Building Criminal Networks in Prison

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Evidence from French cellmates.

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Abstract

This paper examines the impact of prison connections on re-incarceration, using comprehensive data on cell assignments in France. It documents that having one additional cellmate with a drug-related conviction increases re-incarceration for drug crimes (+7.1% in the year after release), while having an extra cellmate with a property crime conviction raises the probability of committing a property crime (+5.2%). The number of cellmates with other convictions has no effect, and other types of recidivism remain unaffected. Peers from prison also affect the place where offenses are eventually committed. Lastly, cellmates have more influence when they share similar characteristics.

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1 Introduction

Since prison became an independent sentence at the end of the 18th century, policymakers have feared that the expected virtues of work, training, or introspection might be cancelled out by socialization in a criminal environment, transforming prisons into a "school of crime" (Foucault (1975)). For this reason, contacts among prisoners were originally avoided, and most penitentiary systems imposed strict silence rules. However, those rules were gradually abandoned[1] because of their adverse effects on prisoners as well as practical difficulties (Smith (2006)). Nowadays, millions of inmates share small cells with unchosen cellmates over extended periods. However, the way and the extent to which this forced cohabitation affects crime remains largely unknown

This paper explores the effects of cellmates on re-incarceration after prison. It utilizes French administrative data that provides information on the specific cell number in which inmates were incarcerated at any given time between June 2016 and December 2022, together with prison registers identifying inmates through unique IDs and offering detailed information about their convicted crimes and personal characteristics. These data are used to construct an individual-level dataset that documents inmates' characteristics upon entry, their experience in prison, and their re-incarceration rates. Specifically, it records the number of cellmates with different traits: the type of crime for which they were convicted – property crimes, drug crimes, violence, or other crimes –, their region of residence before incarceration, as well as potential re-incarceration for these types of crimes or in these geographical areas. The final dataset comprises over 190,000 inmates.

I first show that the number of cellmates of different types is not correlated with observables. This is consistent with the context of high pressure in which the penitentiary administration operates and the absence of control over inmate flows. In such a context, optimizing cell allocation — and then determining the *time* spent by an inmate with cellmates of different types — is already difficult, but optimizing the number of transfers — and then determining the *number* of cellmates of different types an inmate meets in prison — might be impossible.

Then, I document that, after controlling for individuals' duration of incarceration and characteristics upon entry, having an additional cellmate convicted of a drug crime is associated with a 7.1% higher probability of being re-incarcerated for a drug crime. The number of other types of cellmates does not significantly affect this behaviour. Similarly, having an additional cellmate convicted of a property crime is associated with a 5.2% increase in the likelihood of being re-incarcerated for a property crime. In contrast, other types of cellmates do not have a substantial impact. Finally, the probability of re-incarceration for violent crimes or other crimes is, at best, marginally affected by cellmates.

I test the validity of those results by imposing restrictions on identifying variations.

[1] In France, the rule of silence was abandoned in the 70s Carlier (2009).

Controlling for the total number of cellmates – which may vary with unobservables like impulsivity – and the time spent with offenders of various types – which could be manipulated by the penitentiary administration – does not affect the results. Moreover, using duration models or an instrumental variable approach where the number of cellmates is instrumented by the number of cellmate transfers for independent reasons leads to similar results.

Cellmates do not only affect re-incarceration for different types of crime, but also the place where such offenses are committed. Distinguishing between 12 administrative regions in metropolitan France, I show that the probability of being re-incarcerated in a given region significantly correlates with the number of cellmates from this area, but not with the number of cellmates from other region. Once again, this geographical effect is driven by property crimes and drug-related crimes.

The effects vary depending on the joint characteristics of the offenders sharing a cell. Notably, having an additional cellmate from the same city with a drug crime conviction massively increases the probability of committing a drug crime after release. Similarly, the effect is significantly more pronounced when offenders have similar ages or nationalities. Interestingly, offenders convicted of a drug crime do not react more strongly to the number of cellmates with drug crime convictions.

The fact that effects are larger when inmates share similar characteristics creates a situation of contradictory incentives. Indeed, I document that cellmates sharing similar characteristics are less likely to come into conflict with each other. Therefore, reducing re-incarceration may come at the cost of a higher number of incidents in prison.

This research contributes to the literature on peer effects in prison. Pioneering work by Bayer et al. (2009) examines the impact of exposure to various types of crime at the prison level in Floridian's juvenile facilities. The authors identify a reinforcement effect, offenders being more likely to commit a specific type of crime if they have been more exposed to it and have engaged in similar behaviour in the past. Damm and Gorinas (2020) observe comparable patterns among young adults in Denmark. Closer to this paper, Ouss (2011) uses similar data in France and documents the effect of exposure at the *cell level*. Stevenson (2017) uses juveniles incarcerated in Florida to document the importance of peers' backgrounds and attitudes. She finds evidence of social contagion, whereby individuals exposed to fellow inmates from unstable home environments are more prone to committing crimes following their release from prison. Using a slightly different approach, Drago and Galbiati (2012) shows that inmates from the same geographical origin incarcerated in the same prison influence each other after release.

Compared to the existing literature, the present research uses interactions within cells to focus on the *number* of cellmates of various types rather than on *exposure* to different crimes. This allows me to explore the effects of networks beyond skill transfers or social contagion. It also overcomes a fundamental problem in the literature on exposure at the

prison level, where being more exposed to crime A is mechanically associated with being less exposed to crime B. Moreover, the precision and unprecedentedly large volume of the data gives sufficient statistical power to investigate the heterogeneity of the effects.

More broadly, this paper contributes to the existing literature about peer effects on criminal behaviour — at the familial (Hjalmarsson and Lindquist (2012), Bhuller et al. (2018), Dobbie et al. (2018), Lochner (2007)), neighbourhood (Billings et al. (2019); Billings and Schnepel (2022)), or class (Billings and Hoekstra (2023)) levels —, as well as to the study of the effect of prison conditions on crime (Chen and Shapiro (2007), Drago et al. (2011), Mastrobuoni and Terlizzese (2022), Tobón (2022)).

2 Context and data

2.1 French prisons

Context. With around 70,000 prisoners[2], France has an incarceration rate of 102 per 100,000 inhabitants, close to the EU average. 30% of them are in pre-trial detention. Inmates are distributed among 185 prisons divided into three main types of facilities. Short-term facilities ("Maison d'arrêts") accommodate 68% of the prison population: all pre-trial inmates as well as prisoners serving less than two years (in theory). They are extremely overcrowded, with an average occupation rate close to 140%. Around 32% of their cells accommodate one inmate, 52% accommodate two, 12% hold three, and 4% hold four or more. Prisoners can take part in some activities and receive visits from family and friends up to three times a week. The rest of the time, between 18 and 22 hours a day, individuals are in their cells with the door locked. Prisoners serving longer sentences are incarcerated either in "Centres de détention" or in "Maison centrales" (26% and 2.5% of the population, respectively). These two types of facilities differ in their regime — more liberal in the former, with open doors in the daytime — and population — with inmates serving very long sentences in the latter.

Inmate movements and cell allocation. The first type of movement occurs when inmates enter or leave prison. These flows are determined by independent magistrates. The penitentiary administration cannot influence or delay them. Other movements are internal, from one cell to another. A large share of them are the result of inmates moving to a different *type* of cell. Indeed, prisoners are first placed in an "arrival" cell, where they spend around a week before moving to a "regular" one. After this initial movement, they may be transferred to a "worker" cell, different types of medical cells, disciplinary cells, or cells associated with specific programs. Such movements are decided by a multidisciplinary commission or by the disciplinary commission . They represent around 70% of the movements documented

[2]Reference figures are for January 2019.

in the database (see below). In addition, inmates may be transferred if there are tensions (12%) or conflicts (5%) in the cell, or for prison management (13%).

Inmates' cell allocation is determined by prison directors. The law states that male and female, juvenile and adult, remand and sentenced prisoners should be separated. On top of these official criteria, sociologists (El Magrouti (2014), Veaudor (2020)) document other characteristics that are commonly used: age, religiosity, tobacco consumption, and origin. Interestingly, qualitative research does not identify crime types as a relevant criterion.

2.2 Prison data

Data construction. Data was provided by the French penitentiary administration. The raw data indicates the exact cell number where every inmate was incarcerated at any moment during their incarceration spell between June 2016 and December 2022. The reason why inmates were transferred from one cell to another is also indicated. Individuals are identified using a single ID, which allows me to study their re-incarceration. In addition to individuals' location, the data contains inmates' socio-demographic information – age, sex, nationality, city of residence –, the crime they were convicted of – using a precise classification containing more than 1,500 entries –, and the psychological evaluation realized at entry[3].

This information is merged and aggregated to obtain an individual dataset. For each person, I measure the number of cellmates of different types and the aggregated time spent with each type of individual. The main dimensions are the nature of the crime individuals were convicted of, distinguishing between property crime, drug-related crime, violence, or other crimes, and the area where they lived before entering prison, distinguishing between 12 administrative regions.

The primary outcome used in this paper is re-incarceration after one year for different crimes or in different places. To avoid right truncation and keep the dataset homogeneous over time, the sample is restricted to offenders incarcerated between June 2016 and December 2019 for prison spells inferior or equal to 2 years. This way, all offenders were released before December 2021 and could be followed for a year after release.

Descriptive statistics. After cleaning the data and removing offenders for whom one of the main variables is missing (prison or crime type), the final dataset contains 191,000 offenders. On average, inmates spent 212 days in prison, including 160 days sharing their cell with at least one other person. 30% of them were convicted of property crimes, 21% of drug-related crimes, and 25% of violent crimes. They had an average of 8.23 cellmates: 2.47 cellmates convicted of a property crime, 1.7 of a drug crime, and 2.2 of a violent crime. On average, offenders were 32 when they were incarcerated. They are mostly male (95%)

[3] 13 variables documenting prior suicide attempts, self-harm, hospitalization, aggressivity, depression, and addiction.

and French, although foreigners are over-represented (25% in the sample vs 7.7% in the general population). They face several social problems, with 29% of them being illiterate, 58% suffering from an addiction, and 19% having a psychiatric history. One year after their release, 18% of the sample had been re-incarcerated: 6% for a property crime, 3% for a drug-related crime, and 5% for a violent crime[4].

3 Identification

3.1 Hypotheses and baseline specification

This paper aims to measure the effect of criminal connections made in prison on recidivism, focusing on in-cell contact. More precisely, I want to test the following hypotheses:

(i). **Crime-type effect**: The likelihood of committing a crime of type c after prison is affected by the number of cellmates convicted of crime c inmates meet in prison. It is not affected by the number of cellmates convicted of other crimes $m \neq c$. This effect is maximized for crimes requiring a network, like drug crimes, or specific skills, like property crimes.

(ii). **Geographical effect**: The likelihood of committing a crime in place r after prison is mainly affected by the number of cellmates who lived in place r before their incarceration.

(iii). **Likeness effect**: Inmates are more likely to influence each other if they share common characteristics such as origin, age, or place of living.

As mentioned above, I will distinguish between four crime types (property, drug, violence, other) and twelve regions. For the sake of simplicity, the rest of this Section will present the strategy for measuring the crime-type effect. Specific problems arising when measuring the geographical effect will be presented in Section (5). The baseline models used to explore the first two assumptions are as follows:

$$ReInc^{c}_{i,p,t} = \alpha_0 + \sum_{m=1}^{g} \alpha_m NbPeer^{m}_{i,p,t} + X_i\beta + \gamma_p + \delta_t + \varepsilon_{ipt} \tag{1}$$

where $ReInc^{c}_{i,p,t}$ is a dummy equal to one if individual i, incarcerated in prison p at time t, commits a new crime of type c — among g different categories — in the year following their release. $NbPeer^{m}_{i,p,t}$ is the number of cellmates of type m individual i met during their prison spell. $X_{i,p,t}$ is a set of control variables. γ_p and δ_t are prison and month-of-incarceration fixed effects.

Following hypothesis 1, I expect $\alpha_{m=c}$ to be significantly larger than $\alpha_{m\neq c}$ for any crime c. I also expect the latter to be close to zero. Lastly, I expect $\alpha_{m=c}$ to be higher when c

[4]The descriptive statistics for this population can be found in Table A.1

stands for property or drug crimes. To make this comparison, and as all crime types are not equally likely, I will present coefficients divided by the mean of the outcome.

Controls always include three key groups of variables. First, regressions control for incarceration length fixed effects (720 dummies). This is important as the time served is mechanically correlated with both the number of cellmates and the original sentence, which is partly determined by recidivism risks. Second, I include detailed crime fixed effects (1,500 dummies). They allows me to overcome problems of sorting in cells based on crime. For example, if the penitentiary administration puts drug dealers together, and if drug dealers mainly commit drug crimes after release, we would observe a positive correlation between the number of cellmates convicted of drug crimes and the probability of committing such a crime after release. To avoid this bias, I measure the effect of cellmates of type c on re-incarceration for crime c *conditional on the original crime*. Third, I control for characteristics at entry: gender, age fixed effects, and penal category (convict vs pre-trial incarceration), nationality fixed effects (170 codes), literacy, mental health status (13 variables), qualifications, procedural variables (accelerated procedure), and past incarcerations (overall, before 18).

3.2 Sources of variations and additional specifications

Equation 1 captures the correlation between the number of cellmates of different types and re-incarceration. The results may be biased if an unobserved characteristic z is correlated with the number of cellmates of type c and the probability of committing a crime of type c. Note that this variable z cannot be the type of crime.

Sources of variation. To alleviate this concern, I measure the evolution of the effects when exploiting different sources of variations. In the baseline setting, variations in the number of cellmates of type c come from two sources. First, offenders vary in their *total number* of cellmates. For example, two individuals spending their prison time with drug dealers may respectively have met 2 or 3 different persons. Second, offenders vary in the *type* of cellmates they met in prison. For example, two inmates who each had two cellmates in prison may have shared a cell with two drug dealers or two property criminals.

These dimensions do not vary at random. First, inmates can affect the number of times they change cells through their behaviour and their requests for activities or jobs. Second, the penitentiary administration tries to optimize cell allocation and determine the characteristics of the individual(s) who will share the same cell.

It is possible to control for these two sources of variation. First, Equation (1) can be modified to flexibly control for the total number of cellmates. In this case, regressions will capture the *relative effect* of the number of cellmates of type c in comparison to a reference category (see top right panel of Figure A.1).

Second, Equation 1 can be modified to control for the time spent with various types

of peers. In this case, regressions will capture the effect at the *intensive margin*. Indeed, individuals who spend x days with offenders of type c may have had one, two, three... different cellmates, but not zero (bottom left panel of Figure A.1).

Lastly, it is possible to control for both the total number of cellmates and the time spent with different types of cellmates (bottom right panel of Figure A.1). This more stringent specification relies, for example, on the comparison of two offenders, A and B, who both had three different cellmates and both spent 100 days with one or more drug dealer(s) and 100 days with one or more property criminal(s), but with A having spent time with two drug dealers and one robber while B met one drug dealer and two robbers. In this case, the identification assumption is that the penitentiary administration does not dynamically optimize cellmate assignment in prison. This is likely the case in a context of high overcrowding, where flows are unknown and cell transfers are largely determined based on prisoners' requests treated by multidisciplinary commissions and external circumstances.

Formally, those different strategies could be estimated with models of the form:

$$\begin{aligned} ReInc^{c}_{i,p,t} &= \alpha_0 + \sum_{m=1}^{g-1} \alpha_m NbPeer^{m}_{i,p,t} + X_i\beta + \gamma_p + \delta_t \\ &+ \underbrace{\nu_{NbCellmate}}_{(a)} + \underbrace{\sum_{n=1}^{g} \mu_n Time^{n}_{i,p,t}}_{(b)} + \varepsilon_{ipt} \end{aligned} \tag{2}$$

where $\nu_{NbCellmate}$ is a set of fixed effects for the number of cellmates and $\sum_{n=1}^{g} Time^{n}_{i,p,t}$ is a set of controls for the time spent with cellmates of type n. Introducing the fixed effects indicated in (a) eliminates variations based on the total number of cellmates, while introducing the variables indicated in (b) eliminates variations based on the time spent with different types of peers.

Instrumental variable. In a robustness check, I adopt another approach based on cellmates' movements. Indeed, the total number of peers varies with the time spent in cells of various sizes, the number of transfers to another cell, and the number of times a cellmate is transferred. While the first two sources of variations depend on an offender's own characteristics, the third one depends on peers' characteristics and the date of their transfers. Then, for each inmate, I measure the number of times one of their cellmates was transferred while they were sharing a cell, excluding movements justified by conflicts or requests, and use this variable to instrument $NbPeer^{m}_{i,p,t}$ in Equation 1.

4 Crime type effects

4.1 Main results

The effect of the number of peers of various types on re-incarceration for various crimes is presented in Figure 1. It is divided into four panels, showing the results for four outcomes: re-incarceration after one year for property crimes, drug crimes, violence, or other crimes. In each panel, I report the coefficients of the four variables of interest: the number of cellmates convicted of property crimes, drug crimes, violence, or other crimes. Different symbols and colours are used for coefficients from different specifications. In total, Figure (1) reports the results of 16 regressions (four specifications times four outcomes). Coefficients are presented in proportion to the mean to allow for comparison of magnitude across outcomes.

I start the analysis by comparing the correlation between the number of cellmates and *predicted* or *real* re-incarceration following Equation 1 with a minimal number of controls[5]. Predictions are computed by extracting the coefficients obtained when regressing the outcomes on all the observables at entry in prison: detailed description of the crime committed, socio-demographic characteristics, and the psychological evaluation at entry (see Section 2.2). In practice, measuring the correlation between the number of cellmates and the predicted re-incarceration rate is similar to running balancing checks. It allows us to test whether individuals who are more likely to recidivate for a certain type of crime are more likely to have had certain types of cellmates. Results are presented in Figure 1 using red circles for *predicted* re-incarceration and black circles for *real* re-incarceration.

The correlations between the *predicted* probability of re-incarceration and the number of cellmates of various types are mostly small and non-significant. The only observable pattern is that re-incarceration is correlated with the number of violent cellmates. However, this is true for all kinds of recidivism, and the effects are small in magnitude (max 1.7% of the mean).

On the contrary, *real* re-incarceration is correlated with the number of cellmates. The probability of committing a property crime, a drug crime, or, to a lesser extent, a violent crime is correlated with the number of cellmates convicted of those crimes, but not with the number of other cellmates. In particular, having an additional cellmate convicted of a drug crime is associated with a 7.3% (0.22 pp) increase in the probability of being re-incarcerated for that crime.

