

Deal Drugs Once, Deal Drugs Twice: Peer Effects on Recidivism from Prisons*

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Abstract—Given its illegal nature, criminal activity is likely to be learned through social interactions. This study investigates the effects of other inmates' criminal background on crime-specific recidivism among young adults incarcerated for the first time. For drug offenders we find robust evidence that exposure to other young drug offenders while serving time increases the probability of recidivism with a drug-related offense within one year, i.e., reinforcing peer effects for drug criminals. By contrast, we find little evidence of peer influence for other types of crimes. We also provide evidence that inmates sort into networks in the facilities by age: when defining peers as inmates of similar age we find strong evidence of reinforcing peer effects, whereas we find little evidence of peer effects when defining peers as all inmates, irrespective of their demographic characteristics. Due to network sorting, the definition of the peer group is of key importance for testing the existence and magnitude of peer effects in prisons.

Keywords: crime, peer effects, young offenders, prisons

JEL Classification codes: K4, J10

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Crime yields high social costs (for US evidence, see, e.g., Anderson, 1999). There is extensive evidence that the tendency to commit crime is much higher for men and peaks in late adolescence and early adulthood (Hirschi and Gottfredson, 1983; Greenberg, 1985; Hirschi and Gottfredson, 1985; Steffensmeier et al., 1989; Andersen and Tranæs, 2011). Given its illegal nature, criminal activity is likely to be learned within social networks and through peer interactions.¹ Previous findings document the importance of social networks in determining criminal activity (Case and Katz, 1991; Reiss, 1988; Glaeser et al., 1996; Ludwig et al., 2001; Kling et al., 2005).

Few studies, however, estimate a causal relationship between peer interactions and criminal behavior. Notable exceptions are Ludwig and Kling (2007), Damm and Dustmann (2013), Bayer, Hjalmarsson and Pozen (2009), and Drago and Galbiati (2012).² Exploiting the Moving-To-Opportunities Demonstration in five American cities, Ludwig and Kling (2007) find no effect of neighborhood crime—measured by the number of committed violent crimes reported in the police beat per 10,000 inhabitants—on juvenile arrests for violence. Exploiting quasi-random assignment of refugees across Danish municipalities, Damm and Dustmann (2013) find no effect of neighborhood crime—measured by the rate of committed violent crimes—on juvenile delinquency. However, they argue that the share of criminals among youth in the neighborhood, i.e., the youth crime conviction rate in the neighborhood, better accounts for social interactions with delinquent peers living in the neighborhood. Using this measure of neighborhood crime, they establish a causal relationship between growing up in a highly criminal neighborhood and male juvenile delinquency. Furthermore, they find that the youth crime conviction rate of individuals from the same ethnic group living in the neighborhood matters more than the overall youth crime conviction rate in the neighborhood.

A context which is even more suitable than neighborhood to study peer effects on crime is one where all individuals (with the exception of individuals in custody) are criminals, i.e., a prison. Yet, studying peer effects from prison require individual data on inmates. Exploiting exogenous assignment of individuals to inmate groups across correctional facilities for juveniles in Florida, Bayer et al. (2009) show that juveniles acquire and even strengthen criminal capital behind bars due to peer effects. In particular, a juvenile who serves time with juvenile offenders with similar criminal background is more likely to recidivate with the same type of offense. Another study on

¹ See also, e.g., the pioneer works of Becker (1968) on the determinants of criminal behavior and Freeman (1999) for an extensive literature review.

² Another recent study (Corno, 2012) brings evidence that peers affect criminal behavior among the homeless. Corno directly observes individuals' friends networks and, using the share of rainy days and the fraction of inmates released during one's homelessness as instrumental variables, identifies strong peer effects: The probability of arrest of the homeless increases by 20 percentage points when acquainting other homeless people with a criminal record.

prison inmates by Drago and Galbiati (2012) exploits a pardon policy in Italy, which consists in releasing 40% of the national prison population and using the residual sentence as an extra punishment in case of reoffending. Although they have individual data for inmates, the setting of the Drago and Galbiati (2012) is slightly different from that of the other studies of peer effect on crime as they identify the indirect effect of peers' residual sentence at time of pardon on the probability of individual recidivism. The authors find evidence of peer effects and estimate a social multiplier of two, then bringing support for both a direct and an indirect effect of the pardon on reducing individual crime.

