterns as an instrument but modifies the instrument to assess post-release outcomes.<sup>3</sup> The instrument provides a strong first stage and is uncorrelated with prisoner characteristics.

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<sup>3</sup>Judge based instrumental variable strategies have previously been used to study a variety of topics including the impact of incarceration length on employment and earnings, how juvenile incarceration impacts high school completion rates and adult incarceration, whether incarceration increases the probability of reoffending in the long run, and whether pretrial detention increases the probability of conviction (Kling, 2006; Aizer and Doyle Jr, 2015; Mueller-Smith, 2015; Dobbie et al., 2018; Bhuller et al., 2020). Similar strategies have also been used to study the impacts of parental incarceration on children (Bhuller et al., 2018; Norris et al., 2021).

I find that despite Iowa investing a large portion of their corrections budget into residential housing facilities each year, assignment to residential housing does not decrease the probability of a return to prison within three years. Instead, point estimates suggest that former prisoners assigned to residential housing after release are 8.2 percentage points more likely to return to incarceration during this period than those released directly to parole with the 95% confidence interval ranging from a decrease of 1.8 percentage points to an increase of 18.2 percentage points. Moreover, during the 6-month period immediately following release from prison, the period during which individuals assigned to residential housing are living in those facilities before being released to parole, individuals assigned to residential housing are 14.4 percentage points more likely to be reincarcerated.

I go on to explore the mechanisms through which assignment to residential housing impacts reincarceration. I find that assignment to residential housing instead of parole increases the probability of technical violations, but does not affect the overall probability of committing new crimes.<sup>4</sup> This suggests the strict rules and increased monitoring associated with residential housing may be directly causing the increase in reincarceration. Alternatively, it is a common practice in Iowa and in many other states to charge people with technical violations when new crimes have been committed. This practice dramatically reduces the time and effort needed to process the offense while still typically resulting in the individual returning to incarceration. It is therefore possible or even likely that my analysis is underestimating the increases in new crimes associated with assignment to residential housing.

Within new crime reincarceration, my results suggest that assignment to residential housing significantly increases violent crime. This is partially offset by decreases in drug and public order crime. This finding is intuitively appealing as residential housing facilities directly limit opportunities to access drugs and alcohol and often offer drug and alcohol focused reha-

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<sup>4</sup>Technical violations are defined as a return to prison without a new crime conviction. This often implies that the individual violated a condition of their release. Examples include failing to meet with parole officers during assigned times and failing to return to a residential housing facility quickly enough after leaving work. Technical violations are also used in cases where actual crimes have occurred in an effort to avoid costly and time consuming legal proceedings.

bilitation programs. On the other hand, residential housing creates numerous opportunities for interpersonal conflict which may manifest in violent crimes. Moreover, residential housing facilities use a furlough system which allows individuals to earn weekends away from the facility. I find evidence that these furloughs may lead to an increase in risky or anti-social behavior during the short period of relative freedom.

While a number of other papers have assessed the impact of residential housing programs, the effectiveness of these programs has not been clearly established. Prior studies have typically directly compared the reincarceration outcomes of individuals that spent time in residential housing after release to those that did not (Witte, 1977; LeClair and Guarino-Ghezzi, 1991; Turner and Petersilia, 1996; Lowenkamp and Latessa, 2005; Lowenkamp et al., 2006; Berk, 2007; Jung, 2014; Weisburd et al., 2017). Selection bias makes these comparisons difficult to interpret.<sup>5</sup> The previous literature has also been limited in its ability to speak to the mechanisms through which residential housing impacts reincarceration. Because residential housing can be expected to either increase or decrease reincarceration depending on the relative importance of benefits (eg. stable housing, additional programming) and drawbacks (eg. increased supervision, negative peer effects), understanding the mechanisms driving reincarceration is particularly valuable. Recent reductions in federal funding for residential housing programs have made the need for clear evidence of their effectiveness more urgent (Lynch and Harte, 2017).

My findings are consistent with a growing body of evidence that suggests increased supervision is a key driver of increased recidivism (Doleac, 2018b). Specifically, Di Tella and Scharrotsky (2013) found that electronic monitoring reduced criminal reincarceration when used as a substitute for pre-trial incarceration. Further studies have documented that reduced intensity of supervision does not increase the frequency of new crimes and that increased intensity of supervision increases the probability adults will eventually be incarcerated (Barnes

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<sup>5</sup>Waldo and Chiricos (1977) experimentally evaluated a work release program in Florida that had some similarities to modern residential reentry facilities and found that individuals randomly assigned to work release had similar outcomes to the control group.

et al., 2012; Boyle et al., 2013; Georgiou, 2014; Hyatt and Barnes, 2017). The effect persists across age groups. Hennigan et al. (2010) found that youth randomly assigned to an intensive after school supervision program in high crime neighborhoods were far more likely to be incarcerated over the five years following the program.<sup>6</sup>

This study differs from the broader increased supervision literature in a few key ways. First, residential housing programs are a unique type of increased supervision. Most of the other papers in this literature have been looking at degrees of supervision within parole or probation. Residential housing is arguably the most intense version of supervision, short of prison itself, with individuals confined to the facility during non-work hours. It also offers a number of potential benefits including stable housing. Second, I find negative impacts of residential housing that do not appear to be directly caused by increased supervision. Specifically, an increase in violent crime on weekends. This cannot be attributed to increased supervision in part because individuals assigned to residential housing are more likely to be on furloughs and experiencing relatively little supervision during the weekend. In addition, new violent crimes are among the most likely violations to be reported, making differences in supervision a less likely explanation. Finally, I document an important time component of increased supervision. Specifically, I show significant increases in reincarceration during the period in which individuals assigned to residential housing and individuals assigned to parole are being treated differently. However, after individuals in residential housing matriculate to parole, the group originally assigned to parole see higher reincarceration rates which reduces the overall impact of residential housing on reincarceration. This pattern is consistent with residential housing identifying individuals who will eventually be reincarcerated more quickly, likely as a result of the increased supervision. Individuals who make it through their time in residential housing, then, are a selected sample of individuals less likely to be reincarcerated

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<sup>6</sup>There is mixed evidence surrounding dedicated prisoner reentry programs focused on rehabilitation instead of supervision. Grommon et al. (2013b) found that community based, reentry programs focused on substance abuse had little effect on outcomes while wrap-around services post-release not only fail to reduce reincarceration, but in some cases actually increase it (Grommon et al., 2013a; Cook et al., 2015; Wiegand et al., 2015). On the other hand, Cook et al. (2015) found that an employment focused prisoner reentry program that included job subsidies was effective at reducing rearrest rates.

relative to parolees who have not been reincarcerated during the first six months of their release. This has important implications for the time frame of analysis in future recidivism studies.

In Section 2, I provide background information about the Iowa Department of Corrections with a particular focus on residential housing. In Section 3, I detail the data used while Section 4 describes my empirical model. I present results in Section 5 and offer concluding comments in Section 6.

## 2 Background

All prisoners in Iowa are assigned to a case manager upon entry into prison. These case managers work with the prisoners to whom they are assigned during incarceration and have significant influence and discretion over which eligible prisoners are sent to residential housing upon release.<sup>7</sup> Case managers are assigned to prisoners based on a simple rotating assignment system that prioritizes case managers with fewer current cases. Case manager assignments are thus random within a prison from the perspective of the prisoners and should not be correlated with prisoner characteristics.<sup>8</sup>

Case manager caseloads are quite large with case managers typically handling one hundred or more cases at a time. During incarceration, case managers meet individually with their assigned prisoners roughly every 6 months with additional meetings occurring if the prisoner commits a misconduct. These meetings are largely informational with the case manager updating prisoners with their potential release date and responding to any official requests (eg. requests to transfer to a different prison). In addition, case managers work as part of a team that recommends and assigns in-prison programming. The case managers

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<sup>7</sup>Prisoners who have served the entirety of their sentence are not eligible for residential housing (or parole). As such, they are not included in my primary analysis.

<sup>8</sup>If prisoners are moved to a different prison, they are reassigned a new case manager in the new prison using the same system. Because of this, all variables that reference a prison, refer to the prison from which the individual was released. Similarly, only the tendencies of the last case manager for each prisoner are used to predict residential housing assignment.

also facilitate the programs themselves.

Importantly, case managers do not influence when a prisoner is released regardless of whether the prisoner matriculates to parole or residential housing nor do they attend the parole hearings of their charges. Instead, upon release from incarceration, case managers recommend either parole or residential housing for each eligible prisoner.<sup>9</sup> Case managers are instructed to primarily consider the availability and stability of housing options available upon release in their decision to recommend residential housing. Recidivism risk is not intended to be a key factor in the decision. While almost all case managers are more likely to assign residential housing to prisoners with specific traits (eg. prisoners who did not receive a visit, prisoners with long incarcerations), case managers vary widely in their propensity to send individuals overall. A case manager generally favoring parole in the 10th percentile of the assignment distribution sends just 25% of their cases to residential housing while a case manager at the 90th percentile of this distribution sends 47% of their cases.<sup>10</sup> Because of this, two identical individuals may not experience the same post-release treatment if they have been assigned different case managers. This creates variation which can be used to determine the causal impact of residential reentry centers.

The IDOC operates twenty residential facilities spread across 8 judicial districts. Residential facilities tend to be in relatively urban counties with high crime rates. Prisoners are assigned to specific facilities based on the county in which they were convicted and the treatment programs available. In some cases, prisoners can be assigned to residences outside of their judicial district, but this option is only available if the prisoner can document stronger family support in the area. Facilities range in size from 24 to 198 beds with an average of 84 beds. Each facility houses residents in dorm style rooms that contain 2-4 people. Each

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<sup>9</sup>Case managers are not technically given the power to determine whether individual prisoners are sent to residential housing upon release. Instead, case managers make recommendations to a parole board which has final say. In practice, parole boards accept the recommendation of the case manager in 93% of cases. The noise imposed in cases when the parole board does not adopt the recommendation of the case manager biases my estimates towards zero.

<sup>10</sup>One cause of this variation may simply be that recommending parole requires significantly more work from the case manager than a residential housing recommendation. Case managers likely vary in their willingness and ability to carry out this extra work.

facility also has a central area in which residents have meals and spend most of their time while at the facility.<sup>11</sup>

Residents are required to be employed while living in the facility and must return to the facility immediately following work.<sup>12</sup> They are expected to adhere to strict time allowances for travel between the residence and their workplace. The limited freedom given to residents implies that residential housing may have an incapacitation effect, reducing reincarceration, all else equal. Furloughs can be earned through a privilege system with well-behaved, low risk residents earning furloughs as often as every weekend. These furloughs include the opportunity to spend one or two nights away from the facility.

Residential housing also puts recently incarcerated individuals from a variety of backgrounds into close proximity. Antisocial behavior in residential housing typically results in technical violations if not new crime convictions. In either case, the individual is forced to return to prison. This represents a stark change from similar incidents that occur within prison which are typically recorded simply as a misconduct. The strict rules and constant monitoring associated with residential housing also imply that residents may be more likely to commit and be caught for violations than similar individuals assigned to parole.

Typically, residents stay in their assigned facility two to six months depending on behavior, completion of programming, and whether they can secure stable housing outside of the residential facility. 90% of individuals assigned to residential housing stay less than six months. Individuals are released from residential housing at the discretion of the residential facility director with official approval coming from the parole board. Upon release from residential housing, these individuals are placed on parole.