Results remain similar when models controls for all characteristics observed at entry (empty triangles). More importantly, the effects are also similar when regressions follow Equation 2 and include fixed effects for the total number of cellmates as well as controls for the time spent with different types of peers (black triangles). In this last set of models, coefficients capture relative effects — the number of "other" cellmates is taken as the

[5]I control for the time spent in prison, age, an aggregate measure of crime types, and prison fixed effects.

reference group with coefficients set at zero — and extensive margin effects.

Adding controls reinforces contrasts. In the most restrictive specification, one additional peer convicted of a drug crime is associated with an 8.3% (0.25 pp) increase in re-incarceration for drug offenses one year after release. Similarly, sharing a cell with an additional thief increases the probability of being re-incarcerated for a property crime by 5.2% (.31pp). Interestingly, the correlation between the number of cellmates convicted of violence and the probability of being re-incarcerated for such a crime disappears. The correlations between re-incarceration for other crimes and different types of cellmates remain small and non-significant.

A natural interpretation of the findings is that increasing criminal connections fosters criminal opportunities in domains where such connections are relevant. However, the number of cellmates might also increase – if having more cellmates raises the likelihood of being denounced – or decrease – if cellmates contribute to skill enhancement – the probability of arrest. The former is unlikely (particularly in the French context where incentives to denounce are limited) and at odds with results showing that cellmates with whom there was a conflict, arguably more likely to denounce someone, do not drive the effect (see Figure B.2). The latter constitutes a downward bias, and it is not consistent with the geographical dimension presented below.

4.2 Additional results and robustness checks

Intensive margin Every additional cellmate may not have the same importance. For example, the first contact may be more important to teach basic skills. I explore this dimension by measuring the effect of having one, two, three, four or more cellmates of each type. Results indicate that the effects of cellmates convicted of property or drug crimes are linear (see Appendix Figure B.1). This is consistent with what was observed in Figure (1), where measuring the effect at the extensive margin did not change the results.

Robustness checks I test for the robustness of the results in several ways. First, I measure the effects using the IV strategy based on cellmates' movements (Appendix Figure B.3) or using Cox competitive duration models (Appendix Figure B.4). Second, I measure the effect on different samples and for various time horizons (Appendix Figure B.7). Third, I use more detailed classification of crime types, isolating road-related crimes (Appendix Figure B.8) or the most severe crimes (Appendix Figure B.9). In all those checks, results remain similar to the main findings. On the contrary, randomly replacing cellmates with other inmates transferred the same week within the same prison yields to small and mostly insignificant results (see Appendix Figure B.10).

Lastly, I measure the effect of cellmates when the penitentiary administration's ability to control cell allocation is particularly limited. This is the case when the overcrowding rate is high (see Appendix Figure B.5) or at the beginning of prison spells, when prison

workers' knowledge of inmates is limited to the information collected at entry and available in the dataset (Appendix Figure B.6). In both exercises, the effects are similar to those presented in the main results.

5 Geographical Effects

5.1 Regional Effect

To measure the effect of cellmates on crime localization, I follow the structure of the preceding section but look at different geographical areas[6] instead of focusing on crime types. The analysis is mostly conducted at the regional level. After excluding Corsica and overseas territories, which are physically disconnected from the French mainland, we are left with 12 administrative regions . In addition to these 12 areas, I distinguish inmates' *home*, i.e. the département (administrative sub-unit of a region) where they used to live or the département where they were incarcerated (if different)[7]. Then, I consider 13 types of cellmates: cellmates from *home* and *non-home* cellmates from regions 1 to 12. For example, for an inmate living and incarcerated in département A in region 1, I count the number of cellmates from département A, the number of cellmates from region 1 excluding those from département A, and the number of cellmates from region 2 to 12. Models then measure the correlation between these 13 types of cellmates and re-incarceration in regions 1 to 12. As I want to measure displacement, the probability of being re-incarcerated in region r excludes re-incarcerations at *home*.[8]

Results are presented in Figure 2. Each sub-graph presents the correlation between the number of cellmates from *home* or *non-home* cellmates from regions 1 to 12 and the probability of being re-incarcerated in the region indicated in the header.

Inmates are more likely to commit a crime in a given region when they share a cell with individuals from that area. For ten regressions out of 12, the probability of being re-incarcerated in region r is positively and significantly correlated with the number of cellmates coming from r. In these ten cases, the coefficient of interest is larger and usually significantly different from other coefficients. The effects are sizable, with eight coefficients representing more than 50% of the mean. However, it is important to note that baseline probabilities are small, and coefficients are not precisely estimated. It is also worth mentioning that the effects are mostly captured at the extensive margin.

[6] Individuals' place of residence before prison is precisely recorded for 81% of the inmates. Crime locations are not recorded. They are proxied by the place of incarceration.

[7] 70.8% of cellmates are from the inmate's *home* département, and 78% of re-incarcerations happen there.

[8] In Appendix Figure C.1, I adopt a more radical approach and simply drop all inmates coming from or incarcerated in region r when measuring the effect of cellmates on re-incarceration in r.

5.2 Crime type and mobility

I now combine the approaches of the preceding sections to study the geographical effects and crime-type effects of cellmates simultaneously. A natural way of doing this would be to study all the interactions between crime c and region r. However, inmates are rarely re-incarcerated outside their home region, and further dividing the outcomes makes it hard to detect any pattern. To overcome this problem, I restrict the analysis to eight outcomes: re-incarceration at *home* or *outside home* for a property crime, a drug crime, violence, or another crime. Following this logic, I examine eight types of cellmates coming from *home* or *non-home* départements and originally convicted of property crimes, drug crimes, violence, or other crimes.

The results of the eight models are presented in Table 1. They confirm the findings of the previous sections. First, the probability of being re-incarcerated for a property crime or a drug crime is affected by the number of cellmates having experience with such crimes. The number of peers convicted of other types of crime is mostly irrelevant. Moreover, cellmates do not affect violence and other crimes. Second, the probability of committing a property or drug crime in area a – whether *home* or *non-home* – is mostly affected by cellmates from this area. This can be seen by comparing coefficients in red – same crime, same area — and in orange – same crime, different area. For example, an additional peer convicted of a drug crime at *home* increases re-incarceration in the same area for the same crime by 6.1%, but has no effect on re-incarceration elsewhere (+1.4%, non-significant).

6 Proximity Among Cellmates

6.1 Heterogeneity of the Crime-Type Effect

The effect of cellmates on future crime varies with the characteristics of the individuals along three dimensions. Firstly, different inmates are more or less prone to influence by their cellmates. Indeed, heterogeneity results indicate that young offenders are more affected by their cellmates, while inmates with children are less (Appendix D). Secondly, cellmates are more or less influential depending on their own characteristics. Interestingly, offenders later benefiting from early release — and likely considered by judges as having a low probability of reoffending — do not exert a "bad" influence. The same is true for cellmates with children. On the contrary, cellmates with previous incarceration seem to exert a more negative influence (Appendix E).

Lastly, the effects of cellmates might depend on the joint characteristics of the inmates sharing a cell, i.e., on the characteristics of the interaction. This dimension is critical as it could help determine which cell allocations should be preferred or avoided. For the sake of simplicity, the discussion below focuses on the effect of cellmates on re-incarceration for drugs, which is the most affected outcome (see Appendix F for other outcomes).

I begin by measuring the effect of distance between cellmates. Inmates living close by might be more likely to interact after release, and they might benefit more from local knowledge or criminal networks. To test this hypothesis, I use the address registered before entering prison[9]. Panel A of Figure 3 presents the effects of cellmates who used to live in the same city (in red), in cities 0 to 30 km from the inmate's own address (green), or in cities more than 30 km away (blue) on re-incarceration for a drug crime[10]. Having an additional cellmate coming from the same town and incarcerated for a drug-related crime increases the probability of being re-incarcerated for drugs by up to 21% of the mean, an effect almost three times larger than what we observed in the general case. The effect falls to 9.6% of the mean for cellmates living in a different city close by, and it disappears when they live more than 30 km away.

I then test the effect of cellmates depending on individuals' prior experience. Panel B of Figure 3 presents the effect of cellmates on re-incarceration for a drug crime for offenders previously incarcerated for a drug crime (in red) or for another offense (in blue). While preceding research documented a reinforcement mechanism, especially among juveniles (Bayer et al. (2009), Damm and Gorinas (2020), Ouss (2011)), results indicate that former cellmates influence both individuals with prior experience and others.

The last two panels of Figure 3 explore the importance of socio-demographic proximity. The intuition is that inmates might create more durable ties if they share similar characteristics. Panel C presents the effect of younger cellmates (more than five years younger, in red), cellmates of similar age (less than five years' difference, in green), or older cellmates (more than five years older, in blue) on re-incarceration for a drug crime. The effect of cellmates convicted of drug crimes is entirely driven by peers who are about the same age. Similarly, Panel D indicates that inmates are mostly affected by cellmates of similar nationality.[11] Together, these results confirm that inmates sharing similar characteristics are more likely to influence each other.

6.2 Misaligned Incentives

If inmates' recidivism is mainly affected by cellmates sharing similar characteristics, a natural policy recommendation would be to avoid such matches in cells. However, the objective of minimizing recidivism *after prison* might conflict with the penitentiary administration's objective of minimizing tensions and conflicts *inside prison*. Indeed, if individuals incarcerated with cellmates sharing similar characteristics are calmer and less likely to harm themselves or others, the administration may tend to privilege such matches.

To shed some light on these possibly incompatible objectives, I explore the effect of

[9]The distance between cellmates could be calculated for around two-thirds of the interactions.

[10]Regressions also include the number of cellmates living at an unknown distance. Coefficients are not presented.

[11]I distinguish between French, other Europeans, North Africans, Other Africans, Asians, Americans, and Oceanians.

cellmates' characteristics on behaviour in prison. I build a dataset recording all interactions between the inmates of the sample used in the previous sections and other inmates, cohabitation start and end dates, and the reason why it ended: conflicts, request from one party, or transfer to a disciplinary cell. Then, I regress the reasons for the cohabitation ending on the characteristics of the match, using dummies equal to one if cellmates come from the same city, have similar ages or nationalities, and a set of crime interactions. As most inmates have several cellmates, regressions include individual fixed effects to account for differences in "baseline" propensity to misbehave in prison. Regressions also include controls for peers' characteristics: crime type, age, nationality, and city of residence before entering prison. Results are presented in Table 2.

Inmates coming from the same city or having similar national origins are less likely to be in conflict (Column 1 Table 2). However, the risk slightly increases when they are about the same age. Crime types seem largely irrelevant, and no crime combination is particularly associated with a higher or lower degree of conflict. The probability of cohabitation ending because one person is sanctioned is low (inmates usually reintegrate their previous cell after the sanction). It increases when inmates come from the same city or have similar ages (Column 2 Table (2)). The effect on conflicts dominates the effect on sanctions, and the overall risk of cohabitation ending due to a problem decreases when individuals have similar origins – either where they lived before prison or their nationality – and increases when they are about the same age.

Taken together, these results indicate that social objectives – limiting recidivism after prison – and the penitentiary administration's objectives – minimizing problems in prison – may indeed clash.

7 Conclusion

This paper analyzes uniquely rich information on prisoners' cell assignments in France and documents that the probability of being re-incarcerated is affected by the number of cellmates and their characteristics. Recidivism for drug crimes and, to a lesser extent, property crimes is correlated with the number of cellmates with experience in those crimes. Cellmates also influence the likelihood of committing crimes in the region where they come from. These effects are contingent on cellmates' similarities.

These findings carry significant policy implications, advocating in favour of single cells. When individual confinement is unfeasible, minimizing the frequency of inmate movements and maintaining stable cell assignments emerges as a socially beneficial approach. However, drawing up recommendations for specific profiles that should be matched in cells presents a challenge. While incarcerating individuals with shared characteristics may increase recidivism, it also reduces conflicts in jail. Determining the optimal allocation remains, therefore, a question for future research.

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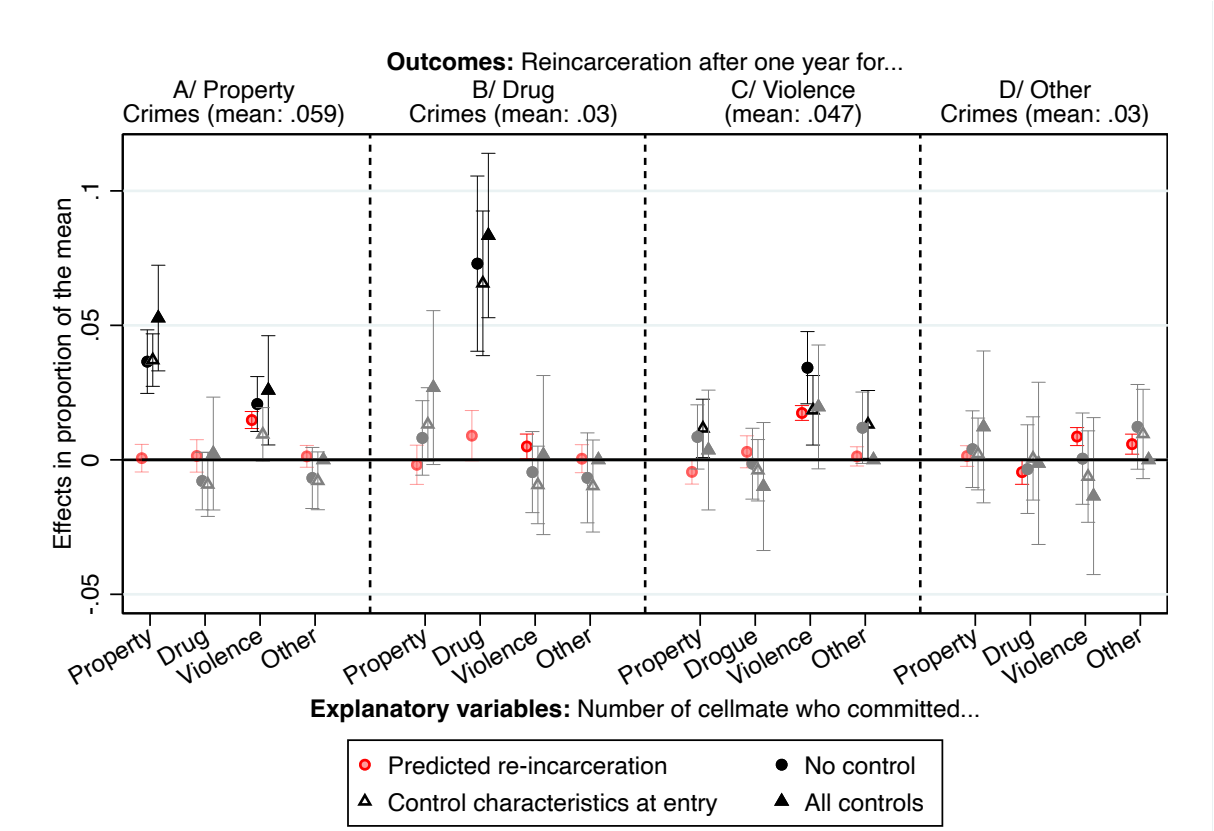
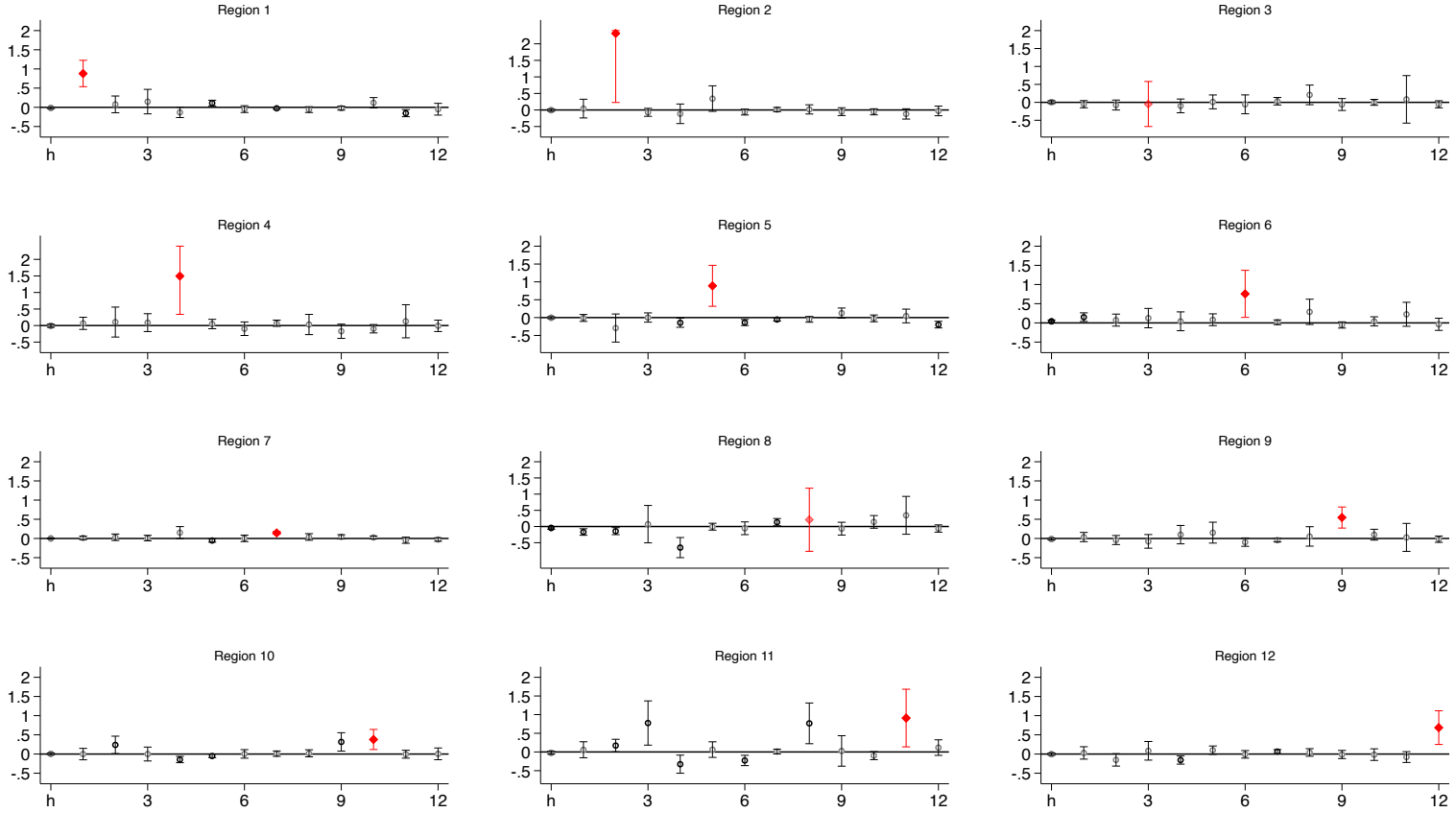
TABLES AND FIGURES