Our study investigates whether young adults acquire criminal capital in sentencing facilities due to peer effects. Suppose two incarcerated individuals who have the same criminal background, say in drug-related offenses, and the same socioeconomic background and serve time in the same facility, but do not have the exact same date of incarceration or date of release. In that case the two individuals may be exposed to different shares of drug offenders among inmates; this difference enables us to test whether a higher share of drug offenders among inmates increases the individual's probability of recidivism with a drug crime. However, we shall use facility-by-prior-offense fixed effects to deal with possible non-randomness in prison assignment and identify peer effects from the random variation in the duration of time-serving overlap between each pair of inmates in a facility as in Bayer et al. (2009). The advantage of extracting a sample of young adults is that they serve time in regular prisons, that is, the inmates differ not only in terms of criminal background but also in terms of demographic characteristics like age, ethnicity and county of residence. We expect young offenders to have more social interactions with inmates from the same age group, ethnic group, or county of residence. In other words, following our earlier example, we expect the share of drug offenders among inmates with similar age and/or ethnicity to have a larger effect on the individual's probability of recidivism with, say drug crime, than the share of, say drug offenders, among inmates in general. If our hypothesis holds, a policy that groups inmates with similar criminal background and demographic characteristics may have the unintended effect of increasing exposure to peers who can facilitate a criminal career. To test this hypothesis we use a number of alternative peer definitions. We define peers as other inmates: (1) from the same age group (below the age of 26); (2) from the same ethnic group (Western vs. non-Western); (3) from the same age and ethnic groups; (4) from the same age group and the same county; (5) above age 26; (6) irrespective of demographic characteristics.

Our study adds to the peer effects literature in general and to the scant literature on peer effects in prisons in particular. It adds to the peer effects literature in general by providing further evidence that individuals sort into networks, highlighting the importance of defining peers appropriately in studies of peer effects. Moreover, it adds to the scant literature on peer effects in prisons in at least two ways. First, this study is the first to estimate peer effects in prisons for *young adults* (aged 18-22) and the first study to examine peer effects in prisons in a non-US context. To this end we use unique data: linked Danish administrative and crime registers for the entire population and all sentencing institutions in Denmark over a ten year-period. Young inmates in Denmark are offered different training programs while incarcerated, ranging from anger management programs to formal education. Upon release, they can benefit from a more accessible educational system and different labor market opportunities and policies easing reinsertion in the society and preventing new criminality.³ Second, our unique data allow us to shed more light on the nature of the peer influence and, more precisely, the following question: Does exposure to a given type of criminals in the peer group in prison affect the individual's probability of recidivism with that type of crime due to information spill over ("social learning", "network as resources") and social norms spill over ("peer effects", "role models", "social influence")?⁴ To shed light on the channel by which peer effects operate in prisons, we examine whether peers' influence on recidivism depends on the type of sentencing institution—open, closed, or local prison, whether peer effects are stronger for inmates with relatively long sentences, whether peer effects are short-lived, and whether former inmates get convicted for a joint crime after release.

Using a unique person identifier, we link records on incarceration, charges, and convictions for the entire Danish population from the Central Police registers with Danish administrative registers. To ensure that any peer effect reflects true criminal capital transmission behind bars and is not due to past incarceration, we extract a sample of individuals incarcerated for the first time at age 18 to 22 between 1994 and 1997 and look at their criminal convictions within one, two, and three years after release.⁵ We distinguish six representative types of offense: misdemeanor assault, burglary, theft, handling of stolen goods, vandalism, and drug-related offenses.

³ Damm and Dustmann (2013) provide suggestive evidence for young refugees in Denmark that a criminal record has little effect on educational attainment by age 25 but lowers the employment probability by that age.

⁴ For theoretical analyses, see Banerjee (1992) and Bikhchandani, Hirshleifer and Welch (1992) for the informational channel and Akerlof (1980) for the norms channel.