Residential housing facilities in Iowa have three distinct sources of funding. First, they receive a set appropriation from the state. This appropriation varies with the number of beds

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<sup>11</sup>All individuals in work release facilities are guaranteed three meals per day on weekdays and at least two meals per day on weekends. This is important in light of recent evidence that food insecurity can be a significant driver of crime (Carr and Packham, 2019).

<sup>12</sup>Individuals who lose their jobs are not typically sent back to prison. Instead, the residential housing staff work with the individual to secure a new employment opportunity.

but not with the number of residents in the facility at any given time. Appropriations are not tied in any way to resident outcomes. Second, residential housing facilities charge rent to their residents. While payment rates among residents are often low, revenue from rent makes up roughly 60% of each facility's total budget. Finally, many facilities host federal inmates and are paid a flat rate per inmate for that service.<sup>13</sup> Each facility employs a number of staff who are primarily program directors and parole officers. Parole officers assigned to a residential housing facility have similar duties, rank, and pay to parole officers who do not work in the facilities, although more experienced officers are eligible to both earn more and work with individuals classified at higher levels of risk. Wages for both staff and parole officers at residential facilities are not tied to either the number of residents nor the outcomes for those residents. Iowa's residential program is fairly typical in terms of programming, work expectations, and the types of prisoners assigned to residential housing upon release relative to other states and the Federal government.<sup>14</sup> Iowa falls close to the median in frequency of residential housing assignment among agencies that use an involuntary residential housing system.

Iowa's system of parole is also similar to the systems in place throughout the US and many IDOC policies do not distinguish between residential housing and parole. Upon release from incarceration to parole, parolees are assigned a risk level between 0 and 5 which determines the frequency with which individuals must meet with their parole officers. Level 5 parolees, the roughly 7.5% of individuals determined to carry the highest level of risk, meet weekly with parole officers. Roughly 30% of parolees in Iowa at any given time are at risk level 1. This group is only required to meet with their parole officer once every 60 days. Another 12% of parolees are designated as risk level 0 and simply receive "monitoring as needed" in lieu of scheduled meeting times. All people on parole are required to find and maintain a job. They are also required to participate in programming tailored to their particular risk

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<sup>13</sup>These federal inmates do not appear anywhere in my data.

<sup>14</sup>In a few states, residential housing facilities are not assigned but instead are optional, conditional on admission to the program.

level. Often, this programming occurs in residential facilities and is done side by side with individuals living in residential housing facilities. As in residential facilities, drug and alcohol use is prohibited for parolees with parolees subject to random tests at the discretion of their parole officer.

### 3 Data

The data used in this project come from the administrative records of the Iowa Department of Corrections (Iowa Department of Corrections, 2017). The sample is composed of men who served at least one month in an Iowa prison and were released between 2011 and 2014. The data include information about the crimes each prisoner committed, the prison and case managers to which they were assigned, whether the prisoner served time in residential housing after release from prison, demographic variables, and whether the prisoner returned to incarceration. Prisoners are categorized as reincarcerated if they return to incarceration in an Iowa prison within three years of release. The cause of this return is also recorded. The level of detail in the data is such that the researcher has nearly all of the information available to the case manager when the decision to assign either parole or residential housing is made.

From the complete sample, I remove the 4,224 individuals who were not eligible for residential housing upon release.<sup>15</sup> I also exclude the 1,307 prisoners assigned to case managers who made recommendations for fewer than 50 eligible prisoners. This restriction increases the probability that differences in case manager residential housing assignment rates reflect real differences in case manager preferences as opposed to natural variation in caseloads. Of the remaining prisoners in my sample, 35% served time in residential housing after their

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<sup>15</sup>In the vast majority of these cases, the individual had already served their maximum sentence while in prison. Case managers have little or no influence in whether a prisoner serves their entire sentence. Instead this is determined by the nature of the prisoner's sentence, and the misconducts a prisoner commits while incarcerated. In the remaining cases, individuals were released from an Iowa prison into the custody of either the federal government or another state or were released because of a judge's reconsideration of their original conviction or sentence.

release from prison.

Tables 1 and 2 display average characteristics for those individuals sent to residential housing and those given parole. Specifically, Table 1 presents statistics only for those traits which are determined before incarceration, while Table 2 presents variables determined, at least in part, during or after incarceration. These variables are presented separately as they have the potential to be influenced by the particular case manager to which each individual was assigned. As expected, individuals assigned to residential housing are different across a number of variables which suggests that there may be unobservable differences as well. Specifically, individuals sent to residential housing are more likely to have previously spent time in prison, committed more crimes before being incarcerated, were incarcerated longer, and received fewer visits. This is unsurprising as each trait may speak to the quality of housing options available to individuals upon release. Individuals sent to residential housing are also older, committed fewer misconducts while incarcerated, and have much lower LSI-R scores. LSI-R scores are used to estimate reincarceration risk upon release with high values indicating individuals are more likely to recidivate.<sup>16</sup> These differences highlight the IDOC's policy of ignoring recidivism risk in the residential housing assignment decision. While the overall direction of the bias is unclear, the differences between individuals assigned to residential housing and parole are sufficiently large that direct comparisons will be of limited use in determining the causal impacts of residential housing.

## 4 Empirical Model

The ideal experiment to consider the impact of residential housing on reincarceration would involve randomly assigning prisoners to either residential housing or parole upon release from prison. Of course, there are a variety of ethical and practical concerns with this type

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<sup>16</sup>Unfortunately during this period the IDOC changed from using LSI-R score to a new risk measure. I am able to convert the new score into LSI-R score for some observations, but neither score was available for 1,341 prisoners (roughly 13% of remaining observations). Given that these reincarceration risk scores directly predict the outcome variable and thus represent an important control variable, I drop these prisoners from my sample.

of approach in practice. Instead, residential housing is targeted at particular prisoners who have different propensities to recidivate even in the absence of treatment. As demonstrated in Table 1, there are significant differences between individuals sent to residential housing and those who are not. This implies specifications that simply examine the impact of residential housing on reincarceration will be marred by selection bias. Even specifications that control for the observable differences demonstrated above may suffer bias from unobservable differences correlated with both residential facility assignment and reincarceration.

To address this concern, I use an instrumental variable strategy that exploits the random assignment of prisoners to case managers. Specifically, for each prisoner, I calculate an adjusted mean residential housing assignment rate among all other prisoners assigned to the same case manager. Given the relatively small number of individuals assigned to each case manager during my sample window, calculating each case manager’s propensity to assign residential housing using only their decisions in other cases avoids problematic correlation between the case manager’s decision in that particular case and their instrument value. In constructing the instrument, I adopt the UJIVE approach suggested by Kolesar (2013). This method conditions the instrument on prisoner characteristics as well as prison by case manager assignment year fixed effects.<sup>17</sup>

The first stage of the two-stage least squares model based on the case manager instrument can be written as:

$$Residential_{icpy} = \alpha Instrument_{icpy} + X'_{icpy}\beta + \phi_{py} + \epsilon_{icpy} \quad (1)$$

for individual  $i$  assigned to case manager  $c$  in prison  $p$  and year  $y$ . The variable  $Residential_{icpy}$

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<sup>17</sup>The prison by case manager assignment year fixed effect isolates the random variation in case manager assignment I am attempting to exploit. Many prisoners change facilities during their incarceration and case manager turnover is relatively high. Because of this, nearly 40% of the individuals in my sample have more than one case manager during their incarceration. Recall, only the last case manager influences residential housing decisions. As such, the prison by case manager assignment year fixed effect is based on the facility from which the individual was released and the year in which the individual’s last case manager was assigned.

is a dummy variable equal to one if the individual was sent to residential housing after prison and 0 otherwise. A range of covariates are included in the vector  $X$  including; whether the individual had previously served time in prison, race dummies, age at release, total crimes committed, months incarcerated, the number of visits received per year in prison, misconducts per year in prison, crime class dummies, crime type dummies, jurisdiction dummies, and the number of programs in which a prisoner participated as well as the fraction of those programs that were required and successfully completed.<sup>18</sup> Prison by case manager assignment year fixed effects are included in  $\phi_{py}$ . Standard errors are robust and allow for clustering by case manager.

The second stage relationship between reincarceration and residential housing is then modeled as:

$$Recid_{ic} = \theta \widehat{Residential}_{icpy} + X'_{icpy} \Gamma + \lambda_{py} + e_{icpy} \quad (2)$$

Where  $Recid_{icpy}$  indicates whether a prisoner returned to incarceration within three years of their release from prison.<sup>19</sup>

The estimation strategy returns estimates of the Local Average Treatment Effect (LATE). That is, the impact of residential housing cannot be estimated for prisoners who would be sent to either residential housing or parole regardless of the case manager to which they were assigned. Instead, results estimate the impact of residential housing assignment on prisoners at the margin of residential housing or parole. As such, this research cannot completely affirm or condemn residential housing as a reincarceration reduction tool for all prisoners. Instead, the estimates reflect effects for only those prisoners at the margin of being sent to residential housing. In this setting, however, outcomes among these marginal prisoners are

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<sup>18</sup>Crime class indicates the severity of a particular crime (eg. class A felony) while crime type indicates the broad category of crime. Iowa uses five crime categories, Violent, Property, Drug, Public Order, and Other. Jurisdiction in Iowa refers to the county in which an individual was convicted and to which they will be released from prison.

<sup>19</sup>As in Angrist and Pischke (2008), I use a simple OLS model in both the first and second stages despite the fact that my outcome variable in both stages is binary.

likely the most policy relevant. While a complete removal of residential housing is unlikely, at least in the short term, my results can be used to show whether residential housing is being assigned with the correct frequency.

In order to serve as a valid instrumental variable,  $FracSent_{ic}$  must predict whether an individual prisoner is assigned to residential housing, but have no other influence on reincarceration. Figure 1, displays a histogram of the values of the case manager instrument. The figure also displays a local linear regression of residential housing assignment on this value. As expected, Figure 1 shows that case managers vary widely in their propensity to assign prisoners to residential housing. To further establish the important role of case managers in residential housing assignment, in Column 1 of Table 3, I present the first stage estimates of my preferred specification. As expected, I find that case managers sending a higher fraction of other prisoners to residential housing are more likely to send the prisoner in question to residential housing. Moreover, across a variety of subgroups, first stage F-statistics are consistently strong. In my preferred specification, the first stage F-statistic is 398.90.<sup>20</sup>

In addition to relevance, case manager assignment must be excludable. That is, case managers should not affect reincarceration except through assignment to residential housing. There are at least two potential threats to excludability in this case. First, if certain case managers are more likely to be assigned prisoners who should rightfully be sent to residential housing, any differences in sending rates may simply be a product of optimal decision making rather than preference differences among case managers. To examine whether certain case managers are disproportionately likely to be assigned more challenging cases, in Column 4 of Table 1, I test whether any observable prisoner characteristic predicts the fraction of all other prisoners assigned to the same case manager who were sent to residential housing. Specifically, I regress the case manager instrument on all of the indicated variables along with

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<sup>20</sup>I also estimated the strength of the first stage using the weak instrument test suggested by Olea and Pflueger (2013). The value of this F-statistic for my complete data is 76.60.

prison by case manager assignment year fixed effects.<sup>21</sup> As should be expected given random assignment, I find that just one of the 11 tested variables predicts case manager behavior at the 5% level (other race). More importantly, the joint F-test of all variables presented in Table 1 returns a value of just 1.31. This confirms that the case manager instrument is not systematically correlated with prisoner characteristics.<sup>22</sup>

Second, case managers may themselves influence reincarceration simply through their interactions with prisoners and by differentially assigning prisoners to in-prison programming.<sup>23</sup> Case manager interactions with prisoners are, however, quite limited. Case managers have large caseloads with an average of 100 prisoners under their supervision at any given time. Moreover, managing these prisoners is not their only responsibility as they also facilitate all programming within the prison. Due to these constraints, case managers meet with prisoners infrequently, averaging just three meetings per year of incarceration. Column 4 of Table 2 presents tests similar to Column 4 of Table 1. The joint F-test of the variables finds no evidence that case managers are systematically influencing these potentially endogenous variables. Moreover, Lee (2017) studies the impact of prison programming in the Iowa prison system and finds that neither prison programming in general nor any specific program type significantly affected reincarceration. I return to a consideration of whether case managers directly affect the reincarceration of their charges in Section 5.3.