Figure 1: *Effect of the number of cellmates of different types on re-incarceration for different crimes*



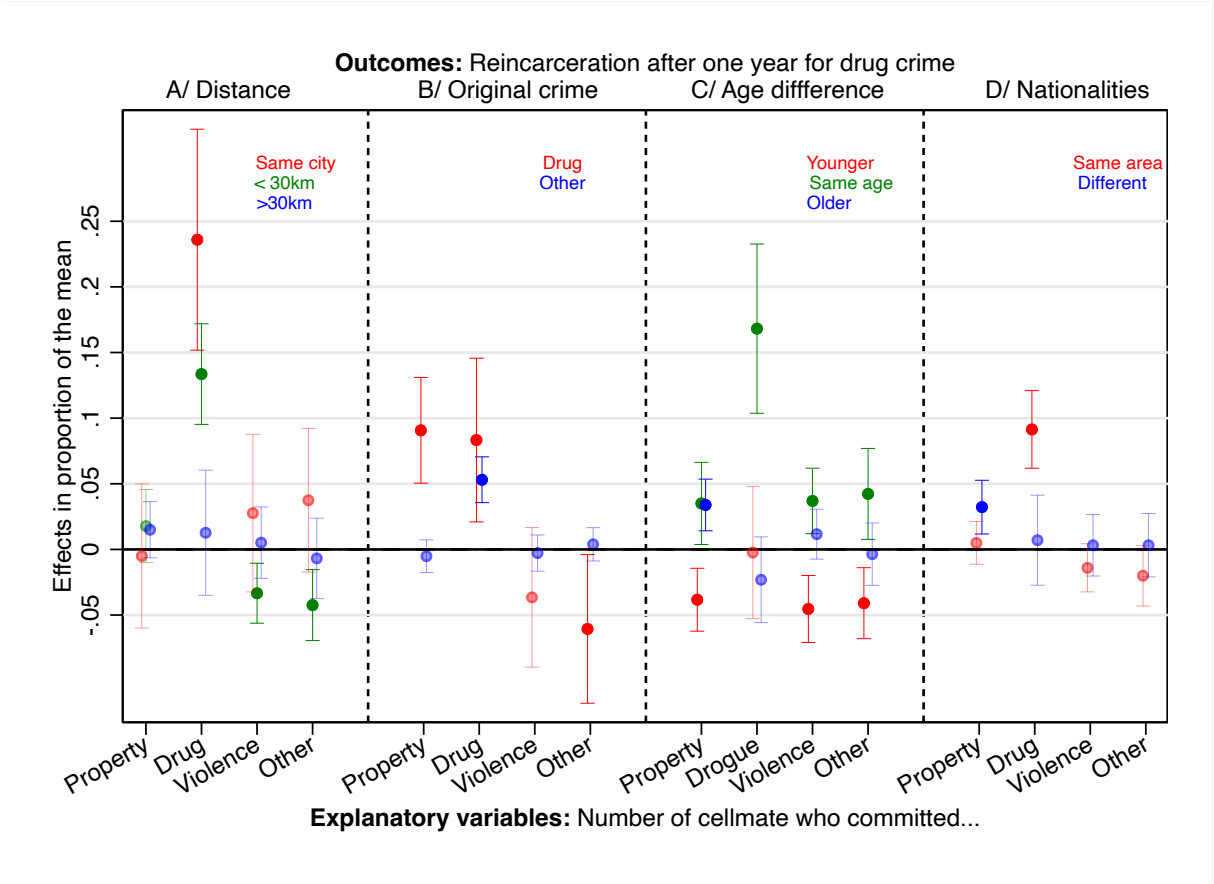
Notes: This Figure presents the correlations between the number of cellmates convicted of the types of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header (Panels A to D). Coefficients come from four sets of equations. The first set (red circles) measures the effect of various types of cellmates on *predicted* re-incarceration. The second set (black circles) measures the effect of cellmates on *real* re-incarceration. In these two sets of equations, only a limited number of controls are included: fixed effects for prison, time in prison, aggregated crime, and age at entry. The third set of results (empty black triangles) presents the same results with the full set of controls for characteristics at entry following Equation (1). Lastly, the fourth set of results (plain black circles) presents the results when controlling for characteristics at entry, the total number of cellmates and time spent with different types of cellmates following Equation 2. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure 2: *Effect of the number of cellmates from different regions on re-incarceration by region*



Notes: This Figure presents the correlations between the number of cellmates who used to leave in the *home* region (h on the x-axis) or in administrative region 1-12 before incarceration and re-incarceration after 1 year in the region indicated in the header. Each sub-graph presents the results of one regression that includes baseline controls for characteristics observed at prison entry. Effects are presented in proportion to the means. Bars represent the 95% confidence intervals (cap at 2.4). Standard errors are clustered at the prison level.

Figure 3: *Effect of the number of cellmates of different types on re-incarceration for drug-related crimes*



Notes: This Figure presents the correlations between the number of cellmates with various characteristics and re-incarceration after 1 year for drug-related crimes. There are four panels (A to D, as indicated in the header) presenting the results for different decompositions of the number of cellmates. Panel A distinguishes between 12 types of cellmates: those convicted of property crimes, drug crimes, violence or other crimes who lived in the same city (coefficients in red), in cities less than 30 km away (green) or more than 30 km away (blue) from an inmate's city of residence before incarceration. Panel B presents the effect of different types of cellmates on inmates convicted of drug crimes (in red) or other crimes (in blue). Panel C distinguishes between 12 types of cellmates: those convicted of property crimes, drug crimes, violence, or other crimes that are younger (in red), around the same age (less than five years difference, in green), or older (in blue). Lastly, Panel D examines 8 types of cellmates: those convicted of property crimes, drug crimes, violence, or other crimes who have similar or different nationalities. Six geographical areas are defined: France, other European countries, North Africa, the rest of Africa, Asia, America, and Oceania. Regressions include the full set of controls for characteristics at entry following Equation (1). Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Table 1: Correlation the number of cellmates with various characteristics and re-incarceration in home départements or outside home épartements for different types of crime

	Outcome: re-incarceration after 1 year for...							
	Property		Drug		Violence		Other	
	Home	Non Home	Home	Non Home	Home	Non Home	Home	Non Home
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Nb cellmates:								
Property crime-Home	**0.021****	*0.008*	0.009	-0.001	0.010	0.014	-0.015	-0.015
Property crime-Non Home	*0.032****	**0.071*****	0.009	-0.008	0.007	-0.008	0.015	-0.019
Drug-Home	-0.015	0.0	**0.061*****	*0.014*	0.014	0.003	0.002	-0.028
Drug-Non Home	-0.019	0.004	*0.012*	**0.064**	0.008	-0.037	0.018	0.025
Violence-Home	-0.014	0.033**	0.017	0.010	**-0.007**	*-0.037*	-0.003	-0.004
Violence-Non Home	0.023	0.033	-0.022	0.036	*0.003*	**0.015**	-0.017	0.036
Other-Home	0.01	0.007	-0.001	0.019	0.017	0.021	**0.001**	*0.007*
Other-Non Home	-0.01	-0.036	-0.006	-0.006	0.025	0.019	*0.001*	**0.043**
Observations	187,352	187,352	187,352	187,352	187,352	187,352	187,352	187,352
Mean outcome	0.030	0.0090	0.014	0.0042	0.023	0.0046	0.024	0.0053

Notes: This table presents the correlations between the number of cellmates convicted of different types of crime and coming from different places on re-incarceration after 1 year for the type of crime indicated in the header. Columns present the results of a single regression following Equation (1). Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Table 2: Correlation between cellmates' characteristics and the reasons why their cohabitation ends

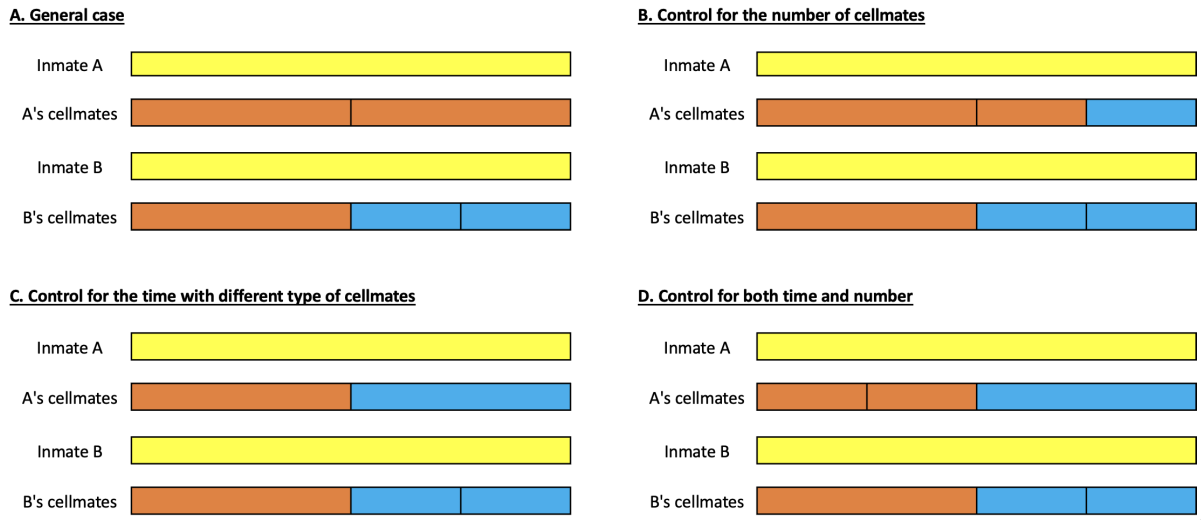
	(1) Demand/Conflict	(2) Sanction	(3) Problem
Same city	-0.021*** (0.0015)	0.0020*** (0.00058)	-0.019*** (0.0016)
Same age	0.0054*** (0.00087)	0.0021*** (0.00032)	0.0075*** (0.00090)
Same origin	-0.011*** (0.0015)	-0.000092 (0.00056)	-0.011*** (0.0016)
Property/Property	-0.0014 (0.015)	0.0015 (0.0056)	0.00012 (0.016)
Property/Drug	-0.018 (0.016)	0.0039 (0.0059)	-0.014 (0.016)
Property/Violence	-0.0080 (0.015)	-0.0017 (0.0056)	-0.0097 (0.016)
Drug/Property	0.0055 (0.015)	0.0027 (0.0057)	0.0082 (0.016)
Drug/Drug	-0.022 (0.016)	0.0036 (0.0059)	-0.019 (0.016)
Drug/Violence	-0.011 (0.015)	-0.0011 (0.0056)	-0.012 (0.016)
Violence/Property	0.0057 (0.015)	0.0025 (0.0056)	0.0082 (0.016)
Violence/Drug	-0.0097 (0.016)	0.0048 (0.0059)	-0.0049 (0.016)
Violence/Violence	-0.015 (0.015)	0.00028 (0.0056)	-0.015 (0.016)
Other/Property	0.0011 (0.015)	0.0018 (0.0057)	0.0030 (0.016)
Other/Drug	-0.019 (0.016)	0.0024 (0.0059)	-0.016 (0.017)
Other/Violence	-0.014 (0.015)	-0.0016 (0.0056)	-0.015 (0.016)
Peer's characteristics	Yes	Yes	Yes
Individual fe	Yes	Yes	Yes
Observations	1,017,597	1,017,597	1,017,597
Mean outcome	0.17	0.019	0.19

Notes: This table presents the correlations between peers' characteristics and the reason why cell cohabitation ended: conflicts or requests from one of the peers, transfer of one peer to a disciplinary cell, or any of those. The sample is composed of all interactions between the inmates of the main sample — i.e. inmates incarcerated before December 2019 and spending less than 2 years in prison — and other inmates (from the main sample or not). For example, an inmate having eight different cellmates over his incarceration spell will appear eight times in the database. Regressions include individual fixed effects and controls for peers' characteristics (crime, age, city of origin, nationality).

ONLINE APPENDIX

A Data and Identification strategy

Figure A.1: *Origins of the variations in the number of cellmates*



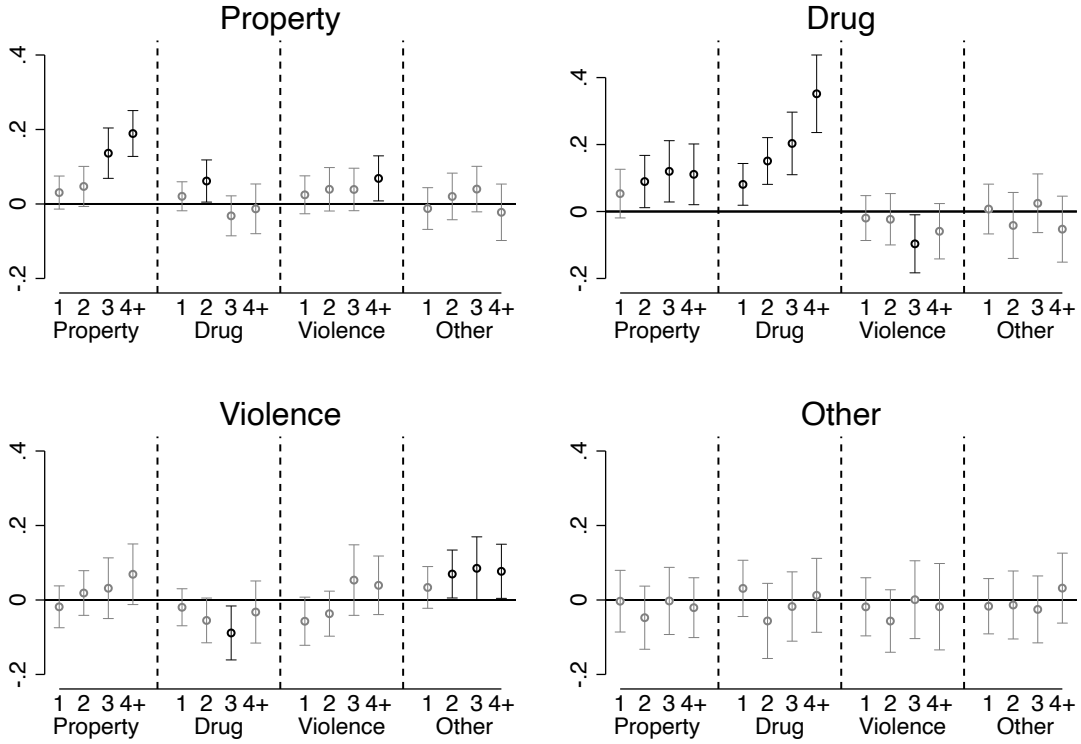
Notes: This Figure illustrate the identification strategy. Each panel present the variation between offenders A and B used to identify the effect of cellmate. Panel A present the baseline case, following Equation 1, where A and B differ on both the total number and the type of cellmates. Panel B presents the situations where the identification is only based on the type of cellmates, the total number of cellmates being fixed. Panel C presents the intuition when the identification is based on the total number of cellmates, the time with different types of cellmates being fixed. lastly, panel D illustrate the situation presented in Equation **??** where both the total number of cellmates and the aggregate time with different types of cellmates are constant.