The final component necessary for interpretability of an instrumental variable model in this context is monotonicity. That is, case managers assigning a higher fraction of their charges to residential housing should do so for all prisoners they interact with, not only those

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<sup>21</sup>This specification uses a measure of the case manager instrument that is constructed without residualizing out prisoner characteristics, as such residualizing could invalidate the test. Standard errors allow for clustering by case manager.

<sup>22</sup>To further test whether assignment to case managers is subject to systematic selection, I predicted recidivism using the complete set of covariates described above but excluding both the instrument and residential housing status. Panel A of Figure A1 in the Appendix plots these predicted values across values of the case manager instrument. Consistent with no selection, I find no relationship between the value of the instrument recidivism as predicted by the model covariates. In Panel B, I repeat this test, but use the lasso method described by Ahrens et al. (2018) in order to choose the included covariates.

<sup>23</sup>Outside of programming, case managers have little or no discretion in other factors that may effect reincarceration including visitation, phone call privileges, and assigning misconducts. Lee (2019) found that visitation did not significantly influence reincarceration in the Iowa prison system.

displaying a particular set of characteristics. To provide some evidence on this margin, I estimate the first-stage across a variety of subsamples. The relative strength of the first stage relationships among each subgroup implies which subgroups are more heavily comprised of compliers (Abadie, 2003). In columns 2-10 of Table 3, I present first stage estimates by subgroup and report the relative strength of the first stage with the ratio  $\frac{\alpha_X}{\alpha}$  where X represents a particular subgroup. First stage estimates are consistent across subgroups with only individuals originally convicted of violent crimes significantly different from the overall sample at the 5% level.<sup>24</sup> This implies that I cannot reject the monotonicity of the case manager instrument which is required for interpretation of the IV estimates (Norris et al., 2021).

A more complete test of monotonicity and excludability has been recently proposed by Frandsen et al. (2019). They demonstrate that the identifying assumptions necessary in instrumental variable designs like this one imply that the conditional expectation of reincarceration given case manager assignment must be a continuous function bounded by each case manager’s propensity to assign residential housing. They go on to suggest a test for monotonicity and excludability. In Appendix Table A1, I present the results of this test using my case manager instrument. Because case manager assignment is random only within a prison in a given year, I include prison by case manager assignment year controls in all specifications. I find no evidence of violations of either monotonicity or excludability.<sup>25</sup>

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<sup>24</sup>In conversations with prison case managers, prior incarceration, duration of incarceration, whether the prisoner was ever visited, and whether the prisoner committed any misconducts while incarcerated were described as key factors in the residential housing recommendation decision. Case managers who recommend immediate parole for individuals with long incarcerations and no visits may also be more likely to see those recommendations overturned by the parole board.

<sup>25</sup>In performing this test, the researcher has a choice in how much weight to put on the slope and fit components of the tests. I use a fit weight of one as Frandsen et al. (2019) finds that this maximizes test power in cases where the number of judges is greater than 20. Using a fit weight below one causes my test statistics to decrease and p-values to increase.

## 5 Results

I first show the reduced form effects of case manager’s propensity to assign residential housing. Specifically, Figure 2 replicates Figure 1, but uses reincarceration as the dependent variable in the local linear regression. While the estimated effect becomes noisy in the extreme tails of the distribution as the number of observations falls, the results suggest that being assigned to a case manager who recommends residential housing more frequently is associated with an increased probability of recidivism. As in Figure 1, the slope of the relationship is consistently positive, but the largest effects are observed in the right hand tail of the distribution.

In Table 4, I present results for any type of reincarceration within three years of release from prison. In Columns 1-3, I present simple OLS estimates and look directly at the impact of assignment to residential housing on reincarceration. While I expect this estimate to be marred by selection bias, it is useful to establish a baseline against which the instrumental variable results can be compared. Columns 4-6 display two-stage least squares results in which the case manager instrument is used to predict whether each prisoner will be sent to residential housing after release. Columns 1 and 4 include only the prison by case manager assignment year fixed effect required to have plausibly random assignment of case managers to prisoners. Columns 2 and 5 add in jurisdiction dummies while Columns 3 and 6 add the complete set of controls described in Equation 2.

Across all six columns, the point estimates suggest that assignment to residential housing increases the probability of returning to incarceration within three years. In my preferred specification, Column 6, I estimate that individuals assigned to residential housing are 8.2 percentage points (18.4%) more likely to return to incarceration after release. Importantly however, my statistical power is insufficient to distinguish this effect from 0 at the 95% confidence level.

Table 4 weakly suggests that assignment to residential housing increases the probability of reincarceration within three years for the marginal prisoner. It is possible however, that

the typical three year reincarceration window is masking beneficial, short term effects of residential housing that occur while an individual is there. Alternatively, if residential housing is having the negative consequences suggested so far, those effects should be most visible during the period in which individuals are still living there. To examine the timing of reincarceration, in Figure 3, I plot unconditional reincarceration rates for individuals assigned to residential housing and parole. I additionally plot the difference between the two reincarceration rates with a solid line. In Panel A, I present cumulative reincarceration rates while Panel B displays the fraction of people in the indicated group who were reincarcerated for the first time in each two-month window. Figure 3 clearly demonstrates that the increased reincarceration among people assigned to residential housing occurs almost entirely within the first 6 months after release. This is most evident in the solid line in each panel. In Panel A, the difference between reincarceration rates among individuals assigned to residential housing and those assigned to parole increases rapidly during the first 6 months after release and then flattens out for the remainder of the three year window. Panel B further highlights that the reincarceration rate difference is nearly three times as large in months 3 and 4 as it is in any other period. In fact, the reincarceration rate among individuals assigned to residential housing during this period is more than twice that of individuals assigned to parole.

In order to better understand the timing of reincarceration, in Figure 4 I present the results of my preferred specification for each two month reincarceration window. In Panel A, I plot the estimated effect of residential housing assignment on cumulative reincarceration.<sup>26</sup> In Panel B, I present results for reincarceration occurring in each two month period, dropping individuals who had recidivated in an earlier period. While the estimates are noisy, both panels indicate a significant increase in reincarceration within the first six months after release. Given that the median person stays in residential housing about 4 months, 90% of people are released from residential housing within 6 months, and 95% of people are

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<sup>26</sup>Numerical results can be found in Appendix Table A2.

released within eight months, this implies residential housing is directly causing an increase in reincarceration.<sup>27</sup>

It is also worth noting in Figure 4 that the increases in reincarceration that occur while individuals are living in residential housing facilities, are partially reversed in the following months. This suggests that rather than increasing reincarceration directly, residential housing accelerates the time frame in which individuals are caught for violations and returned to prison. One explanation for this pattern is that individuals who make it through their time in residential housing without returning to incarceration are very unlikely to become reincarcerated in the months immediately after they earn parole. This is consistent with both the individuals that avoid reincarceration during residential housing being a selected sample based on reincarceration probability, and with a specific deterrence effect of residential housing. While there is also selection among the parolees who avoid reincarceration in the first 6 months after their release, their lower rates of reincarceration during this period implies less selection among this group than among the people originally assigned to residential housing facilities.

## 5.1 Mechanisms

Recall, there are a number of reasons to believe that residential housing should reduce reincarceration. In fact, a clear goal of the residential housing program is to reduce reincarceration by giving recently released prisoners a stable place to stay, guaranteed employment, and a range of programming opportunities. Moreover, the high cost of residential housing relative to parole implies that assignment to residential housing should be yielding improved outcomes in order to justify its cost. Instead, my results indicate that assignment to residential housing fails to reduce reincarceration and may actually increase it. In this section, I attempt to determine why residential housing is not reducing reincarceration rates.

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<sup>27</sup>Note that there is an inherent selection bias that occurs when considering reincarceration in later periods as those individuals most likely to offend have already done so and are no longer in the sample.

One possible explanation is that individuals assigned to residential housing simply face stricter rules and more intense supervision. This could imply differential rates of reincarceration even with similar behavior among parolees and people in residential housing. In an effort to test the impact of the stricter rules associated with residential housing, in panels A and B of Table 5, I break reincarceration into new crimes and technical violations. I find increases in technical violations of more than 14 percentage points (89%) while new crimes actually fall by a statically insignificant 6.3 percentage points.

Unfortunately, the split between measured new crimes and technical violations is an imperfect proxy for the actual changes in those events. Officially, any offense classified as a felony cannot be processed as a technical violation. Anecdotal evidence, on the other hand, suggests that it is not uncommon for new crimes in Iowa to be processed as technical violations because technical violations are cheaper and easier to deal with for the state while also typically leading to less additional prison time for offenders than new crime convictions. When combined with the increased supervision faced by individuals in residential housing, this raises a number of possible explanations for the results in Table 5. First, it may be the case that individuals assigned to residential housing are committing more new crimes and more technical violations but enough new crimes being processed as technical violations to obscure the new crime effect. Second, the increased reincarceration coming from residential housing may be an artifact of the stricter rules and increased scrutiny for people assigned to residential housing relative to those assigned to parole. Under this story, individuals assigned to residential housing may be behaving as well as individuals on parole. Indeed, one reasonable interpretation of the increased reincarceration rate among people assigned to residential housing is that they are simply given many more opportunities to fail.

Residential housing may also increase exposure to peers who encourage antisocial behav-

ior.<sup>28</sup> There is mixed evidence on whether negative peer effects during incarceration are a key driver of reincarceration (Bayer et al., 2009; Ouss, 2011; Stevenson, 2017; Harris et al., 2018). Unfortunately, my setting does not provide a good opportunity to directly test for peer effects within residential housing. Recall, residential facilities in Iowa are large. The median facility in Iowa houses an average of 103 people per night in my sample. Because I do not observe room assignments within the residential facilities, the large size provides limited variation in average peer traits over time and masks the traits of potentially important roommates.<sup>29</sup> Moreover, I do not have data on the federal prisoners living in residential housing facilities in Iowa. In the facilities where this group comprises a significant share of the individuals in the residence, this has the potential to bias any results I might find.