Table A.1: Descriptive statistics for main study sample

	Mean	Sd
Duration:		
Time in prison	212.73	164.01
Time with cellmates	159.82	131.95
Crime type:		
Property	0.3	0.46
Drug	0.21	0.41
Violence	0.25	0.44
Other	0.23	0.42
Re-incarceration after 1y:		
All	0.17	0.38
Property	0.06	0.24
Drug	0.03	0.17
Violence	0.05	0.21
Nb of cellmates:		
All	8.23	6.09
Property	2.47	2.36
Drug	1.7	2
Violences	2.22	2.3
Other	1.84	1.96
Socio-demo:		
Age	32.44	10.78
Female	0.04	0.21
French	0.75	0.43
Illiterate	.29	.45
Addict	0.58	0.49
Psy pb	0.19	0.39
Observations	191,037	

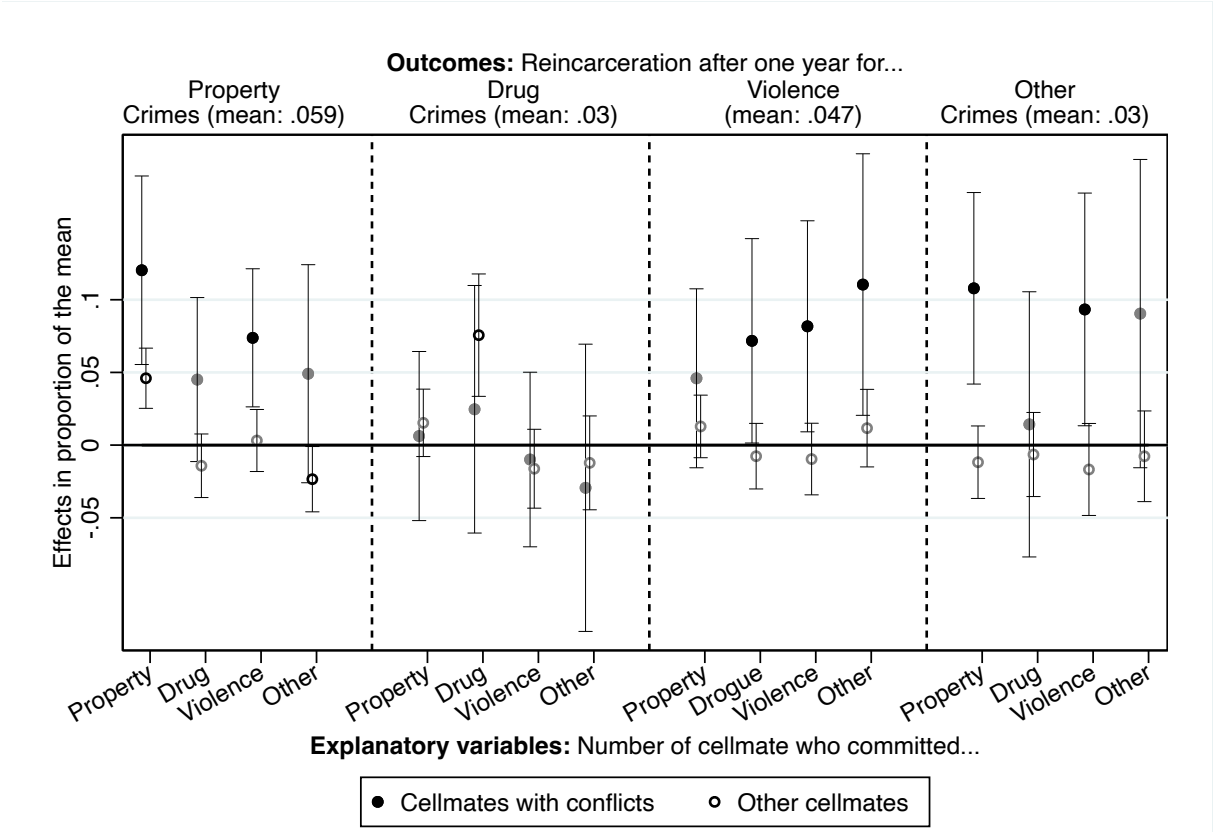
B Additional results and robustness checks

Figure B.1: *Effect of the number of cellmates of different types on re-incarceration for different crimes, intensive margin*



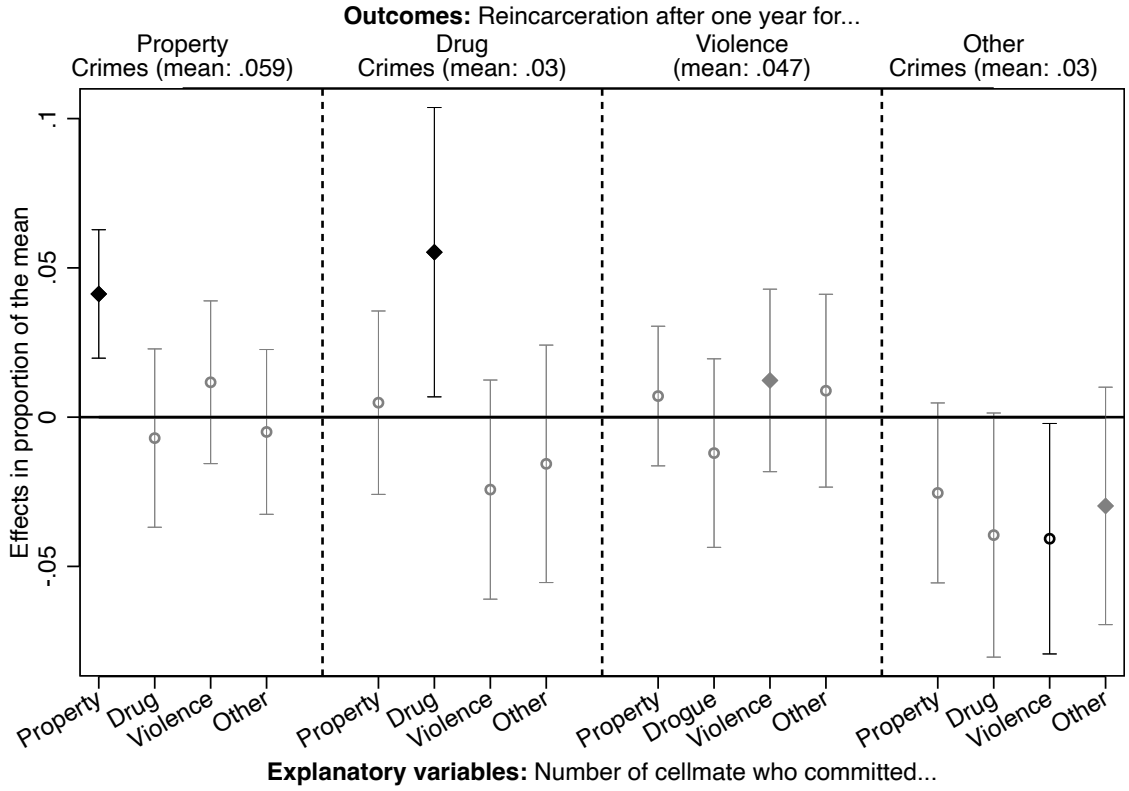
Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for a crime of the type indicated in the header. Each sub-graph presents the results from one regression that includes controls for characteristics observed at entry into prison. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure B.2: *Effect of the number of cellmates of different types on re-incarceration for different crimes differentiating between cellmates with whom there was a conflict from others*



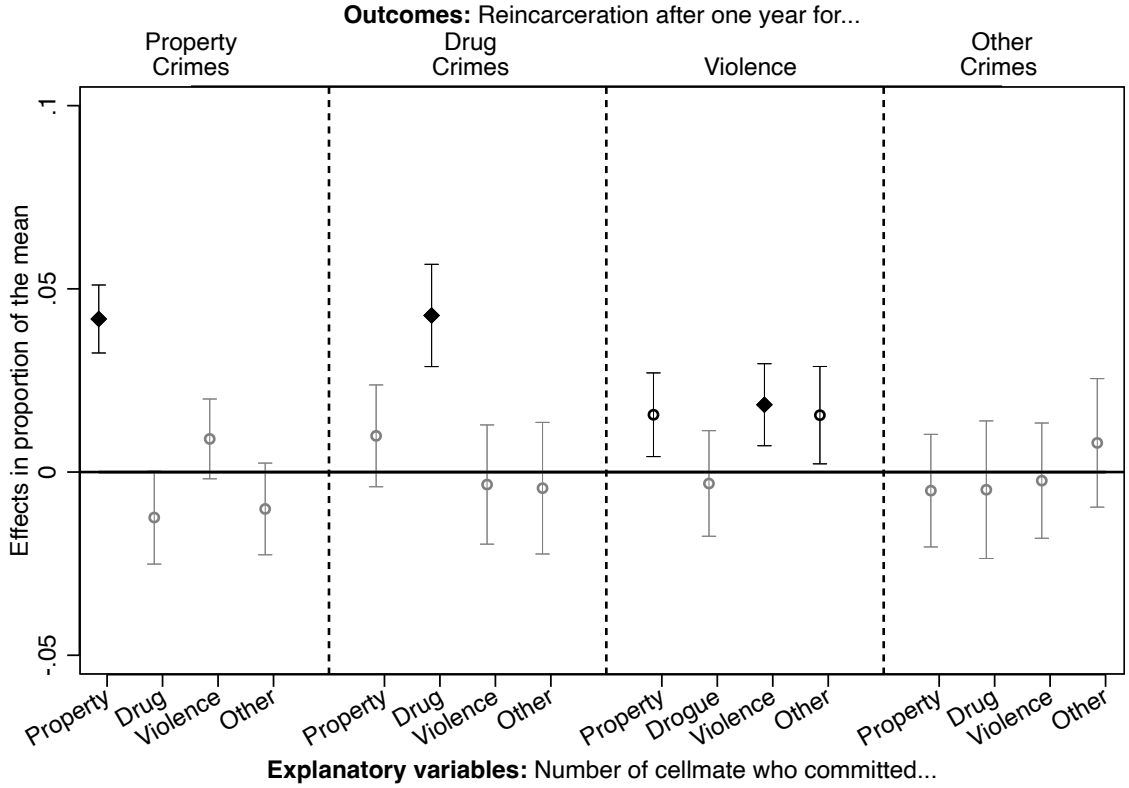
Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for a crime of the type indicated in the header. Cellmates are divided into height groups depending on their crime type (property crimes, drug crimes, violence, other crimes) and the presence or absence of a registered conflict. Each panel presents the results from one regression that includes controls for characteristics observed at entry into prison. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure B.3: *Effect of the number of cellmates of different types on re-incarceration for different crimes, IV results*



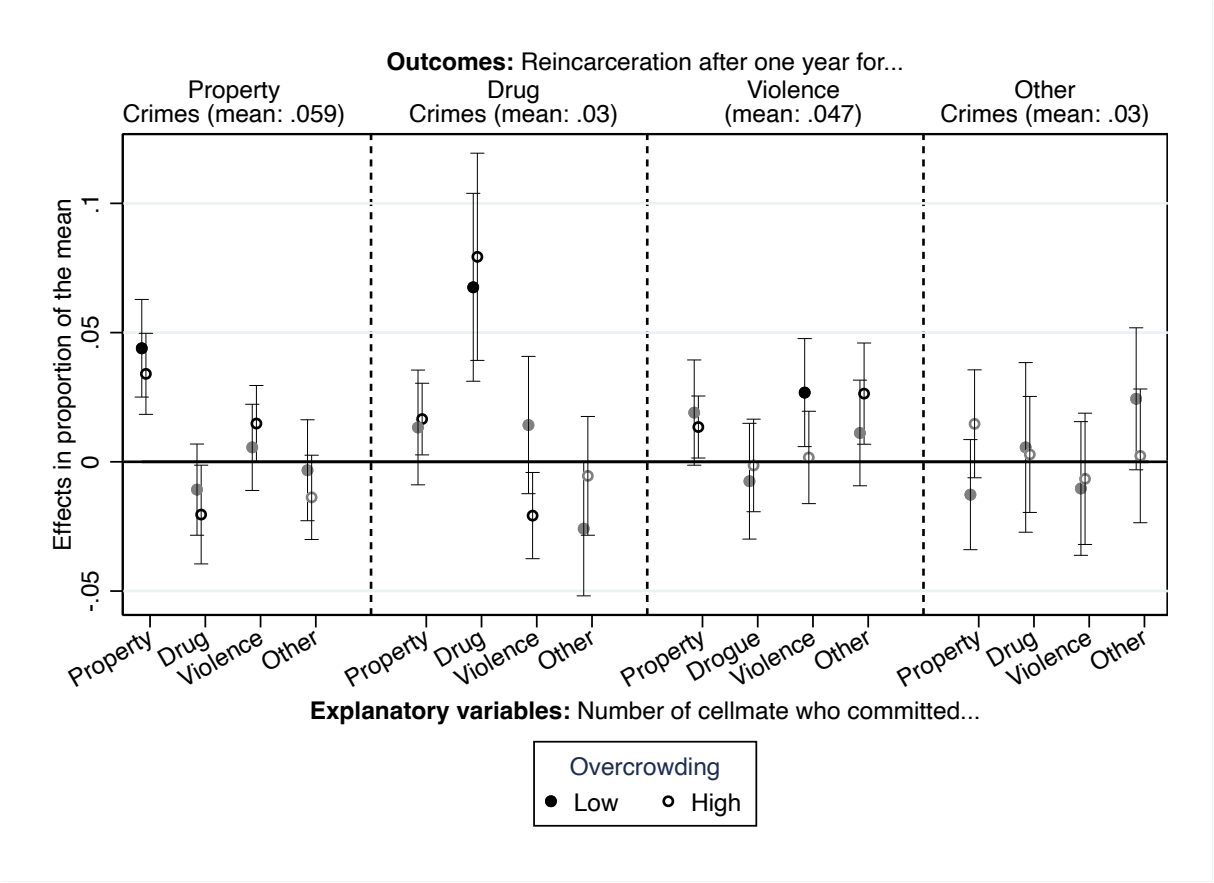
Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. Each coefficient comes from a different 2SLS regression where the relevant number of cellmates is instrumented with the number of cellmates transferred while sharing the cell (excluding transfers due to conflicts or demands). Regressions include baseline controls and controls for characteristics at entry, number of own movements, and time in cells with 2, 3, 4, or 5+ cellmates. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure B.4: *Effect of the number of cellmates of different types on re-incarceration for different crimes, Cox duration models*



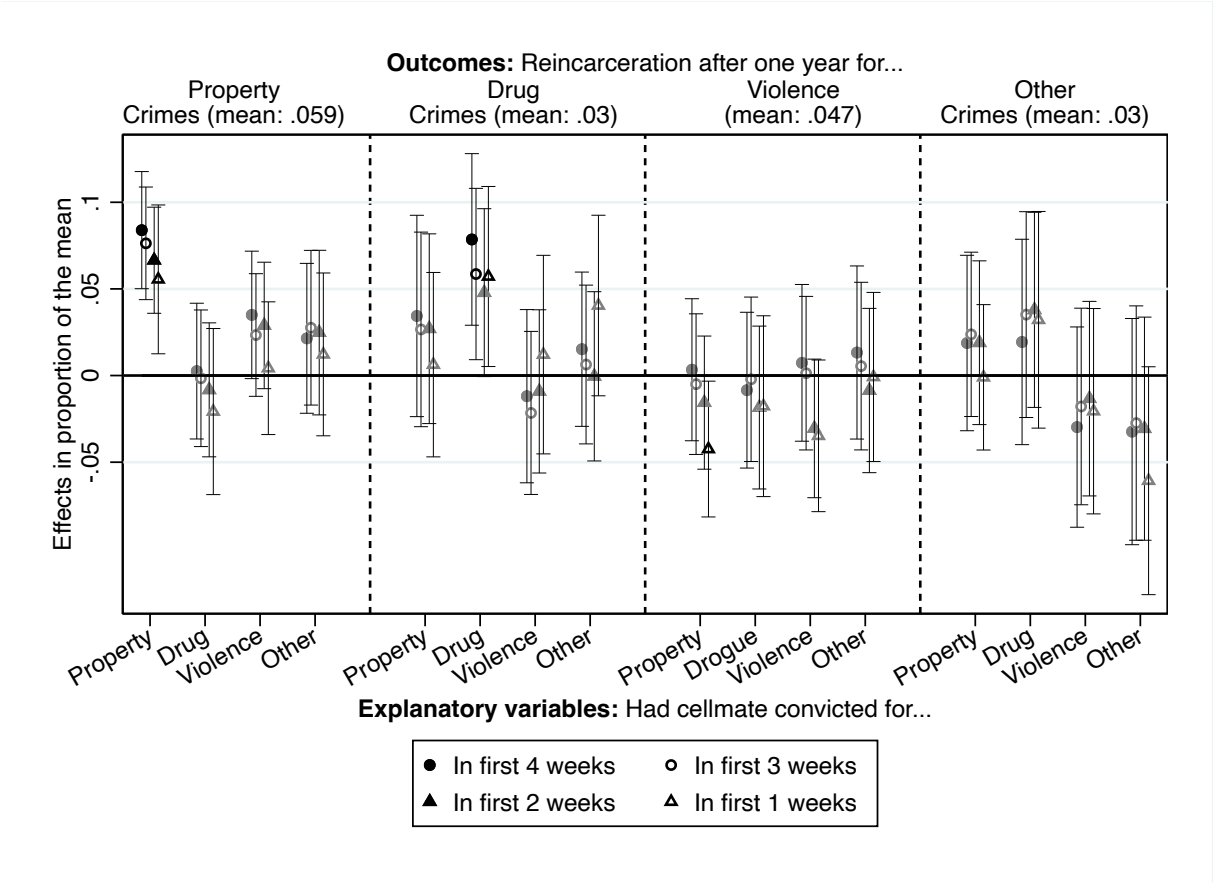
Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. Effects are measured using Cox competitive duration models, and being reincarcerated for a type of crime is considered as a right truncation when measuring the probability of being reincarcerated for other types of crime. Models include baseline controls and controls for characteristics at entry. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure B.5: *Effect of the number of cellmates of different types on re-incarceration for different crimes, difference between individuals incarcerated in prisons with high vs. low overcrowding rates*



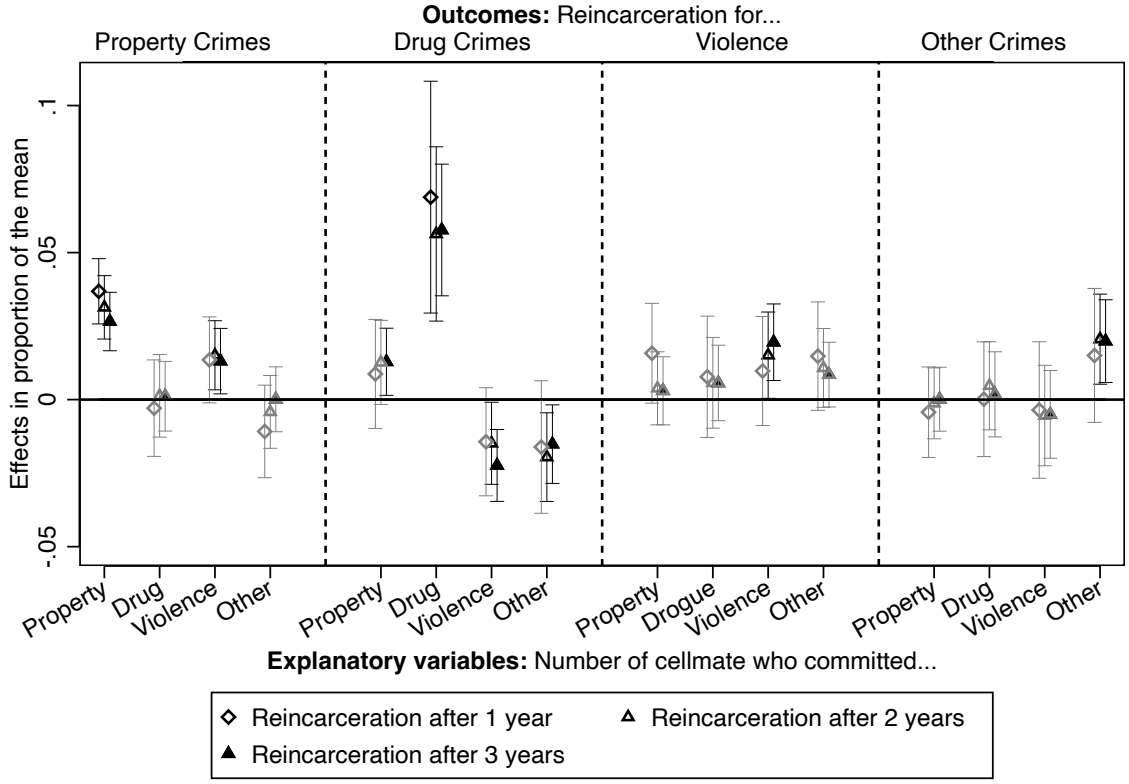
Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. The numbers of cellmates of different types are interacted with dummies for low (i.e. below the median) and high (above) overcrowding rates. Each panel present the result of a unique regression including baseline controls and controls for characteristics at entry. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure B.6: *Effect of encountering cellmates of different types in the first 4, 3, 2, or 1 weeks of incarceration spell on re-incarceration for different crimes*



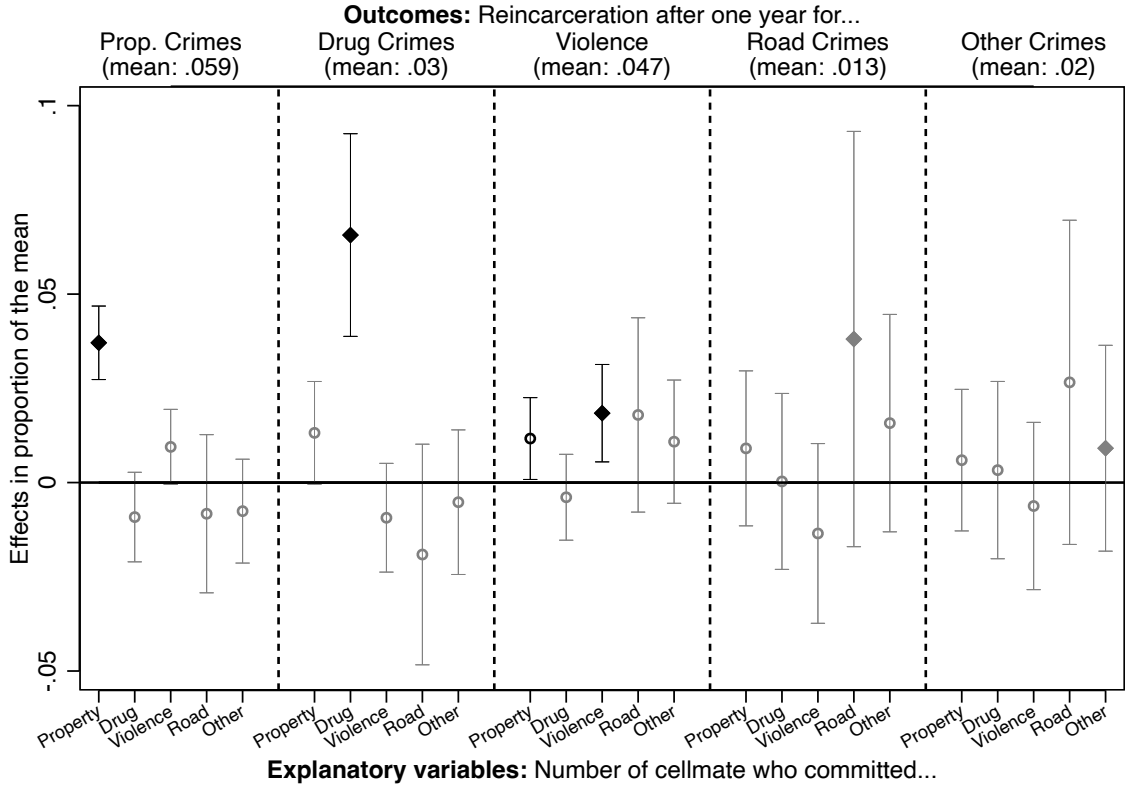
Notes: This Figure presents the effect of having at least one cellmate in a certain type period convicted for the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. There are four sets of regressions measuring the effect of cellmates encountered in the first four (plain circle), three (empty circles), two (plain triangles), one (empty triangles) weeks afetr entering in prison. Regressions include baseline controls and controls for characteristics at entry. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure B.7: *Effect of the number of cellmates of different types on re-incarceration for different crimes, variation in sample and time window*



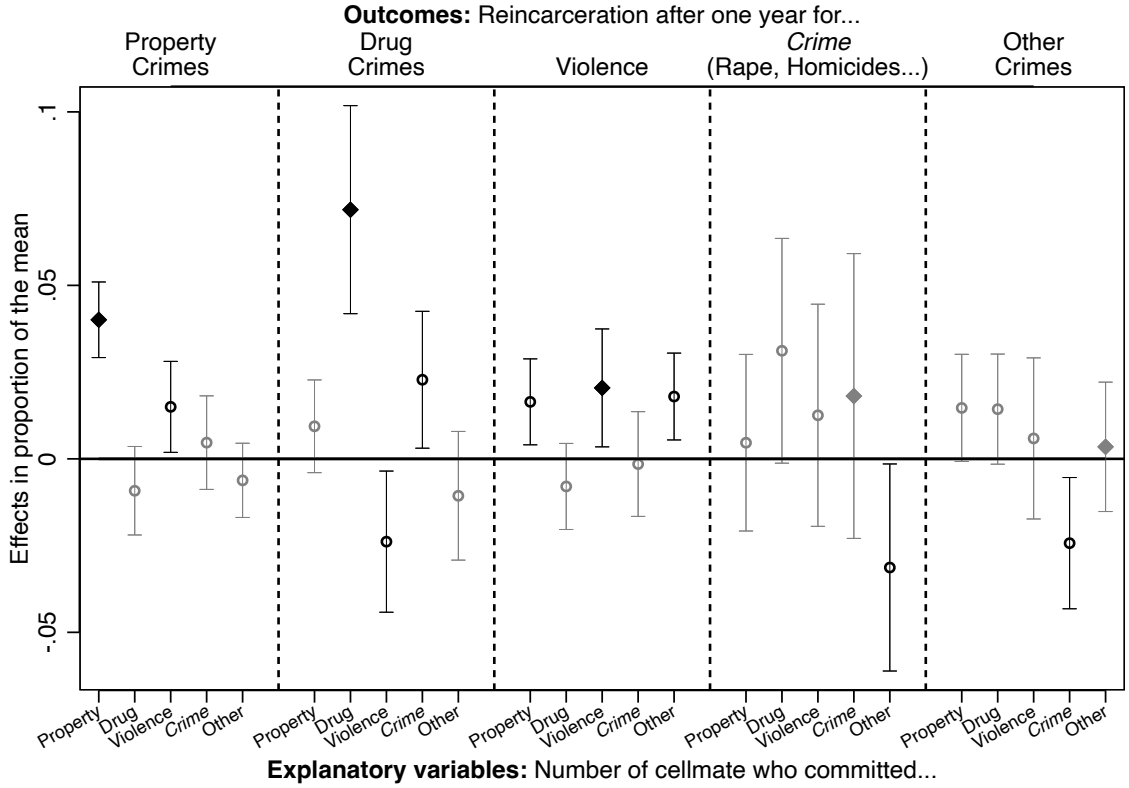
Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. There are three sets of regressions measuring the effect of cellmates on reincarceration after one (plain diamonds), two (empty triangles), or three (plain triangles) years. The sample is restricted to offenders incarcerated for a year or less. In the last series, the sample is further restricted to offenders incarcerated before December 2018. Regressions include baseline controls and controls for characteristics at entry. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure B.8: *Effect of the number of cellmates of different types on re-incarceration for different crimes, isolating road-related crimes*



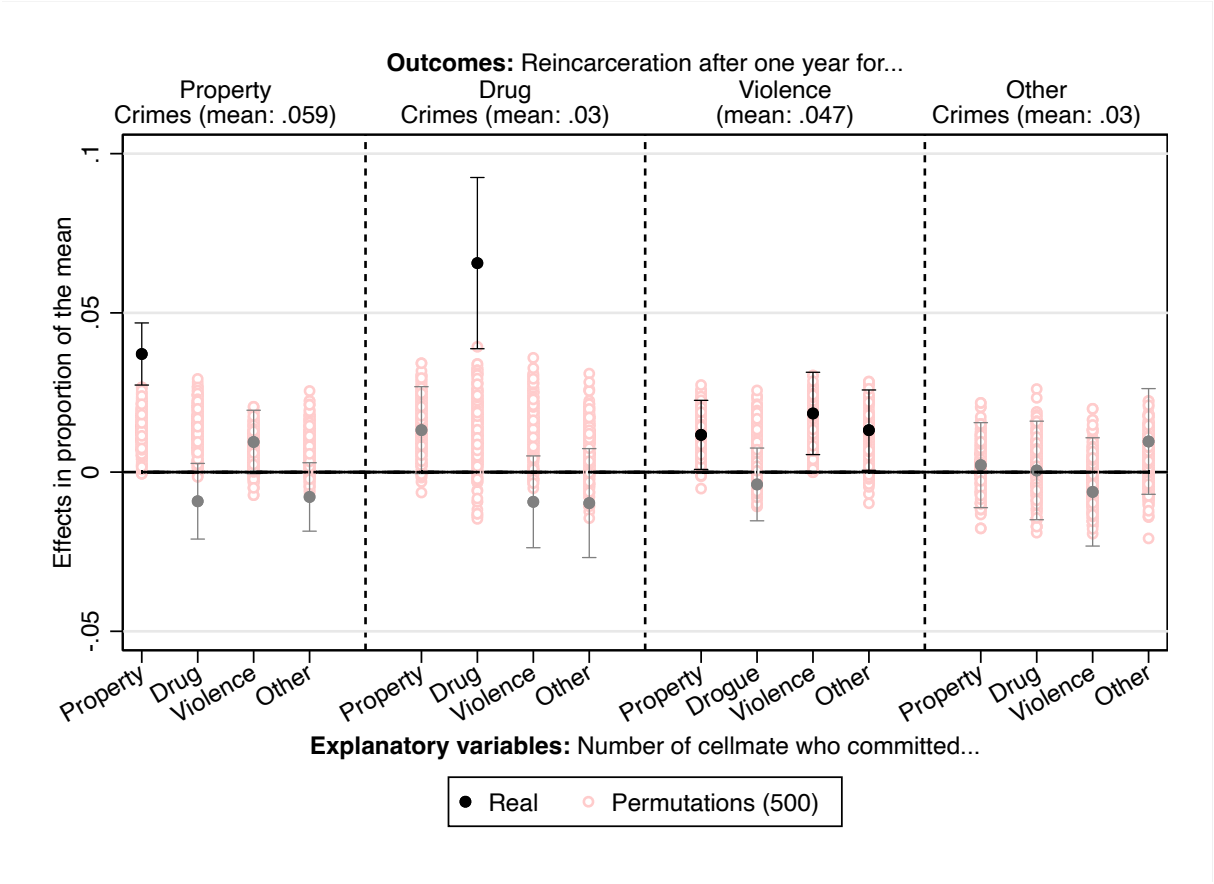
Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. Regressions include baseline controls and controls for characteristics at entry. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure B.9: *Effect of the number of cellmates of different types on re-incarceration for different crimes, isolating most severe crimes*



Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. Regressions include baseline controls and controls for characteristics at entry. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

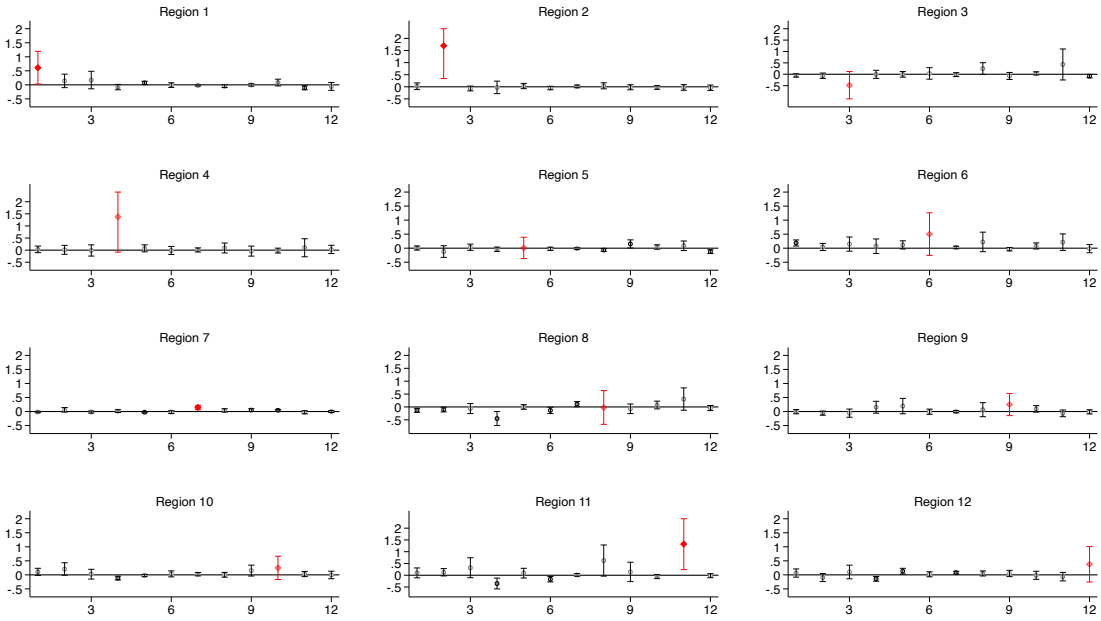
Figure B.10: *Effect of the number of cellmates of different types on re-incarceration for different crimes, permutation exercise*



Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. Estimates for "permutations" are based on 500 permutations exercises. Each time, individuals' numbers of cellmates of different types are calculated based on random re-allocation of inmates moving the same week in the same prison. Regressions include baseline controls and controls for characteristics at entry. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

C Geographical effects

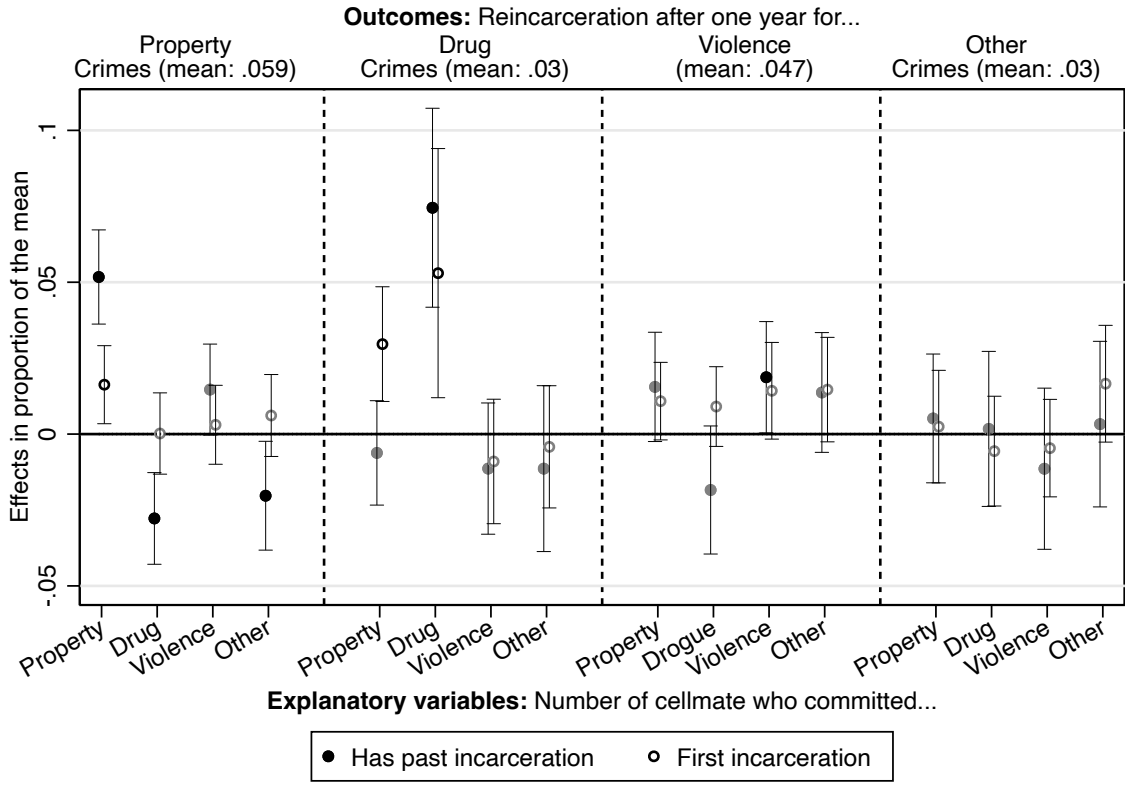
Figure C.1: *Effect of the number of cellmates from different regions re-incarceration after 1 year by region*



Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year in the region indicated in the header. Each sub-graph presents the results from one regression that includes baseline controls for characteristics observed at the entry into prison. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

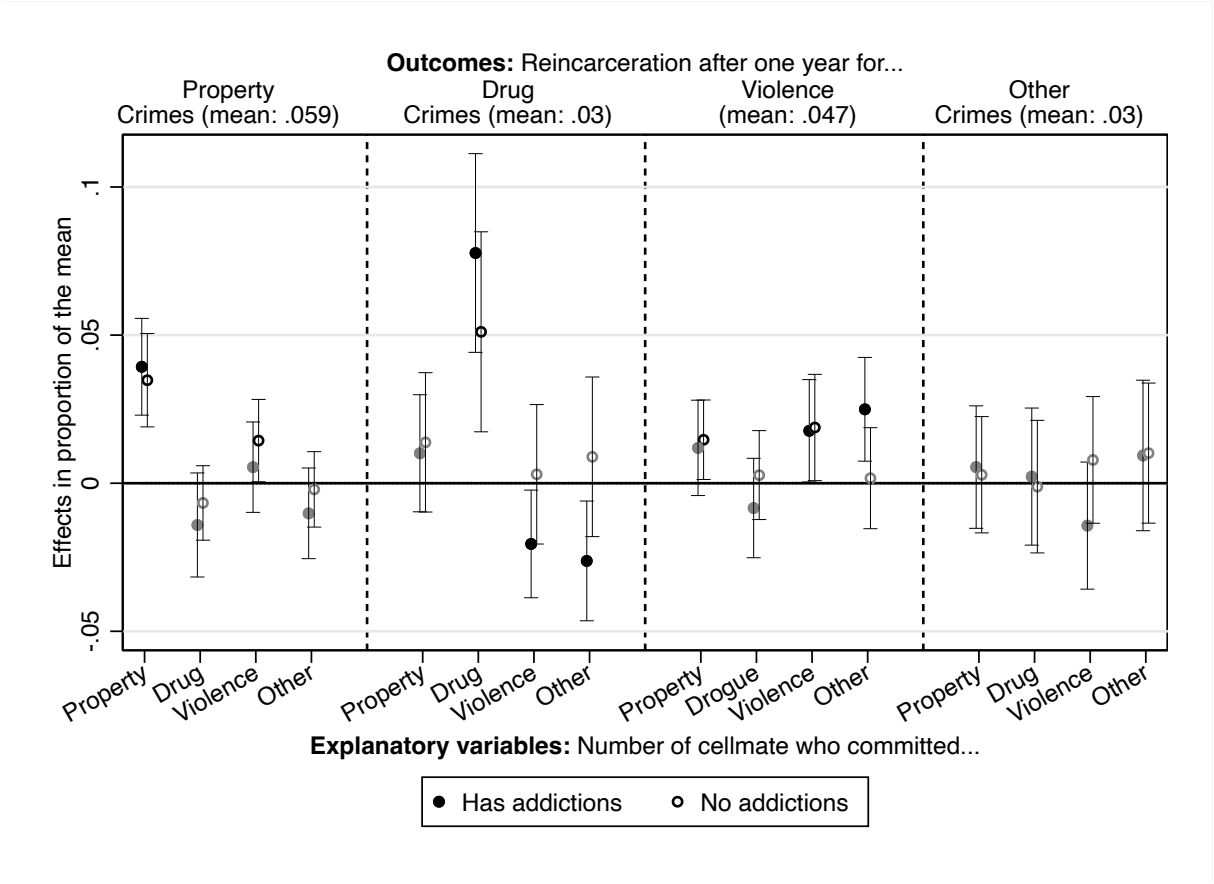
D Heterogeneity among inmates

Figure D.1: *Effect of the number of cellmates of different types on re-incarceration for different crimes, by past incarceration*