In earlier descriptive work in this area Lowenkamp and Latessa (2005) argued that residential housing programs were effective in reducing reincarceration among high risk offenders but failed for lower risk offenders. The suggested mechanism was that residential housing exposed low risk offenders to higher risk offenders, creating the potential for negative peer effects. Higher risk offenders, on the other hand, benefited from additional exposure to programming. In Appendix Table A3, I present results across three different risk levels.<sup>30</sup> Given the small sample size, wide confidence intervals, and questionable first stage strength for some subgroups, it is difficult to make definitive statements about the role of risk levels in residential housing outcomes. Moderate risk prisoners experience large increases in new crime reincarceration, but no increase in technical violations. High and low risk prisoners,

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<sup>28</sup>The impacts of peer effects may be mitigated in this context, given that everyone in my sample has recently been released from prison where presumably they were exposed to risky peers. On the other hand, individuals assigned to residential housing are exposed to a higher number of risky peers (as their residential housing units will not be populated with the same people with whom they interacted while incarcerated) and face continued exposure to risky peers even during a period in which they allowed to go out into the community (during their work and furlough hours). Parolees, on the other hand, are explicitly discouraged and may be forbidden from associating with the peers who have been deemed most risky.

<sup>29</sup>Compounding this challenge, peer effects can only be estimated among individuals assigned to residential housing. This dramatically limits my sample size and makes identification more difficult muddying the interpretation of results.

<sup>30</sup>Categorizing prisoners by risk level is complicated by the fact that in the middle of my sample window, Iowa changed its risk classification system from the LIS-R to a state specific violence risk measure. As such, the risk measures here are an amalgamation of LSI-R and violence risk scores.

on the other hand both experience increases in technical violations that are more than offset by decreases in new crimes. Overall, the results do not support the hypothesis that low risk individuals are differentially harmed by residential housing.<sup>31</sup>

## 5.2 Heterogeneity

It is possible that the broad category of new crime recidivism is masking significant and important heterogeneity.<sup>32</sup> In Table 6, I separately consider recidivism that occurs as a result of new drug, public order, property, or violent crime convictions.<sup>33</sup> I also include a subset of public order crimes, escapes, and two subsets of violent crimes, assault and domestic abuse. Across the seven columns, I find evidence that violent crimes, and assaults in particular, significantly increase as a result of assignment to residential housing while drug and public order crimes fall. Importantly, Table 6 only includes new crime convictions. Breaking new crimes into their component types suggests that residential housing is successfully mitigating drug and public order crimes at the cost of increased violent crime. Given that violent crimes are particularly costly to society, this tradeoff is likely welfare reducing overall (Chalfin and McCrary, 2018; Rozo, 2018). Moreover, drug and public order crimes are typically considered to be less severe violations and as such, are more likely to be processed as technical violations. Given this, it is entirely possible that the observed declines in drug and public order crimes do not represent real changes in behavior, but are instead simply the result of these incidents being processed as technical violations more often for people in residential housing than for parolees. This is particularly likely given that individuals in residential housing are much more likely to be caught by staff at the facility, while parolees are often caught by police.

To further explore the observed increase in violent crime, Panels C and D of Figure

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<sup>31</sup>Additional heterogeneity analysis is presented in the appendix. Specifically, it appears that neither the size of the residential facility (Appendix Table A4) nor the presence of women in a facility (Appendix Table A5) significantly changes estimated effects.

<sup>32</sup>There may be heterogeneity in the types of technical violations that occur as well, but I do not have clear data on the cause of an individual's technical violation.

<sup>33</sup>The IDOC also uses an "other" category but this categorization is used too rarely for meaningful estimation as a subgroup of infractions.

4 show the timing of new violent crime reincarceration. Importantly, while Panels A and B of Figure 4 show that the initial increase in reincarceration due to residential housing assignment is gradually eroded once individuals in residential housing have matriculated to parole, Panels C and D show that the increased violent crimes caused by residential housing lead to permanent differences in reincarceration and, by extension, in the number of violent crimes that occur.

There are at least two mechanisms through which residential housing may be increasing violent crime. First, there may be significant interpersonal conflict within the residential housing unit itself. Residential housing units in Iowa house both probationers and former prisoners and place many people with criminal histories into a confined space. This is likely to lead to conflict among the residents. Second, most people assigned to residential housing are eventually able to earn weekend furloughs. These furloughs allow people to be away from the residence on Friday, Saturday, and Sunday. Near the end of their time in residential housing, individuals can earn furloughs as often as every weekend. It is possible that during the short term bouts of freedom available through furloughs, individuals engage in more risky behavior than occurs during parole.<sup>34</sup>

Recall, in Table 6, I divide the violent crime into assaults and domestic abuse.<sup>35</sup> The results suggest that the increase in violence I observe comes almost entirely from an increase in assault. Moreover, these assaults are not being categorized as domestic violence suggesting the incidents are not taking place while individuals are at home. While I do not observe the locations of the crimes themselves, this could be evidence of former prisoners coming into conflict with each other while in residential housing. Similarly, violations may be higher generally while individuals are in their residential housing facilities due to increased supervision, but the drug and public order offenses are being processed as technical violations. Alternatively, the increase in assaults is also consistent with risky behavior that occurs away

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<sup>34</sup>It's worth noting that this second explanation is the one officials within the IDOC believe to be most likely driver of the observed increase in violent crime reincarceration.

<sup>35</sup>Note that these categories are not mutually exclusive.

from home during furloughs. For example, individuals may choose to celebrate their furlough with a night at the bar. This setting creates ample opportunities for new assault crimes to occur.

To separate these possibilities, in Figure 5 I present a series of simple bar graphs that plot the fraction of violent crimes that occur on weekends (Friday, Saturday, or Sunday) and weekdays. In Panel A, I present results for people assigned to residential housing. Panel B replicates Panel A but considers individuals assigned to parole. In each panel, I separate crimes that occur within the first four months of the individual's release from prison, while assigned individuals can still be expected to be in residential housing, from those that occur more than four months after release. Crimes are scaled so that, if crimes were equally likely to occur on each day of the week, the weekend and weekday bars would each represent 50% of all crimes.

Looking across the Panels, I find that individuals assigned to residential housing are far more likely to commit violent crimes on weekends during the period in which they are still living in the residential housing facilities. After residents have matriculated to parole, this pattern stops. Together, these results weakly suggest that the increase in violent crimes associated with residential housing is occurring due to assaults committed during furloughs. Importantly, because residents are not required to return to their facilities overnight while on furlough, these results are likely not driven by increased supervision relative to parolees.<sup>36</sup>

A plausible explanation for the pattern observed in Figure 5 is that parole officers stationed in residential housing facilities tend to process infractions as technical violations while the police officers who will be involved in infractions that occur away from the facility (during furlough) are more likely to process them as new crimes. If this is the case, technical viola-

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<sup>36</sup>Figure 5 obviously lends itself to a difference in difference strategy in which I estimate whether violent crimes are more likely to occur on weekends specifically for individuals assigned to residential housing during their first four month than for other groups. Unfortunately, in a regression of this type, I can only include observations in which a new violent crime was committed (crime date is not observable unless a new crime was committed). This dramatically limits my observations in this type of regression. While the sign and magnitude of the results were reasonable, the standard errors were sufficiently large that a significant difference could not be established.

tions should be higher on weekdays, especially for individuals assigned to residential housing during the first four months after their release from prison. In Figure 6, I replicate Figure 5 but for technical violations. While technical violations are more likely to occur on weekdays, this pattern is remarkably consistent for individuals assigned to either residential housing or parole and over time. This suggests that the differential increase in new crimes observed on weekends among people living in residential housing facilities represent real increases in new crimes.<sup>37</sup>

I further test the differences between weekend and weekday crime in Table 7. There, I present estimates of the impact of being assigned to residential housing on violations occurring specifically on weekdays (Panel A) or weekends (Panel B). In an effort to isolate the differences that are arising during residential housing, I adjust the outcome variable to equal one only if the reincarceration occurred within six months of the individual's initial release. An important caveat in interpreting these results, I am not able to determine whether weekend crimes are occurring while the resident is on furlough.

Table 7 indicates that assignment to residential housing appears to lead to similar increases in reincarceration for any reason on both weekends and weekdays. This pattern also holds for both new and technical violations although it is worth noting that restricting attention to only reincarceration occurring in the first six months after release causes both new and technical violations to return positive coefficients. New violent crimes, on the other hand, increase much more on weekends for individuals in residential housing than for individuals on parole. While the power in these tests is limited, the results suggest that increased supervision alone does not explain the increased reincarceration rate observed among individuals assigned to residential housing.

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<sup>37</sup>Figure A2 in the Appendix shows similar results for the other major types of crime as well as for new crime generally. Most strikingly, I find that new public order crimes are significantly more common on weekdays for individuals assigned to residential housing while parolees are more likely to be convicted of a public order crime on weekends.

### 5.3 Placebo

One potential concern is that some case managers influence reincarceration directly by significantly impacting individuals in their limited time with them. Similarly, some case managers may be more able to match their charges to beneficial programs during incarceration. Either of these influences would represent a bias in my estimation strategy. To test this potential, I look for case manager impacts among prisoners ineligible for either residential housing or parole.<sup>38</sup> If case managers who assigned a high (low) fraction of their eligible charges to residential housing increase (decrease) reincarceration in ways unrelated to residential housing assignment, I should observe that effect among prisoners who did not serve time in either residential housing or parole. Importantly, other than the residential housing/parole recommendation, case managers interact with these individuals in the same ways that they interact with all other prisoners. In fact, case managers typically don't know which prisoners will end up serving their entire sentence until shortly before the prisoner's release.

In Panel A of Table 8, I test whether the case manager instrument predicts reincarceration among ineligible prisoners. Using an OLS regression model and including the complete set of controls described in Equation 2, I find no evidence that case managers influence reincarceration rates among this group.<sup>39</sup> It's worth noting, however, that the limited number of ineligible people in my data results in less than ideal power for this test. The 95% confidence interval for all reincarceration ranges from a 18 percentage point decrease to a 26 percentage point increase in recidivism. For comparison, Panel B of Table 8 presents similar reduced form estimates among prisoners eligible for either residential housing or parole. This exercise demonstrates that, in addition to the lack of statistical significance in Panel A, the point estimates in Panel A are relatively small. On the other hand, the lack of statistical power in Panel A prevents me from rejecting the hypothesis that the matching coefficients

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<sup>38</sup>Typically this is the result of a prisoner serving the entire duration of their sentence while in prison. Case managers have no influence over when an individual is released.

<sup>39</sup>Because individuals who are ineligible for either parole or residential housing all have the same status upon release, I am unable to estimate the first stage of a two stage least squares regression which would allow a more direct comparison to my primary results.

across the two panels are equal. Overall, these results suggest that case managers who more frequently assign residential housing are not influencing reincarceration outcomes in ways that could bias my results.

## 5.4 Robustness

Throughout the previous analysis, I excluded case managers who had made decisions in fewer than 50 cases in my sample. The goal of the restriction is to ensure that each case manager's true tendencies are reflected in their leave-out residential housing recommendation rate, rather than having rates reflect unobservable differences among the particular cases assigned to each case manager. The cost of this restriction is that I eliminate a number of observations while also slightly restricting the difference between the most strict and lenient case managers. On the other hand, one could argue that even 50 cases is insufficient to establish case manager preferences and that a higher threshold should be employed.

In Appendix Table A6, I present results for a variety of minimum cases per case manager. As expected, as the number of cases increases, F-statistics increase but the total number of observations and the number of unique case managers falls. Coefficient estimates are reasonably consistent across all five columns with estimated effects ranging between a 5.3 and an 8.2 percentage point increase in reincarceration. While the estimates for any type of reincarceration are not statistically significant, I consistently find large and significant effects for technical violations.

In Table 9, I present results for three alternative instruments. Specifically, in Column 1, I present results using the leave-out fraction of individuals sent to residential housing as an instrument. This instrument is similar in spirit to that used elsewhere in the paper, but does not adjust for the average characteristics of the individuals assigned to a particular case manager or for prison by case manager assignment year fixed effects. In Column 2, I modify this instrument to calculate the leave out mean residential housing assignment rate within each case manager year. In Column 3, I calculate case manager behavior among each block

of fifty cases over which they presided. Point estimates in all three columns are consistent with earlier results and suggest that residential housing increases reincarceration by between 4.1 and 11.2 percentage points. As in Appendix Table A6, I find large and statistically significant increases in technical reincarceration across all three columns.

## 6 Conclusion

Doleac (2018a) argues “More research on the effects of housing related programs, particularly for individuals who have recently been released from prison, would be valuable.” This research helps fill that need by evaluating the reincarceration impact of assignment to residential housing. To get around the potential selection bias, I exploit variation in the frequency with which randomly assigned prison case managers recommend residential housing for the prisoners with whom they work. Consistent with a growing body of literature on intensive supervision strategies, I find that residential housing fails to reduce and may even increase reincarceration. In particular, I find that individuals assigned to residential housing are more likely to be reincarcerated within six months of their release from prison than parolees. This time frame encompasses the period in which individuals assigned to residential housing are still living in those facilities before matriculating to parole. Importantly, this estimated increase in reincarceration for any reason falls and becomes insignificant over longer time horizons. This sensitivity to the timing of reincarceration should inform future research in this area. Specifically, relatively short term analyses of post-prison supervision may be overstating the impacts of that supervision. That being said, even using a three year reincarceration window, I find significant increases in technical violations and violent crime. These are partially offset by decreases in new drug and public order crimes.

I identify three channels through which these effects occur. First, the increased supervision and stricter rules imposed in residential housing relative to parole likely account for a significant part of the increase in technical violations. Second, technical violations are likely

further increased, somewhat artificially, by the practice of processing new, nonviolent crimes as technical violations, particularly for individuals living in residential housing. This practice may also explain the observed decreases in new drug and public order crimes. Finally, and perhaps most importantly, my results suggest that the increase in violent crimes among individuals assigned to residential housing are occurring during overnight furloughs which residents can earn with good behavior. Given the high cost of violent crimes, the current furlough system should be carefully reexamined.

These findings have important policy implications. Residential housing is a very expensive program. In 2018, Iowa spent \$74.66 per person per day on residential housing. Over this same period, Iowa spent just \$5.36 per person per day on parole supervision (Iowa Department of Corrections, 2018). Given that I find the residential housing program does not decrease reincarceration, it is very difficult to recommend as a widespread policy option. Instead, residential housing needs to be scaled back and assigned less frequently with more prisoners transitioning directly from prison to parole.

Moving away from mandatory residential housing as a common step in the reentry process could potentially free up millions of dollars. This money could then be used to pay for other programs shown to help reduce reincarceration. Examples might include offering rehabilitation certificates to prisoners which limit employer liability when hiring ex-offenders (Leasure and Stevens Andersen, 2016; Leasure and Martin, 2017), expanding DNA databases (Doleac, 2019; Anker et al., 2017) and hiring well qualified psychologists to implement cognitive behavioral therapy programs which would also relieve pressure on already overburdened prison case managers (Pearson et al., 2016; Barnes et al., 2017; Heller et al., 2017). Alternatively, assigning fewer individuals to residential housing each year could lead to increased resources and support for those who truly need a residential option to ease the transition away from incarceration.

My results do not imply that the complete removal of residential housing is warranted. I present estimates only for the marginal prisoner who is affected by the individual tendencies

of the case manager to which they were assigned. It is still possible or even likely that for some prisoners, particularly those who truly have nowhere else to go, residential housing is an important tool in aiding the transition out of incarceration. One way to find the prisoners most likely to benefit may be to let prisoners choose to participate in residential housing programs rather than assigning it to them. This opt-in model would ensure that residents have bought into the program which has significant implications for success while also increasing individual autonomy.

Of course, residential housing likely has implications for prisoners beyond reincarceration. For example, it is possible that among individuals who do not recidivate, the additional programming can help end addictive behaviors and prevent relapse, particularly in light of the observed reductions in new drug and public order crimes among people assigned to residential housing. Similarly, the employment requirement during residential housing, and the significant resources devoted to ensuring that residents have job opportunities after incarceration, may give these individuals a leg up in the labor market once they matriculate to parole. Future research should explore more deeply these and other mechanisms through which residential housing impacts reincarceration. In particular, understanding the role of peer effects both in residential housing and during parole would be quite valuable. In addition, recent evidence from France suggests that halfway houses can be effective when used as a replacement for incarceration rather than as a transition step after incarceration (Monnery et al., 2019). Future research should attempt to identify and understand other residential housing systems that work as intended.

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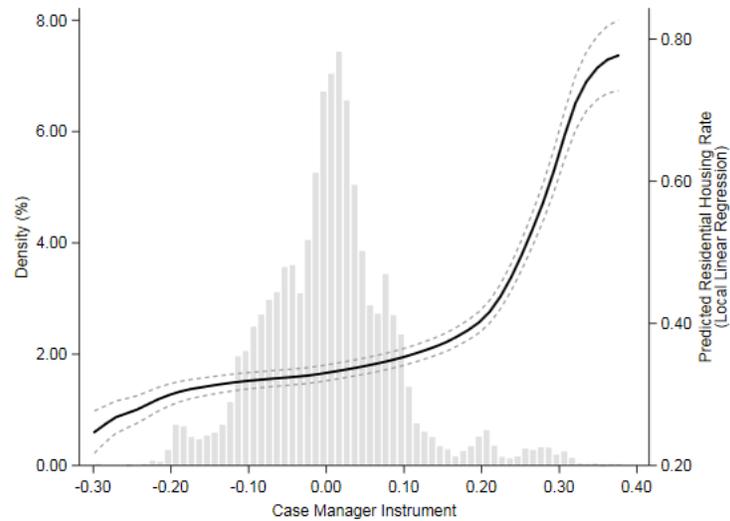
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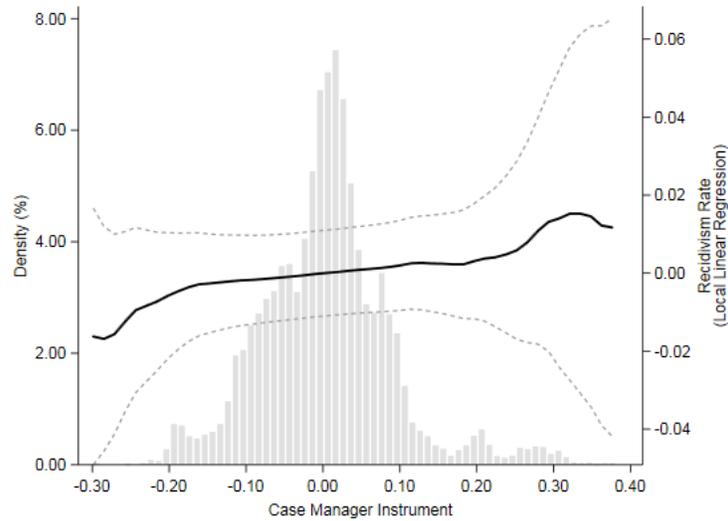
## 7 Tables and Figures

Figure 1: First Stage: Residential Housing Assignment



*Notes:* This figure displays a histogram of the case manager instrument. The instrument is the leave-out mean residential housing assignment rate for each case manager as described in Section 4. The solid line represents a local linear regression of residential housing assignment on the case manager instrument. The 95% confidence interval is indicated with dashed lines. The two largest negative values of the case manager instrument are omitted to preserve figure scaling.

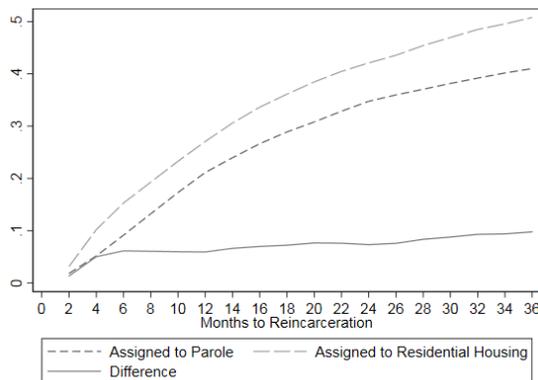
Figure 2: Reduced Form: Reincarceration Rates



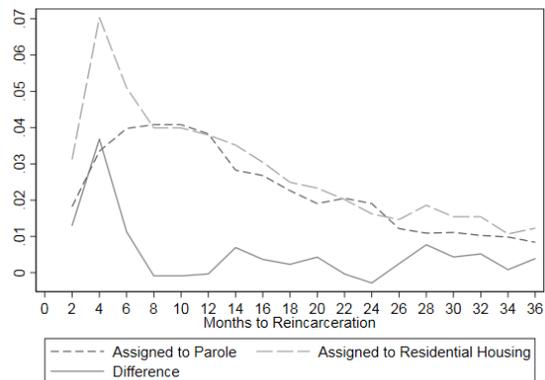
*Notes:* This figure displays a histogram of the case manager instrument. The instrument is the leave-out mean residential housing assignment rate for each case manager as described in Section 4. The solid line represents a local linear regression of reincarceration on the case manager instrument. The 95% confidence interval is indicated with dashed lines. The two largest negative values of the case manager instrument are omitted to preserve figure scaling.

Figure 3: Reincarceration Over Time  
All Crimes

Panel A: Cumulative



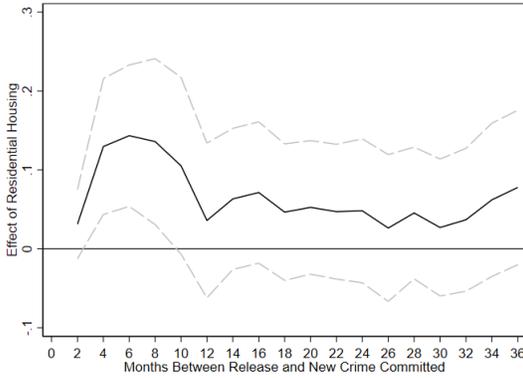
Panel B: 2 Month Window



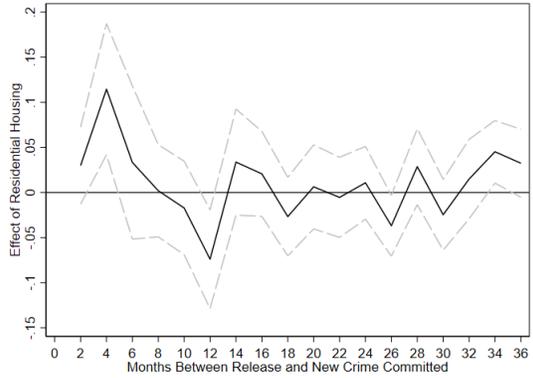
*Notes:* In Panel A, the Y axis indicates the cumulative probability of reincarceration among individuals assigned to either residential housing or parole. The solid line represents the difference between these values. Panel B is identical to Panel A except that the Y axis presents the reincarceration rate within each 2 month window. The X-axis represents the number of months between release from prison and return to prison.