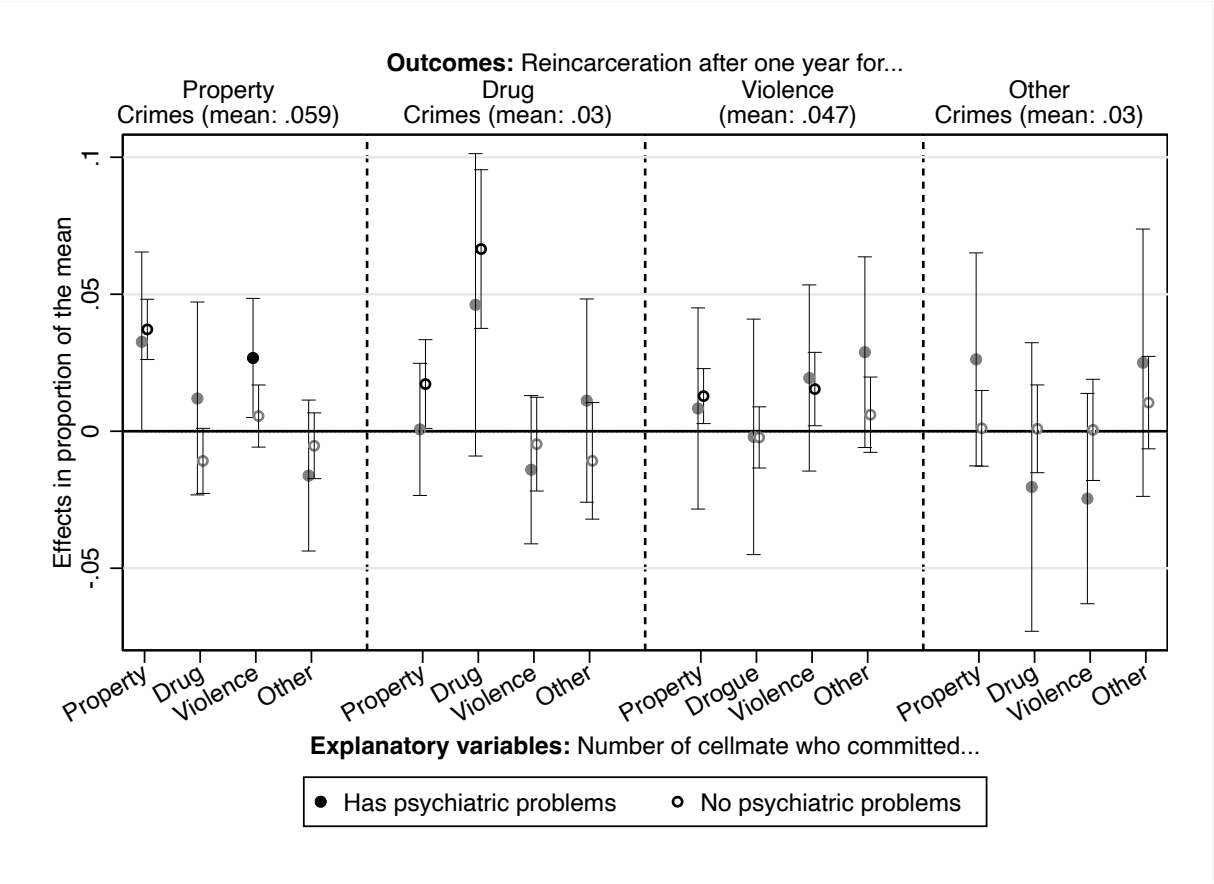
Notes:

Figure D.2: *Effect of the number of cellmates of different types on re-incarceration for different crimes, inmates suffering from addictions or not*



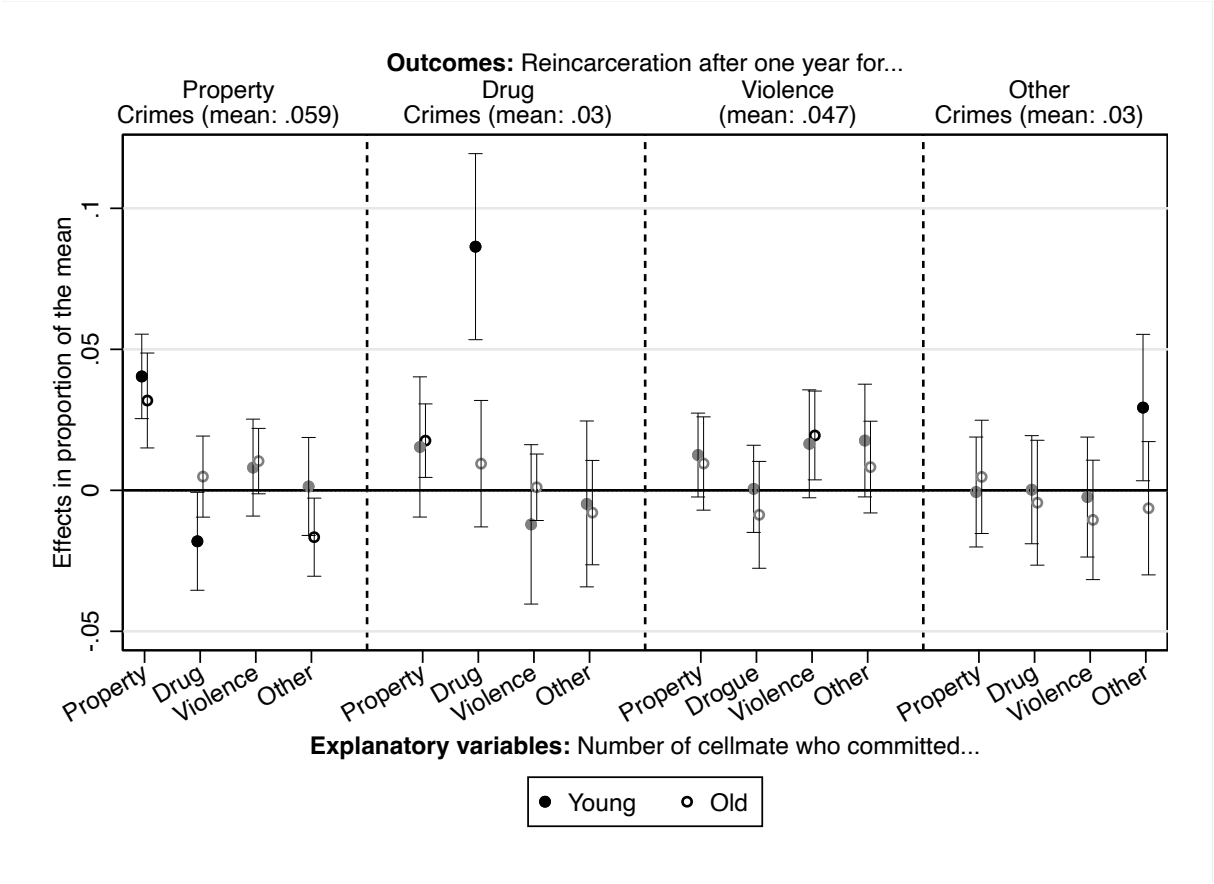
Notes:

Figure D.3: *Effect of the number of cellmates of different types on re-incarceration for different crimes, inmates having past mental health issues or not*



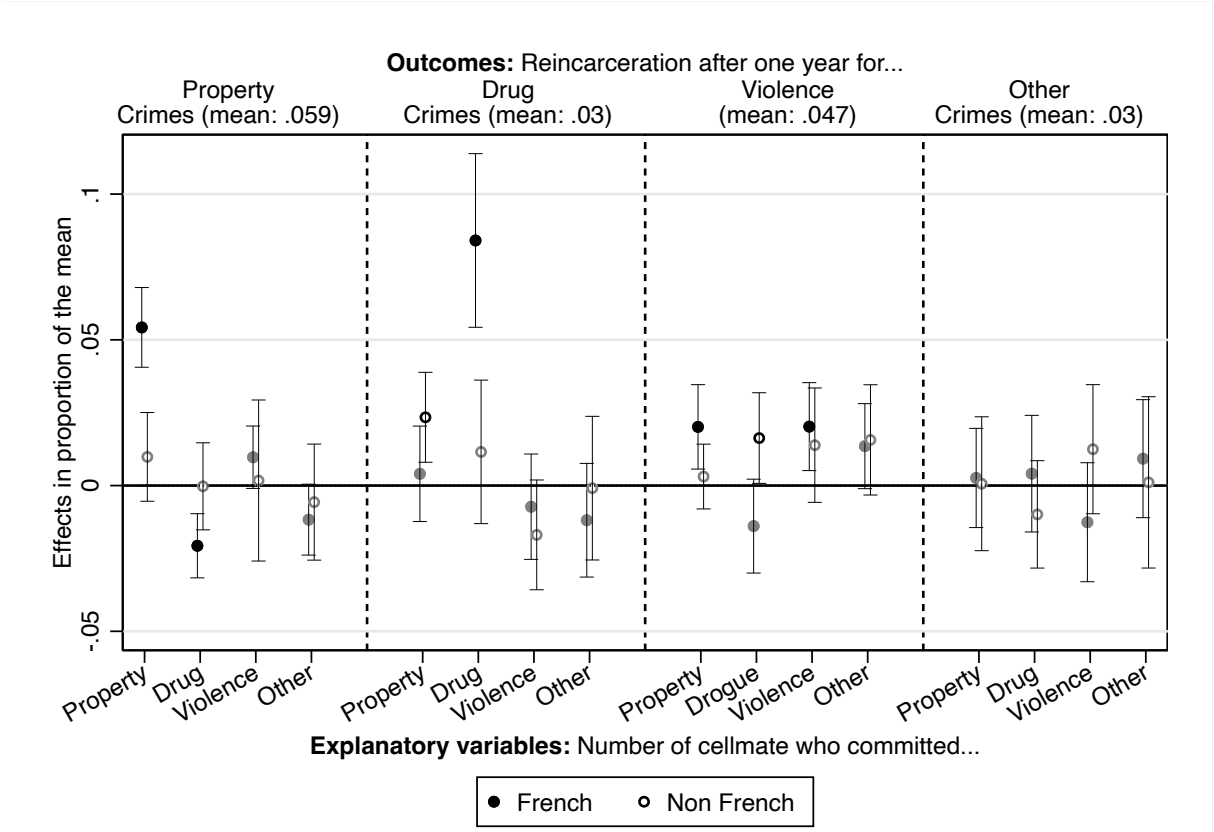
Notes:

Figure D.4: *Effect of the number of cellmates of different types on re-incarceration for different crimes, by age*



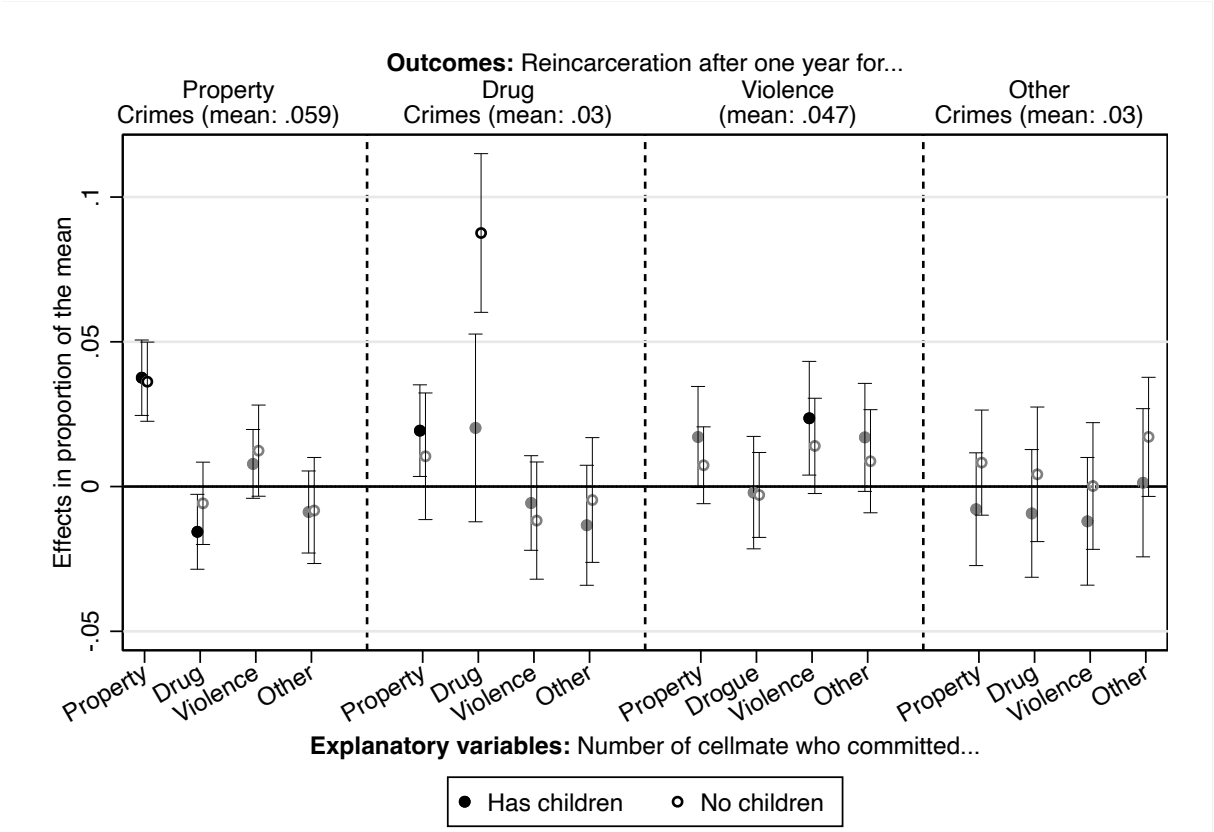
Notes:

Figure D.5: *Effect of the number of cellmates of different types on re-incarceration for different crimes, French vs. non-French*



Notes:

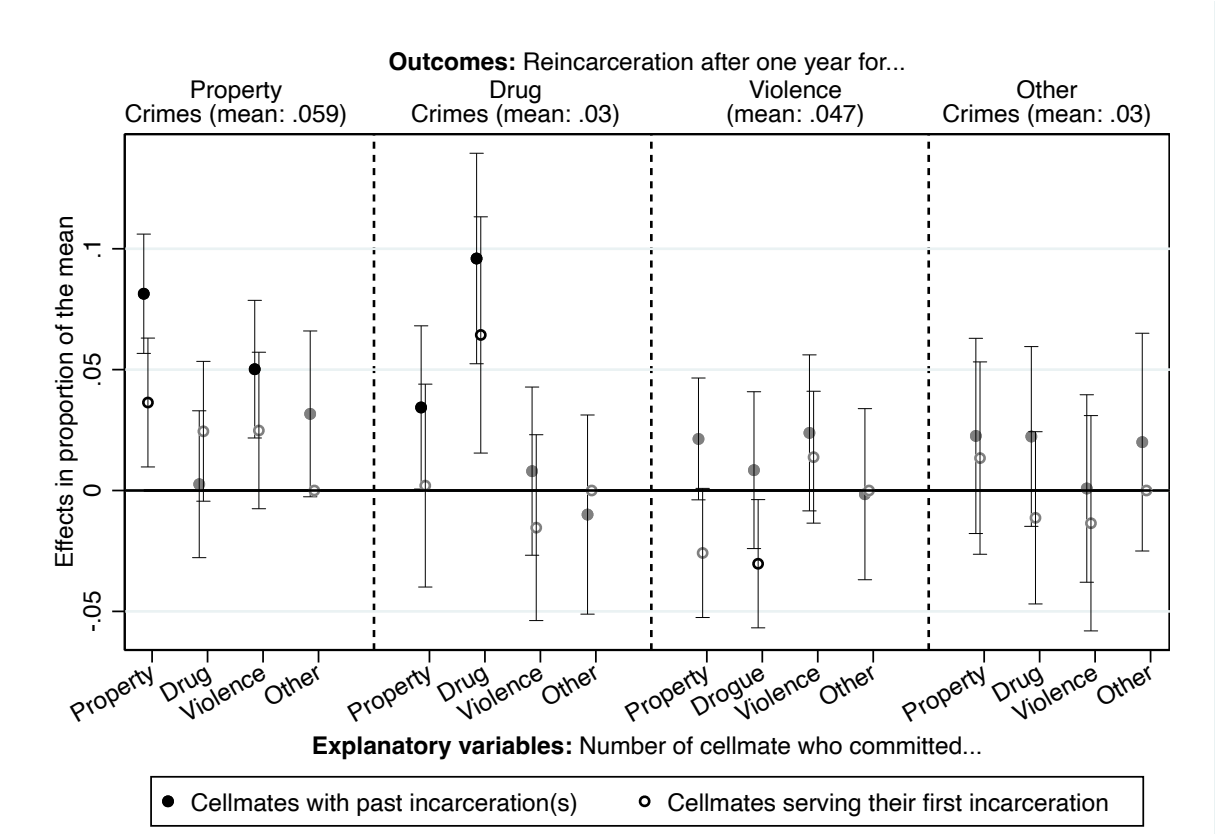
Figure D.6: *Effect of the number of cellmates of different types on re-incarceration for different crimes, inmates having children or not*