Figure 4: Estimated Effects Over Time  
**All Reincarceration**

Panel A: Cumulative

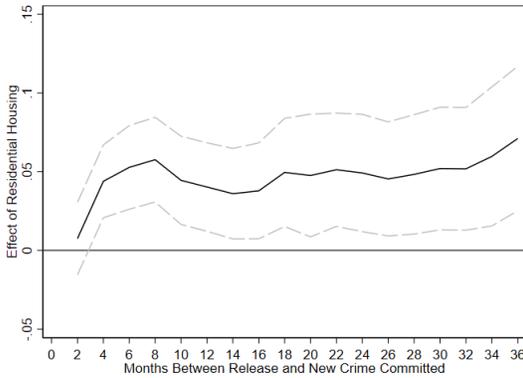


Panel B: 2 Month Window

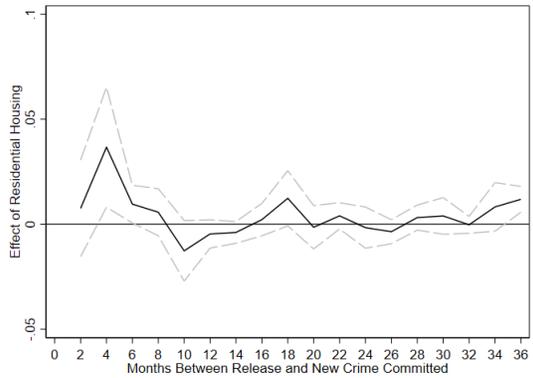


**Violent Crimes**

Panel A: Cumulative

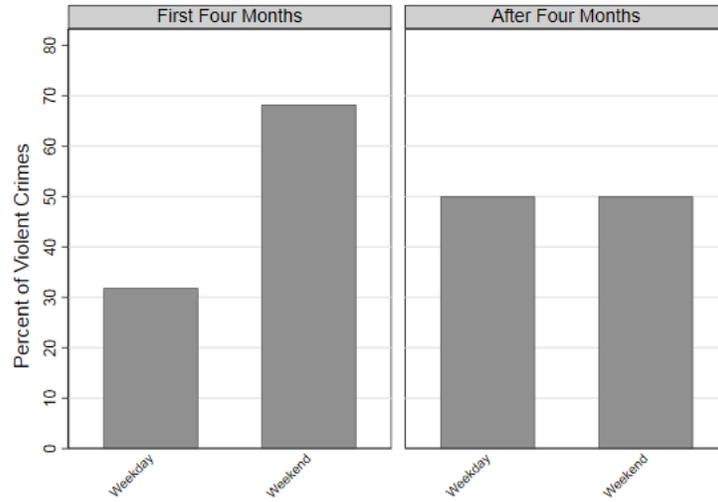


Panel B: 2 Month Window

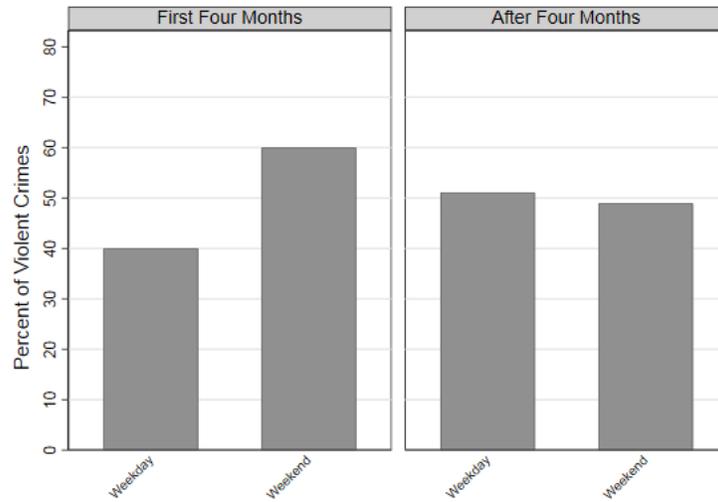


*Notes:* In Panel A, the Y axis is the predicted impact of residential housing assignment on cumulative reincarceration rates. Panel B is identical except that reincarceration rate is calculated within each 2 month window. The X-axis represents the number of months between release from prison and return to prison. Estimates are based on the specification described in Equations 1 and 2. 95% confidence intervals displayed with lighter colored lines. Robust standard errors allow for clustering by case manager. Panels C and D replicate Panels A and B respectively but measure only reincarceration due to a new violent crime.

Figure 5: Timing of Violent Crime  
Panel A: Residential Housing

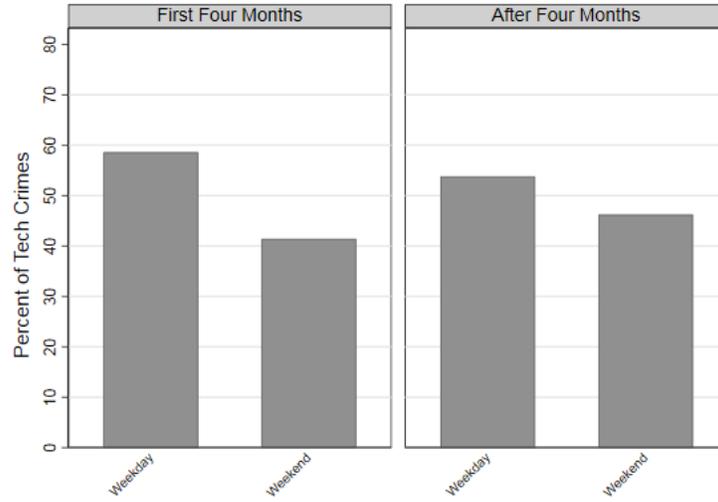


Panel B: Parole

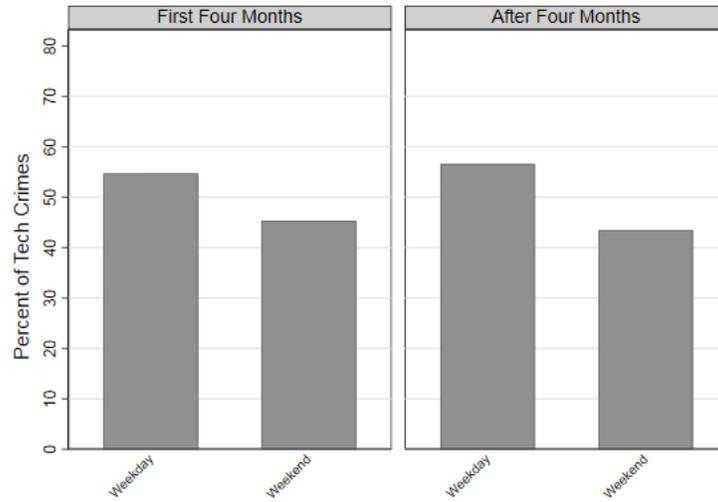


*Notes:* Each panel presents the percentage of all violent crime committed by individuals in either residential housing (Panel A) or parole (Panel B) that occurred on Friday, Saturday, or Sunday (Weekend = 1). Crime are further separated by whether they occurred within the first four months after release from prison.

Figure 6: Timing of Technical Violations  
Panel A: Residential Housing



Panel B: Parole



*Notes:* Each panel presents the percentage of all technical violation committed by individuals in either residential housing (Panel A) or parole (Panel B) that occurred on Friday, Saturday, or Sunday (Weekend = 1). Violations are further separated by whether they occurred within the first four months after release from prison.

Table 1: Descriptive Statistics - Pre-Assignment Characteristics

	(1)	(2)	(3)	(4)
	Residential Housing	Released to Parole	Difference	Balance Test
White	0.643 [0.479]	0.711 [0.454]	-0.067 (0.014)	
Black	0.303 [0.460]	0.226 [0.418]	0.077 (0.014)	0.013 (0.008)
Hispanic	0.0336 [0.180]	0.0425 [0.202]	-0.009 (0.004)	0.004 (0.004)
Other Race	0.0206 [0.142]	0.0211 [0.144]	-0.001 (0.003)	-0.012 (0.006)
LSI-R Score	19.33 [7.959]	29.79 [8.039]	-10.46 (0.433)	-0.001 (0.001)
Prior Prison	0.555 [0.497]	0.446 [0.497]	0.109 (0.013)	0.010 (0.007)
Age at Release	36.64 [10.29]	35.58 [10.84]	1.059 (0.287)	0.000 (0.000)
Total Crimes	3.046 [2.308]	2.673 [1.974]	0.373 (0.054)	0.001 (0.001)
Violent Crime	0.198 [0.399]	0.152 [0.359]	0.046 (0.013)	0.007 (0.007)
Drug Crime	0.360 [0.480]	0.382 [0.486]	-0.021 (0.014)	0.001 (0.006)
Property Crime	0.271 [0.444]	0.245 [0.430]	0.026 (0.012)	0.004 (0.005)
Public Order Crime	0.0957 [0.294]	0.162 [0.368]	-0.066 (0.011)	0.001 (0.007)
Observations	2,530	4,779	7,309	7,309
F-Stat (Excluding FE)				1.31
Joint P-Value				0.241

*Notes:* Columns 1 and 2 report mean values for the indicated groups and standard deviations in square brackets. Column 3 presents the results of a simple regression with the indicated variable as the dependent variable and a dummy variable indicating whether the prisoner was sent to residential housing as the independent variable. Column 4 tests for random assignment of case managers to prisoners by testing whether any prisoner characteristic predicts the fraction of all other prisoners the given case manager assigned to residential housing. The specification includes prison by case manager assignment year fixed effects. Column 4 also reports the F-statistic and joint P-value from a joint test of all variables, excluding the prison by case manager assignment year fixed effect. In Columns 3 and 4, robust standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 2: Descriptive Statistics - Post-Assignment Characteristics

	(1)	(2)	(3)	(4)
	Residential Housing	Released to Parole	Difference	Balance Test
Any Reincarceration	0.509 (0.500)	0.413 (0.492)	0.096 (0.013)	
New Crime Reincarceration	0.268 (0.443)	0.293 (0.455)	-0.025 (0.013)	
Technical Reincarceration	0.241 (0.428)	0.119 (0.324)	-0.122 (0.010)	
Years Incarcerated	2.524 (2.850)	1.538 (1.426)	0.986 (0.131)	0.001 (0.001)
Visits Per Year	4.085 (14.90)	21.39 (34.48)	-17.30 (0.922)	-0.000 (0.000)
Misconducts Per Year	0.178 (0.625)	0.623 (1.303)	-0.445 (0.062)	-0.008 (0.003)
Programs Per Year	3.587 (2.334)	4.310 (3.065)	-0.723 (0.162)	-0.002 (0.001)
Fraction Required	0.544 (0.280)	0.567 (0.306)	-0.023 (0.015)	-0.013 (0.006)
Fraction Completed	0.615 (0.272)	0.640 (0.297)	-0.025 (0.010)	-0.002 (0.007)
Observations	2,530	4,779	7,309	7,309
F-Stat (Excluding FE)				1.52
Joint P-Value				0.188

*Notes:* Columns 1 and 2 report mean values for the indicated groups and standard deviations in square brackets. Column 3 presents the results of a simple regression with the indicated variable as the dependent variable and a dummy variable indicating whether the prisoner was sent to residential housing as the independent variable. Column 4 tests for random assignment of case managers to prisoners by testing whether any prisoner characteristic predicts the fraction of all other prisoners the given case manager assigned to residential housing. The specification includes prison by case manager assignment year fixed effects. Column 4 also reports the F-statistic and joint P-value from a joint test of all variables, excluding the prison by case manager assignment year fixed effect. In Columns 3 and 4, robust standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 3: First Stage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	All	Prior Prison	Violent Crime	Drug Crime	Property Crime	Non-White	Age ≤ 34	Incarceration ≥ 15 months	Ever Visited	Misconduct in Prison
Case Manager Instrument	0.817 (0.059)	0.752 (0.078)	0.576 (0.095)	0.976 (0.079)	0.905 (0.078)	0.609 (0.131)	0.775 (0.072)	0.804 (0.061)	0.502 (0.193)	0.734 (0.230)
Observations	7309	3518	1207	2720	1843	2261	3773	3603	3796	2122
First Stage F Stat	398.892	311.736	64.962	119.263	157.841	116.413	164.515	202.852	16.31	13.247
Ratio		0.920	0.705	1.194	1.108	0.746	0.949	0.984	0.614	0.898
Difference		-0.065 (0.098)	-0.241 (0.112)	0.159 (0.098)	0.088 (0.098)	-0.208 (0.144)	-0.042 (0.093)	-0.013 (0.085)	-0.315 (0.202)	-0.083 (0.238)

*Notes:* Results based on the first stage of a two stage least squares regression as described in Equation 1. In Columns 2-10, the sample is restricted as indicated in the column header. Standard errors allow for clustering by case manager and are reported in parentheses. Difference standard errors are calculated simply as  $\sqrt{(SE_{b_{all}})^2 + (SE_{b_{subgroup}})^2}$  (Clogg et al., 1995). \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 4: Base Results - All Crimes

	OLS			2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Residential Housing	0.101 (0.012)	0.112 (0.013)	0.102 (0.016)	0.045 (0.061)	0.039 (0.070)	0.082 (0.051)
LSI-R Score			0.002 (0.001)			0.001 (0.001)
Prior Prison			0.114 (0.012)			0.116 (0.014)
Black			0.013 (0.013)			0.014 (0.014)
Hispanic			-0.044 (0.026)			-0.045 (0.026)
Other Race			0.094 (0.034)			0.094 (0.033)
Age at Release			-0.006 (0.001)			-0.006 (0.001)
Total Crimes			0.020 (0.003)			0.020 (0.003)
Violent Crime			-0.160 (0.033)			-0.160 (0.033)
Drug Crime			-0.087 (0.029)			-0.087 (0.029)
Property Crime			-0.064 (0.032)			-0.063 (0.032)
Public Order Crime			-0.086 (0.035)			-0.086 (0.035)
Months Incarcerated			0.000 (0.000)			0.000 (0.000)
Visits Per Year			-0.001 (0.000)			-0.001 (0.000)
Misconducts Per Year			0.018 (0.005)			0.017 (0.006)
Programs Per Year			0.007 (0.003)			0.007 (0.003)
Fraction Required			0.041 (0.022)			0.040 (0.022)
Fraction Completed			-0.104 (0.022)			-0.105 (0.022)
Observations	7309	7309	7309	7309	7309	7309
First Stage F Stat				10.4	12	398.9
Dependent Variable Mean	0.446	0.446	0.446	0.446	0.446	0.446
Prison by case manager assignment year FE	Yes	Yes	Yes	Yes	Yes	Yes
Jurisdiction Dummies	No	Yes	Yes	No	Yes	Yes
Other Controls	No	No	Yes	No	No	Yes

*Notes:* Dependent variable is whether an individual returned to prison within three years of release from incarceration. Residential Housing instrumented with the case manager instrument. Standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 5: Base Results - New Crimes and Technical Violations

	OLS			2SLS		
<b>Panel A: New Crime Reincarceration</b>						
	(1)	(2)	(3)	(4)	(5)	(6)
Residential Housing	-0.014 (0.013)	-0.010 (0.013)	0.014 (0.016)	-0.084 (0.059)	-0.085 (0.059)	-0.063 (0.053)
Observations	7309	7309	7309	7309	7309	7309
First Stage F Stat				10.4	12	398.9
Dependent Variable Mean	0.285	0.285	0.285	0.285	0.285	0.285
<b>Panel B: Technical Violations</b>						
	(1)	(2)	(3)	(4)	(5)	(6)
Residential Housing	0.115 (0.011)	0.122 (0.011)	0.087 (0.012)	0.129 (0.057)	0.124 (0.064)	0.144 (0.051)
Observations	7309	7309	7309	7309	7309	7309
First Stage F Stat				10.4	12	398.9
Dependent Variable Mean	0.162	0.162	0.162	0.162	0.162	0.162
Prison by case manager assignment year FE	Yes	Yes	Yes	Yes	Yes	Yes
Jurisdiction Dummies	No	Yes	Yes	No	Yes	Yes
Other Controls	No	No	Yes	No	No	Yes

*Notes:* Dependent variable is whether an individual returned to prison because they committed either a new crime (Panel A) or technical violation (Panel B) within three years of release from incarceration. Residential Housing instrumented with the case manager instrument. Standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 6: Type of Crime

	Drug	Public Order	Property	Violent	Escape	Assault	Domestic Abuse
Residential Housing	-0.078 (0.038)	-0.071 (0.033)	0.035 (0.024)	0.069 (0.024)	-0.001 (0.002)	0.058 (0.015)	-0.006 (0.019)
Observations	7309	7309	7309	7309	7309	7309	7309
First Stage F Stat	398.9	398.9	398.9	398.9	398.9	398.9	398.9
Dependent Variable Mean	0.105	0.084	0.042	0.028	0.0004	0.020	0.019

*Notes:* Dependent variable is whether an individual returned to prison within three years of release from incarceration due to the indicated type of violation. The complete set of controls described in Equation 2 is included but not reported. Crime types follow Iowa Department of Corrections official classifications. Escape crimes are a subset of Public Order crimes. Assault and Domestic Abuse crimes are a subset of violent crimes. Crimes can be categorized as both Assault and Domestic Abuse. Residential Housing instrumented with the case manager instrument. Standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 7: Weekend and Weekday Offenses

<b>Panel A: Weekday Crime</b>							
	All	Technical	New	Drug	Public Order	Property	Violent
Residential Housing	0.103 (0.037)	0.057 (0.024)	0.046 (0.035)	0.013 (0.017)	0.003 (0.010)	0.018 (0.026)	0.024 (0.009)
Observations	5995	5995	5995	5995	5995	5995	5995
First Stage F Stat	235.5	235.5	235.5	235.5	235.5	235.5	235.5
Dependent Variable Mean	0.082	0.031	0.051	0.015	0.008	0.021	0.004

**Panel B: Weekend Crime**

	All	Technical	New	Drug	Public Order	Property	Violent
Residential Housing	0.097 (0.052)	0.041 (0.020)	0.056 (0.046)	-0.008 (0.015)	0.016 (0.018)	-0.009 (0.017)	0.055 (0.016)
Observations	5360	5360	5360	5360	5360	5360	5360
First Stage F Stat	297.1	297.1	297.1	297.1	297.1	297.1	297.1
Dependent Variable Mean	0.063	0.022	0.041	0.010	0.008	0.013	0.007

*Notes:* Dependent variable is whether an individual returned to prison within six months of release from incarceration due to the indicated type of violation. The complete set of controls described in Equation 2 is included but not reported. Crime types follow Iowa Department of Corrections official classifications. Weekends defined as Friday, Saturday, and Sunday. Residential Housing instrumented with the case manager instrument. Standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 8: Outcomes Among Prisoners Ineligible for Parole or Residential Housing

**Panel A: Ineligible Prisoners**

	All Reincarceration (1)	New Crimes (2)	Technical Reincarceration (3)
Case Manager Instrument	0.040 (0.114)	-0.003 (0.139)	0.043 (0.077)
Observations	2724	2724	2724
Mean	.250	0.158	0.091

**Panel B: Eligible Prisoners**

	All Reincarceration (1)	New Crimes (2)	Technical Reincarceration (3)
Case Manager Instrument	0.101 (0.048)	-0.040 (0.051)	0.141 (0.050)
Observations	7309	7309	7309
Dependent Variable Mean	0.446	0.285	0.162

*Notes:* In Panel A, the sample is restricted to prisoners ineligible for either parole or residential housing. Dependent variable is whether an individual returned to prison within three years of release for the indicated reason. The complete set of controls described in Equation 2 is included but not reported. The case manager instrument is calculated among prisoners eligible for parole and residential housing for each case manager and is regressed directly on reincarceration outcomes for ineligible prisoners. Panel B presents similar estimates for prisoners eligible for residential housing or parole and is provided for comparison. Standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 9: Other Instruments for Case Manager Behavior

	(1)	(2)	(3)
	Case Manager	Case Manager-Year	Case Manager-Block
<b>Panel A: All Reincarceration</b>			
	(1)	(2)	(3)
Residential Housing	0.112 (0.062)	0.041 (0.042)	0.068 (0.048)
Observations	7309	5745	6210
First Stage F Stat	290.9	207.8	178
Dependent Variable Mean	0.446	0.438	0.437
<b>Panel B: New Crime Reincarceration</b>			
	(1)	(2)	(3)
Residential Housing	-0.047 (0.055)	-0.161 (0.054)	-0.121 (0.047)
Observations	7309	5745	6210
First Stage F Stat	290.9	207.8	178
Dependent Variable Mean	0.285	0.284	0.276
<b>Panel C: Technical Violations</b>			
	(1)	(2)	(3)
Residential Housing	0.158 (0.072)	0.202 (0.052)	0.189 (0.058)
Observations	7309	5745	6210
First Stage F Stat	290.9	207.8	178
Dependent Variable Mean	0.162	0.154	0.161

*Notes:* Dependent variable is whether an individual returned to prison within three years of release from incarceration due to the indicated reason. Column 1 presents a version of the leave-out case manager instrument calculated directly as the fraction of other individuals sent to residential housing by that particular case manager. In Column 2, the instrument is calculated only among all other cases decided by the given case manager in the same year. In order to have sufficient observations for estimation, the threshold for cases is set to 25 instead of 50. In Column 3, the instrument is calculated within blocks of 50 cases (ie first fifty cases, second fifty, etc.). The complete set of controls described in Equation 2 is included but not reported. Standard errors allow for clustering by case manager and are reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## 8 Appendix

Table A1: Monotonicity Test

	5 knots	10 knots	15 knots	20 knots
Test Statistic	68.24	58.42	49.95	22.13
Degrees of Freedom	(53)	(48)	(43)	(38)
Combined P-Value	[0.078]	[0.144]	[0.217]	[0.981]

*Notes:* Table displays the test statistics, degrees of freedom in parentheses, and p-values in brackets from the monotonicity test proposed in Frandsen et al. (2019). Each column uses the indicated number of knots in a spline function and controls for prison by case manager assignment year. All columns use a fit weight of 1.