Notes:

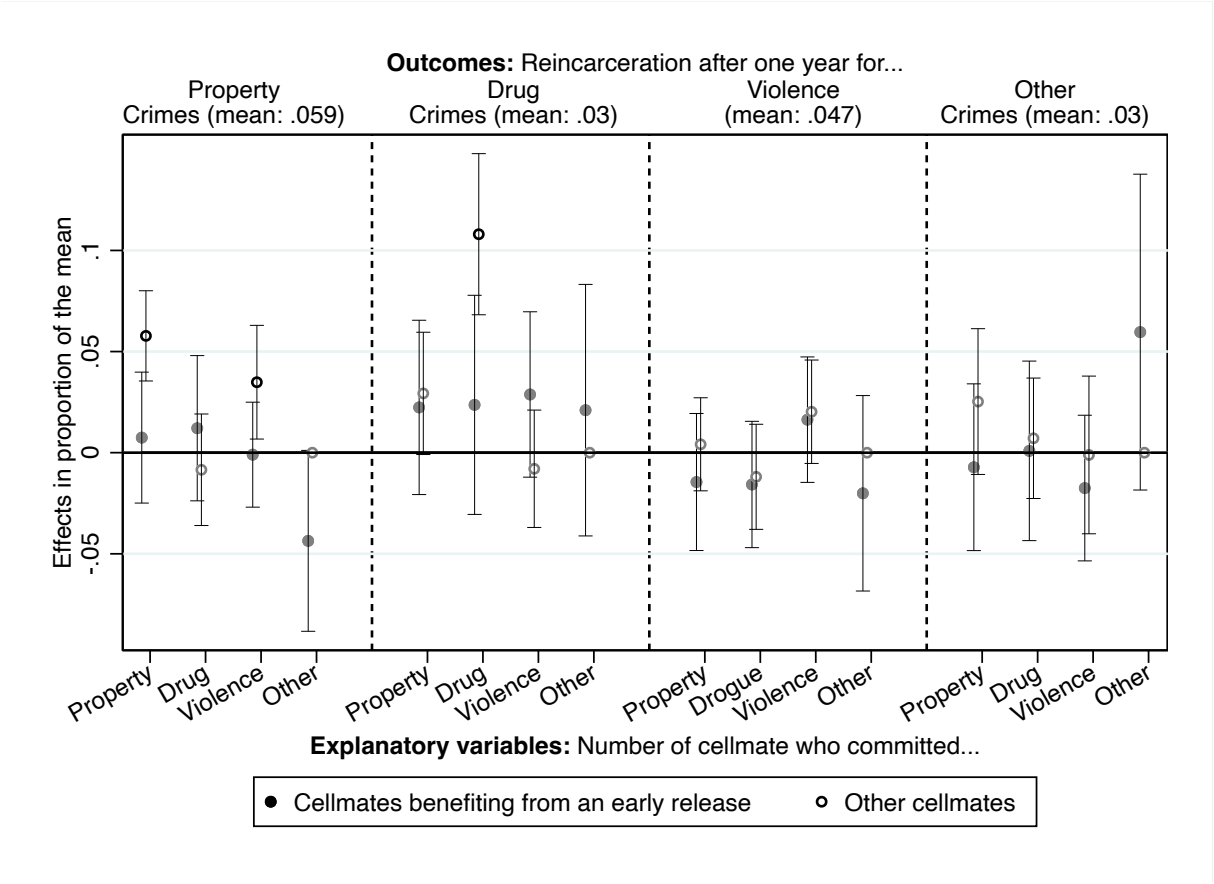
E Heterogeneity among cellmates

Figure E.1: *Effect of the number of cellmates with or without past incarceration on re-incarceration for different crimes*



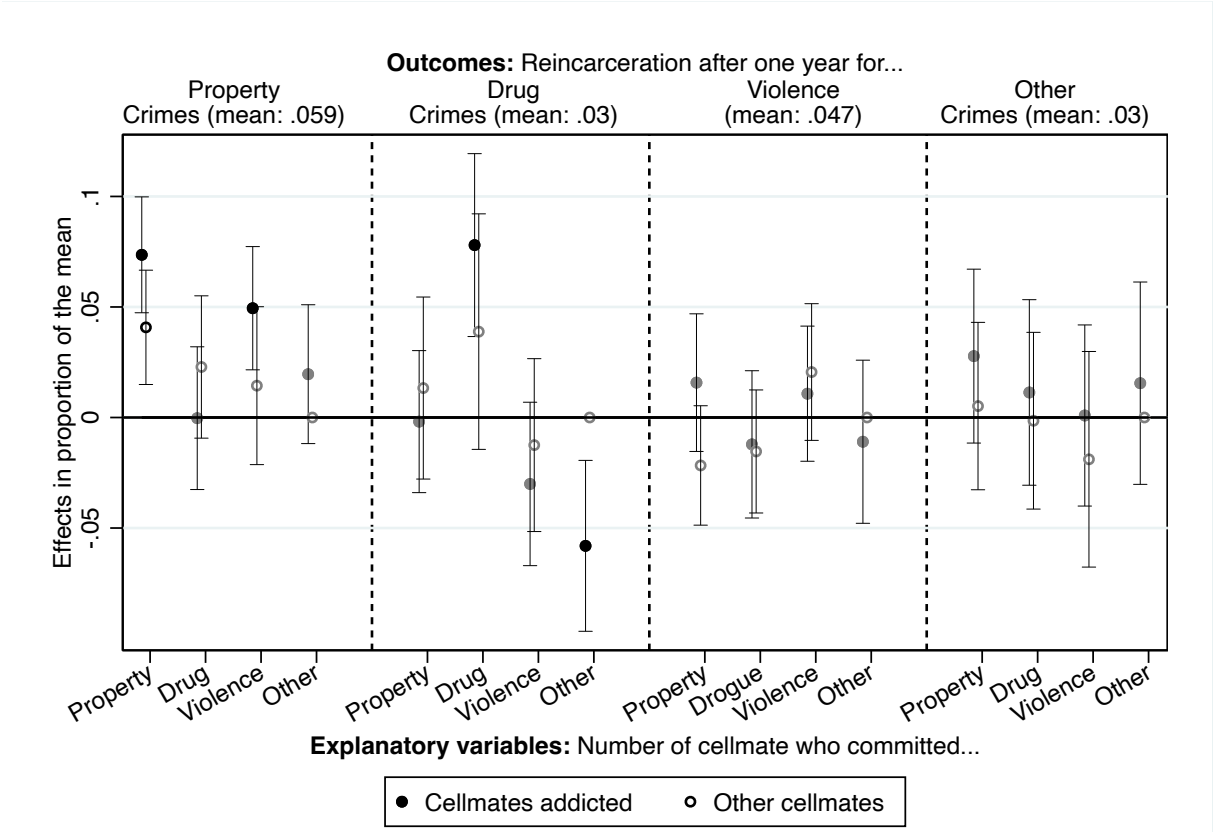
Notes:

Figure E.2: *Effect of the number of cellmates benefiting from an early release or not on re-incarceration for different crimes*



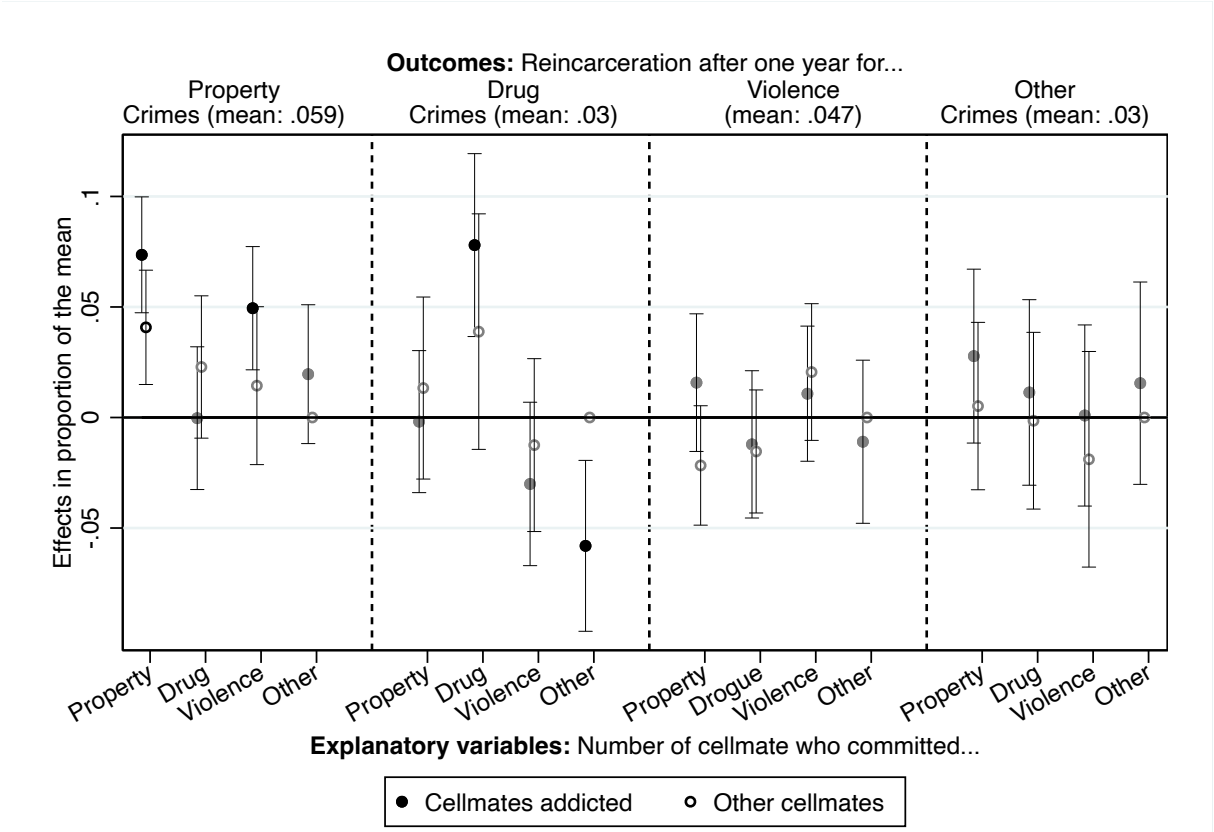
Notes:

Figure E.3: *Effect of the number of cellmates with addiction problems or not on re-incarceration for different crimes*



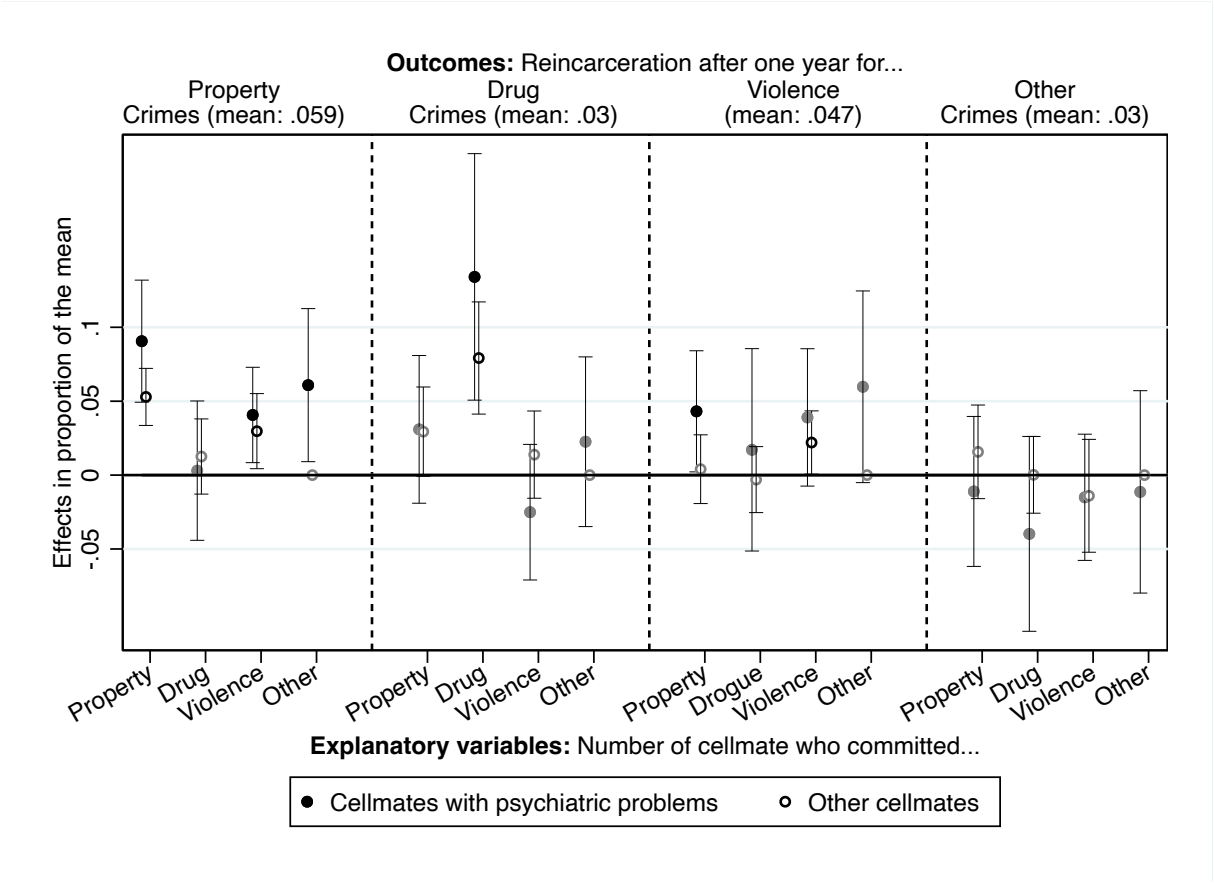
Notes:

Figure E.4: *Effect of the number of cellmates with addiction problems or not on re-incarceration for different crimes*



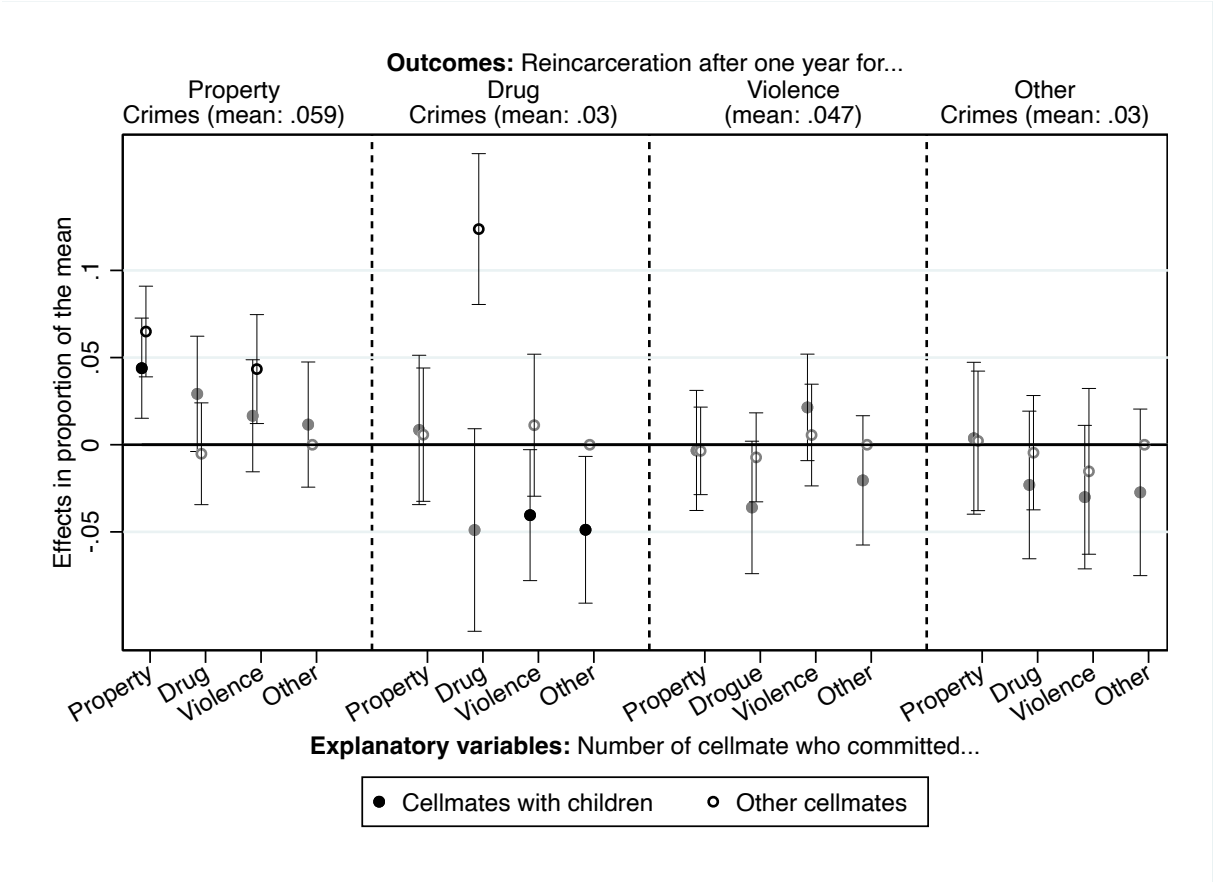
Notes:

Figure E.5: *Effect of the number of cellmates with past mental health issues or not on re-incarceration for different crimes*



Notes:

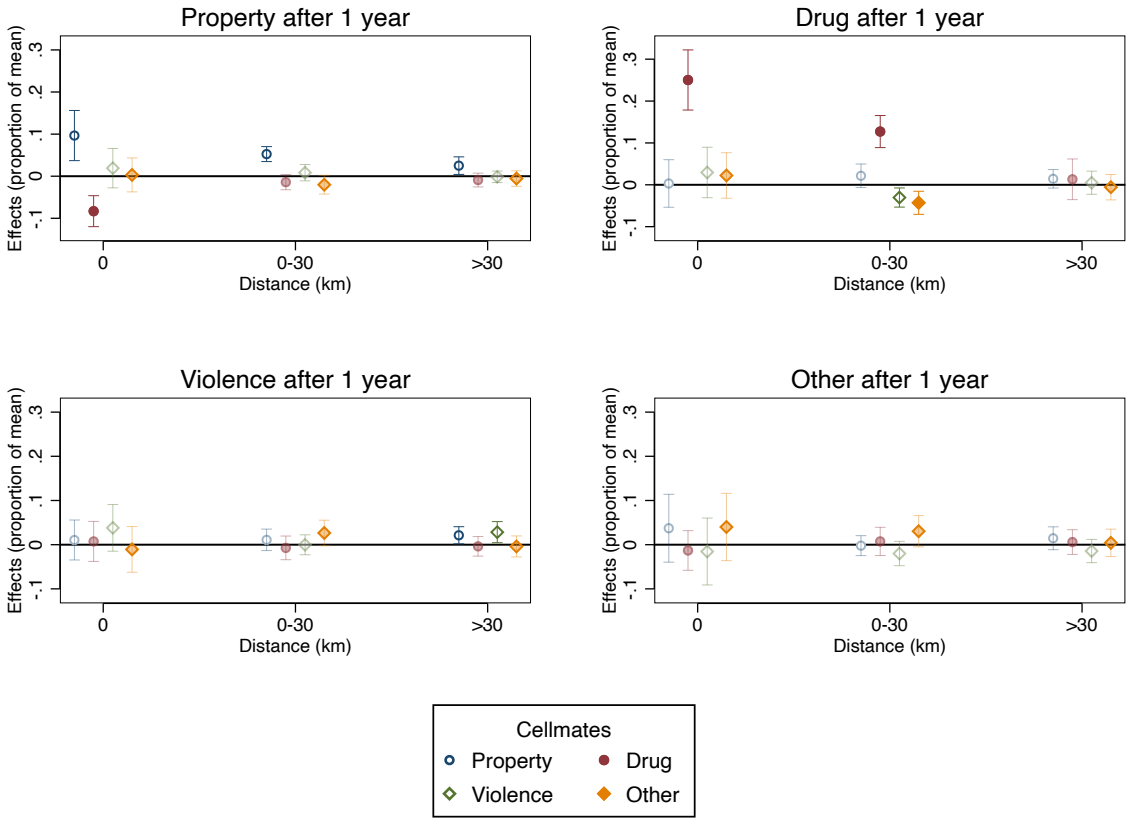
Figure E.6: *Effect of the number of cellmates with children or not on re-incarceration for different crimes*



Notes:

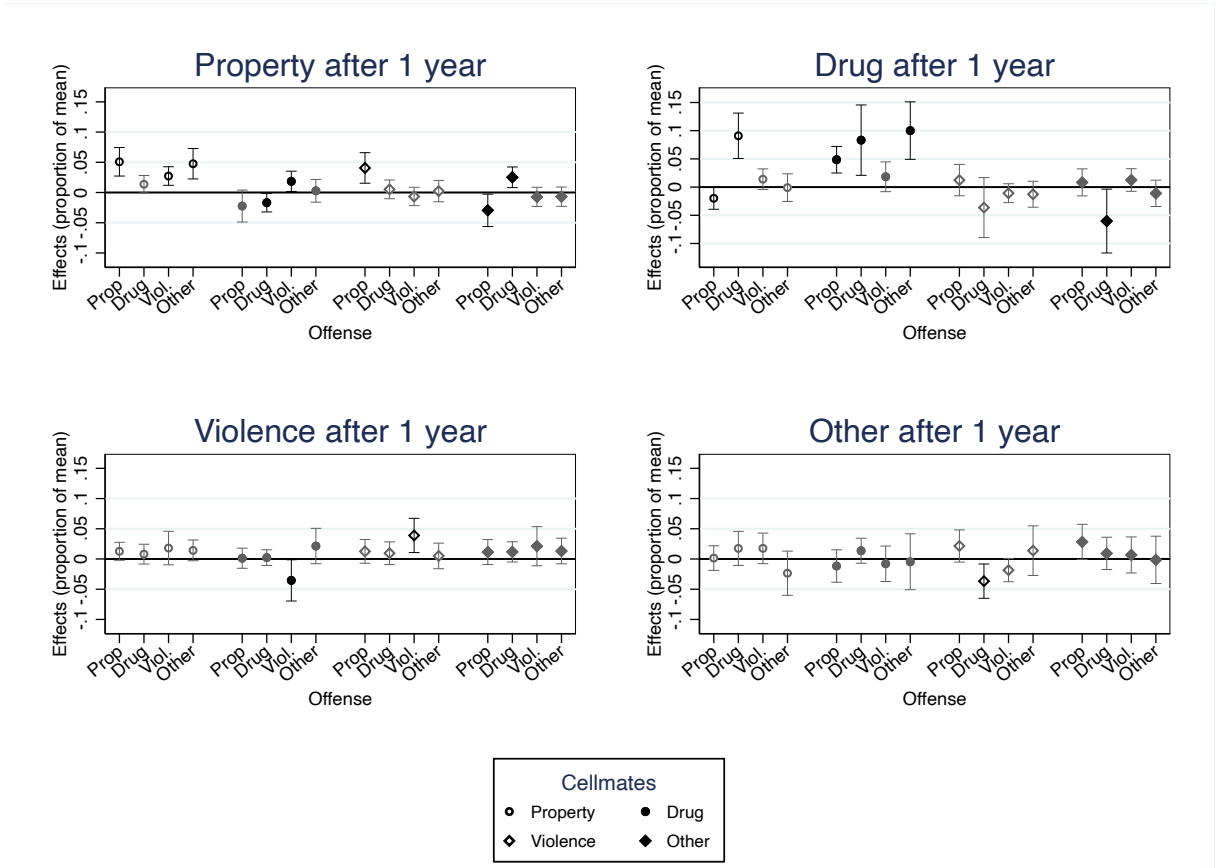
F Heterogeneity

Figure F.1: *Effect of the number of cellmates of different types on re-incarceration for different crimes, by distance*



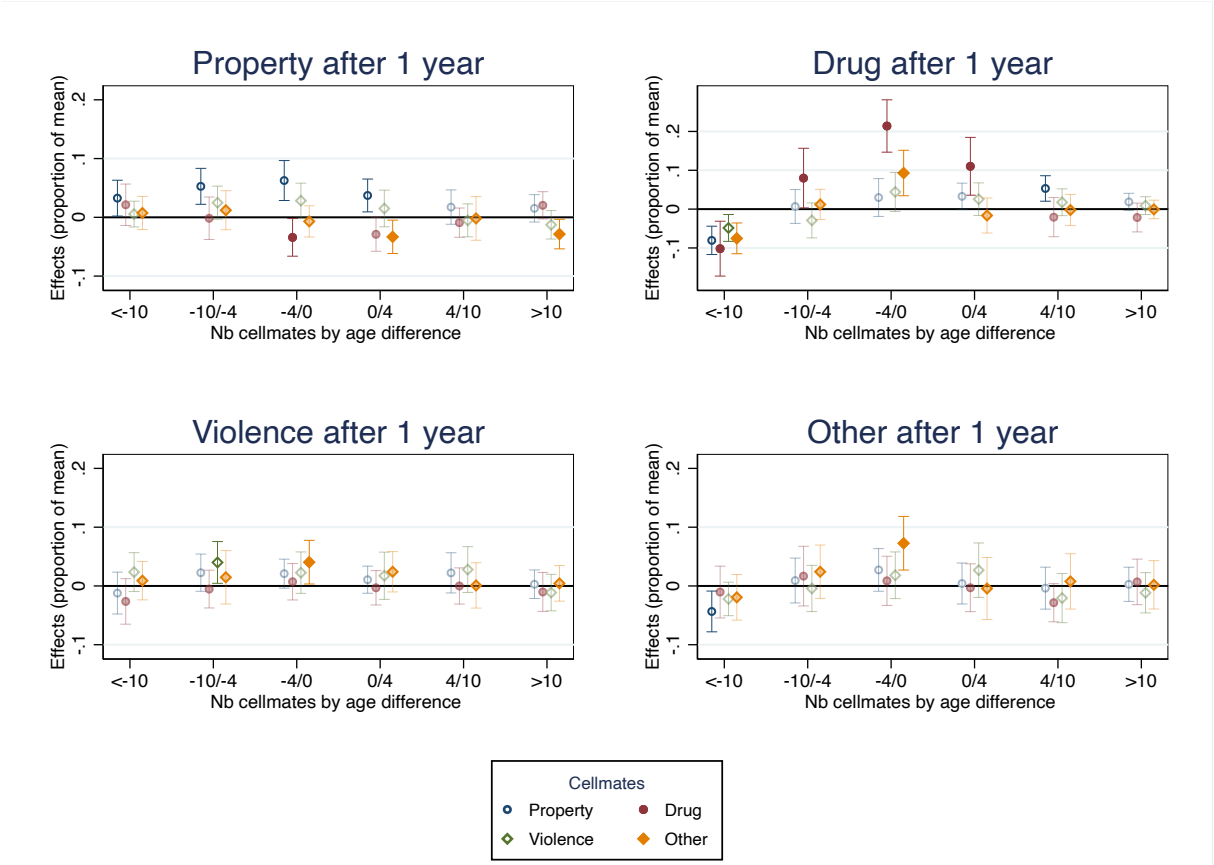
Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for a crime of the type indicated in the header. Each sub-graph presents the results from one regression that includes baseline controls for characteristics observed at the entry into prison. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure F.2: *Effect of the number of cellmates of different types on re-incarceration for different crimes, depending on own crime type*



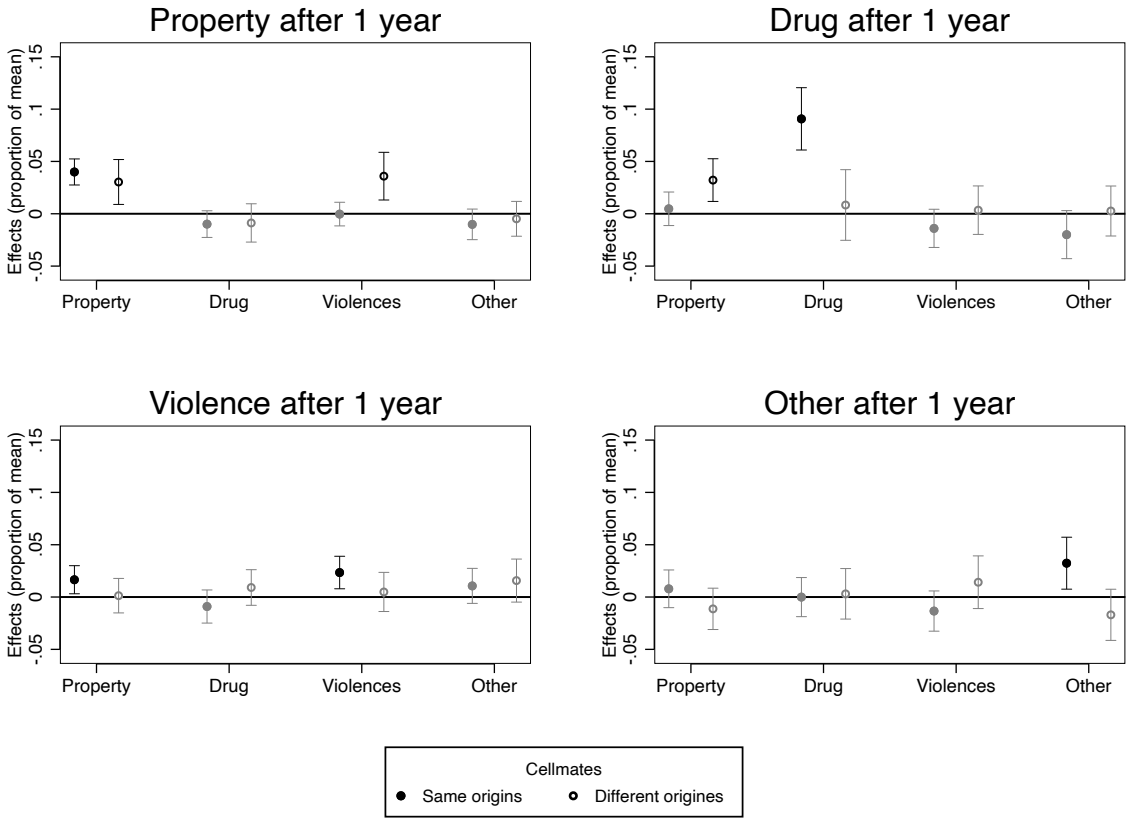
Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. Coefficients from three sets of four regressions (one per type of re-incarceration) are presented. The first set – whose coefficients are presented with black dots – includes baseline controls for characteristics observed at the entry in prison. The second set – whose coefficients are presented with empty dots – includes baseline controls plus fixed effects for the number of cellmates encountered in prison. Lastly, the third set – whose coefficients are presented with black triangles – includes baseline controls, fixed effects for the number of cellmates encountered in prison, and controls for the time spent with cellmates of each type. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure F.3: *Effect of the number of cellmates of different types on re-incarceration for different crimes, heterogeneity by age difference*



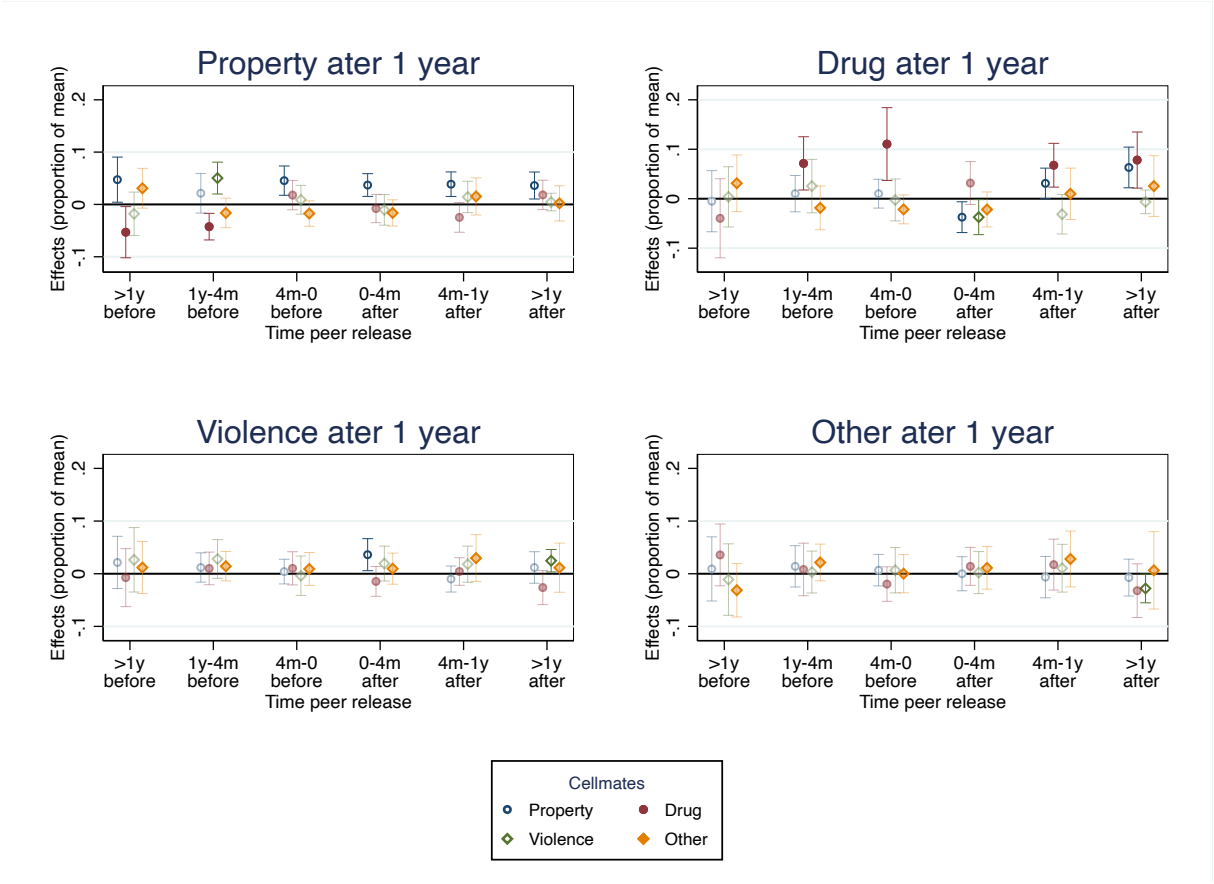
Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. Coefficients from three sets of four regressions (one per type of re-incarceration) are presented. The first set – whose coefficients are presented with black dots – includes baseline controls for characteristics observed at the entry in prison. The second set – whose coefficients are presented with empty dots – includes baseline controls plus fixed effects for the number of cellmates encountered in prison. Lastly, the third set – whose coefficients are presented with black triangles – includes baseline controls, fixed effects for the number of cellmates encountered in prison, and controls for the time spent with cellmates of each type. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure F.4: *Effect of the number of cellmates of different types on re-incarceration for different crimes, heterogeneity by origin*



Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. Coefficients from three sets of four regressions (one per type of re-incarceration) are presented. The first set – whose coefficients are presented with black dots – includes baseline controls for characteristics observed at the entry in prison. The second set – whose coefficients are presented with empty dots – includes baseline controls plus fixed effects for the number of cellmates encountered in prison. Lastly, the third set – whose coefficients are presented with black triangles – includes baseline controls, fixed effects for the number of cellmates encountered in prison, and controls for the time spent with cellmates of each type. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.

Figure F.5: *Effect of the number of cellmates of different types on re-incarceration for different crimes, heterogeneity by date of release*



Notes: This Figure presents the correlation between the number of cellmates convicted of the type of crime indicated in the x-label and re-incarceration after 1 year for the type of crime indicated in the header. Coefficients from three sets of four regressions (one per type of re-incarceration) are presented. The first set – whose coefficients are presented with black dots – includes baseline controls for characteristics observed at the entry in prison. The second set – whose coefficients are presented with empty dots – includes baseline controls plus fixed effects for the number of cellmates encountered in prison. Lastly, the third set – whose coefficients are presented with black triangles – includes baseline controls, fixed effects for the number of cellmates encountered in prison, and controls for the time spent with cellmates of each type. Bars represent the 95% confidence intervals. Standard errors are clustered at the prison level.