Table A2: Timing of Reincarceration

	<b>6 Months</b>	<b>8 Months</b>	<b>10 Months</b>	<b>1 Year</b>	<b>2 Years</b>	<b>3 Years</b>
	(1)	(2)	(3)	(4)	(5)	(6)
Residential Housing	0.144	0.136	0.106	0.038	0.052	0.085
	(0.048)	(0.055)	(0.058)	(0.052)	(0.048)	(0.051)
Observations	7309	7309	7309	7309	7309	7309
First Stage F Stat	398.9	398.9	398.9	398.9	398.9	398.9
Dependent Variable Mean	0.112	0.153	0.193	0.235	0.373	0.446
Prison by case manager assignment year FE	Yes	Yes	Yes	Yes	Yes	Yes
Jurisdiction Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Notes:* Dependent variable is whether an individual returned to prison within the indicated amount of time since release from incarceration. Residential Housing instrumented with the case manager instrument. Standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A3: Risk Level

	Low Risk	Moderate Risk	High Risk
<b>Panel A: All Reincarceration</b>			
Residential Housing	-0.101 (0.118)	0.240 (0.190)	-0.057 (0.186)
Observations	3018	2409	1843
First Stage F Stat	89.2	10.4	6.5
Dependent Variable Mean	.4719286657859973	.4037190082644628	.4594304137560452
<b>Panel B: New Crime Reincarceration</b>			
Residential Housing	-0.213 (0.080)	0.234 (0.151)	-0.120 (0.176)
Observations	3018	2409	1843
First Stage F Stat	89.2	10.4	6.5
Dependent Variable Mean	.2836856010568032	.2586776859504132	.3197205803331542
<b>Panel C: Technical Violations</b>			
Residential Housing	0.112 (0.096)	0.006 (0.118)	0.063 (0.188)
Observations	3018	2409	1843
First Stage F Stat	89.2	10.4	6.5
Dependent Variable Mean	.1882430647291942	.1450413223140496	.1397098334228909

*Notes:* Dependent variable is whether an individual returned to prison within three years of release from incarceration due to the indicated reason. The complete set of controls described in Equation 2 is included but not reported. Risk groups are based on the classifications used by the Iowa Department of Corrections. Residential Housing instrumented with the case manager instrument. Standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A4: Number of Residents

	(1)	(2)	(3)	(4)
	Less than 59 Residents	60-91 Residents	92-104 Residents	More than 105 Residents
<b>Panel A: All Reincarceration</b>				
Residential Housing	0.130 (0.108)	0.140 (0.124)	0.109 (0.117)	0.216 (0.066)
Observations	5322	5423	5226	5591
First Stage F Stat	21.8	40	19.5	69.4
Dependent Variable Mean	0.418	0.421	0.420	0.435
<b>Panel B: New Crime Reincarceration</b>				
Residential Housing	-0.045 (0.123)	-0.019 (0.098)	-0.120 (0.142)	-0.085 (0.074)
Observations	5322	5423	5226	5591
First Stage F Stat	21.8	40	19.5	69.4
Dependent Variable Mean	0.290	0.295	0.289	0.287
<b>Panel C: Technical Violations</b>				
Residential Housing	0.175 (0.112)	0.159 (0.112)	0.230 (0.135)	0.301 (0.072)
Observations	5322	5423	5226	5591
First Stage F Stat	21.8	40	19.5	69.4
Dependent Variable Mean	0.128	0.126	0.131	0.148

*Notes:* Dependent variable is whether an individual returned to prison within three years of release from incarceration due to the indicated reason. The complete set of controls described in Equation 2 is included but not reported. Number of residents is based on the median number of daily residents at each facility. Residential Housing instrumented with the case manager instrument. Standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A5: Presence of Women in Facility

	(1)	(2)
	No Women in Facility	Some Women in Facility

**Panel A: All Reincarceration**

	(1)	(2)
Residential Housing	0.142 (0.060)	0.107 (0.080)
Observations	5938	6144
First Stage F Stat	124.2	149.4
Dependent Variable Mean	0.439	0.427

**Panel B: New Crime Reincarceration**

	(1)	(2)
Residential Housing	-0.069 (0.072)	-0.050 (0.069)
Observations	5938	6144
First Stage F Stat	124.2	149.4
Dependent Variable Mean	0.289	0.287

**Panel C: Technical Violations**

	(1)	(2)
Residential Housing	0.211 (0.066)	0.157 (0.068)
Observations	5938	6144
First Stage F Stat	124.2	149.4
Dependent Variable Mean	0.151	0.139

*Notes:* Dependent variable is whether an individual returned to prison within three years of release from incarceration due to the indicated reason. The complete set of controls described in Equation 2 is included but not reported. Residential Housing instrumented with the case manager instrument. Standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A6: Number of Cases

	(1)	(2)	(3)	(4)	(5)
	25	50	75	100	125

**Panel A: All Reincarceration**

	(1)	(2)	(3)	(4)	(5)
Residential Housing	0.057 (0.053)	0.082 (0.051)	0.055 (0.049)	0.067 (0.050)	0.053 (0.054)
Observations	8127	7309	6446	5725	5161
First Stage F Stat	408.9	398.9	404.3	520.1	581.7
Dependent Variable Mean	0.449	0.446	0.444	0.444	0.445

**Panel B: New Crime Reincarceration**

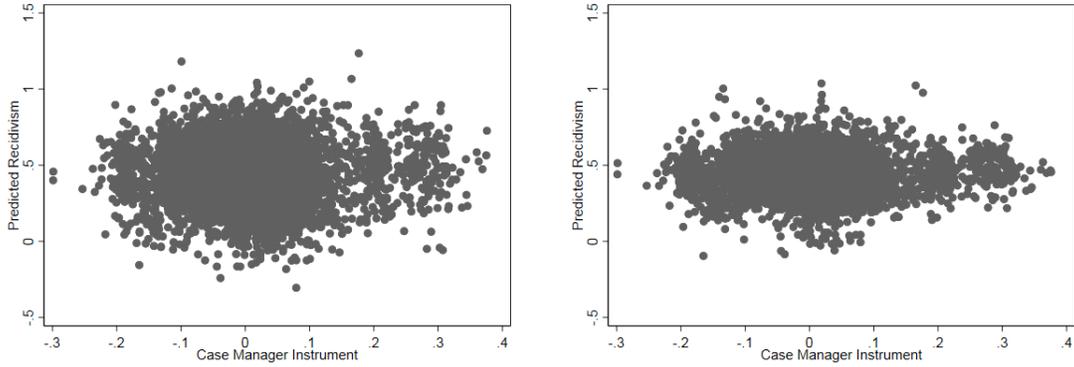
	(1)	(2)	(3)	(4)	(5)
Residential Housing	-0.055 (0.058)	-0.063 (0.053)	-0.093 (0.050)	-0.073 (0.054)	-0.096 (0.048)
Observations	8127	7309	6446	5725	5161
First Stage F Stat	408.9	398.9	404.3	520.1	581.7
Dependent Variable Mean	0.286	0.284	0.287	0.287	0.286

**Panel C: Technical Violations**

	(1)	(2)	(3)	(4)	(5)
Residential Housing	0.112 (0.051)	0.144 (0.051)	0.148 (0.046)	0.140 (0.046)	0.149 (0.042)
Observations	8127	7309	6446	5725	5161
First Stage F Stat	408.9	398.9	404.3	520.1	581.7
Dependent Variable Mean	0.163	0.162	0.158	0.157	0.160
Number of Case Managers	85	61	44	34	28
10th to 90th Percentile of Frac Sent to Resi	24-47	25-47	25-47	25-44	25-44

*Notes:* Dependent variable is whether an individual returned to prison within three years of release from incarceration due to the indicated reason. Number of cases indicates the minimum number of releases each case manager had to make in order to be included in the sample. The complete set of controls described in Equation 2 is included but not reported. Residential Housing instrumented with the case manager instrument. Standard errors allow for clustering by case manager and are reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

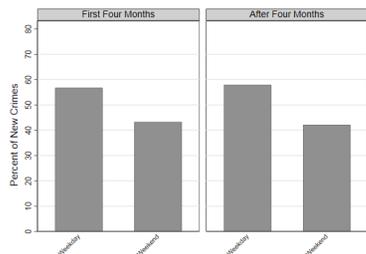
Figure A1: Predicted Recidivism  
All Controls                      Lasso Model



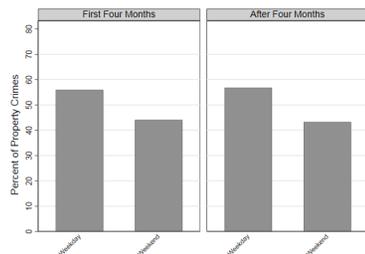
*Notes:* Each panel presents the predicted values from a regression that explains the indicated type of reincarceration with either the complete set of covariates described in Equation 1 but omitting the instrument and residential housing status (Panel A) or with a set of covariates selected using a lasso (Panel B) (Ahrens et al., 2018). The variables chosen by the lasso model included a prior prison stint, age at release, total convictions, violent conviction dummy, number of visits received each year, the fraction of programs which had been successfully completed, and the jurisdiction fixed effect. Facility by manager assignment year fixed effects were partialled out. Results are plotted across the values of the case manager instrument.

Figure A2: Timing of New Crimes  
**Residential Housing**

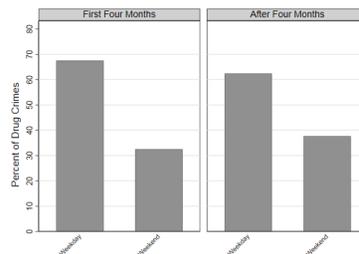
Panel A: All New Crimes



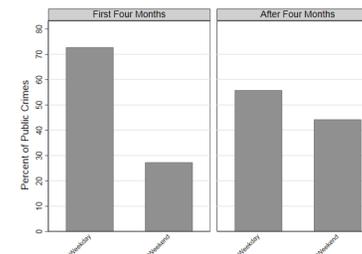
Panel B: Property Crimes



Panel C: Drug Crimes

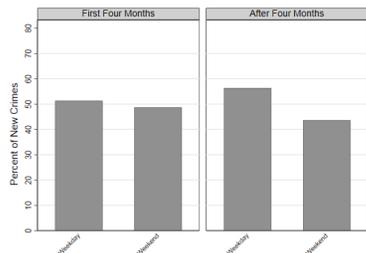


Panel D: Public Order Crimes

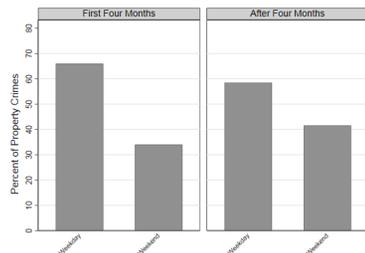


**Parole**

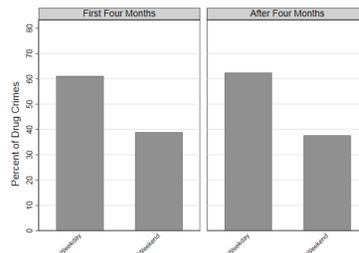
Panel A: All New Crimes



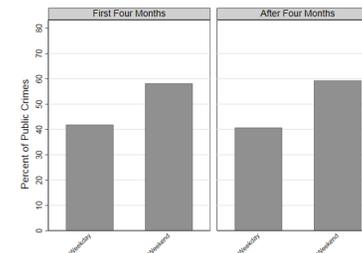
Panel B: Property Crimes



Panel C: Drug Crimes



Panel D: Public Order Crimes



*Notes:* Each panel presents the percentage of all crimes of the indicated type committed by individuals in either residential housing (Panel A) or parole (Panel B) that occurred on Friday, Saturday, or Sunday (Weekend = 1). Violations are further separated by whether they occurred within the first four months after release from prison.