⁵ In Denmark, the minimum age of criminal responsibility was 15 until July 2010 (where it was sunk to 14). Denmark has no juvenile justice system: Persons aged 15 and above are sentenced in the same courts as adults and in accordance with the same criminal code (Kyvsgaard, 2004). However, most juveniles convicted of an unconditional sentence serve time in a half-way house (pension in Danish). Unfortunately, the central Police registers have no information about incarcerations in half-way houses before 2007. Therefore, we exclude juvenile offenders from our sample.

For drug criminals we find strong evidence that peer exposure increases the probability of recidivism with a drug-related offense (i.e., reinforcing peer effects) when we define peers as other inmates from the same age group or from the same age and ethnic groups. By contrast, this reinforcing effect of exposure to drug offenders turns insignificant when we define peers as older inmates or as all other inmates irrespective of demographic characteristics. The magnitude of the reinforcing effect on drug-related crimes from young drug offenders is sizable: A one-percentage point increase in the share of young inmates with a drug conviction increases an individual's propensity to re-offend with a drug crime by 2.7 percentage points. In other words, a standard deviation increase in the share of young inmates with a drug conviction augments the likelihood of recidivism with drugs of first-time incarcerated drug convicts' by 9 percentage points. We find no evidence of reinforcing peer effects for misdemeanor assault, burglary, theft, handling of stolen goods, and vandalism. Our findings thus partly support the view that young offenders build criminal capital behind bars due to social interactions with inmates with similar criminal history and demographic characteristics. From a political perspective, our findings can help design more appropriate prison assignment strategies to prevent recidivism among young drug offenders.

The rest of the paper is organized as follows. Section 1 presents information about Danish sentencing institutions. Section 2 introduces the data and depicts summary statistics. Section 3 explains the empirical model. Section 4 presents the empirical results from our baseline specification and robustness analyses. Section 5 explores the nature of the reinforcing peer effect for drug-related offenses, including the co-offending behavior of former inmates. Section 6 concludes.

1. Danish Sentencing Institutions

1.1. Contemporary Prison Assignment Criteria

The assignment of criminals to sentencing institutions in Denmark is decided by The Danish Prison and Probation Service (thereafter DPPS, *Kriminalforsorgen* in Danish).⁶ The decision of the DPPS depends on factors such as the sentence, the age, or the residence location and follows the Danish Sentence Enforcement Act.⁷ The assignment decision is typically a two-stage decision process. First, the DPPS chooses the type of institution the offender should be sent to: an open state prison or

⁶ During interviews with the responsible unit we learned that, formally, the Police decides on the prison assignment of weapon- and violence-convicted criminals. Yet, the Police follows the guidelines of the DPPS.

⁷ Available (in Danish) in Retsinformation (2013). This Act, nonetheless, leaves the DPPS with some discretionary power to consider practical issues such as bed availability.

a closed state prison.⁸ By law, as a starting point, offenders with an unconditional sentence must serve time in an open state prison. Yet persons with a sentence longer than five years, with a high protection need, a high risk of evasion, or known as gang members may serve time in closed prisons, characterized by higher levels of security and monitoring.⁹ Local prisons (*arresthus* in Danish) are primarily used for custody, but members of certain gangs and offenders with a short sentence may serve their entire sentence in a local prison.¹⁰

Second, the DPPS chooses a particular prison where to send the offender. The primary determinant is the age of the person. Offenders of age 18 or 19 are typically sent to an open prison close to their residential address, so that they can stay close to their relatives and easily remain enrolled (or become so while serving time) in education or vocational training. Offenders between 20 and 22 assigned to an open prison can go to any open institution, whereas offenders of the same age group assigned to a closed prison must serve their time at the prison of Ringe. In the decision of the particular prison, the second-most important determinant includes family needs (e.g., whether one has young children or elderly parents who need care), medical treatment needs (e.g., for drug or gambling addicts), and whether the person is likely to return to education or employment after release. Detailed information on each criminal offender is accessed via several documents available to the DPPS including a visitation scheme filled out at the local prison by both the personnel and the offender and the person's criminal dossier provided by the Police.¹¹ The third most important determinant of the choice of prison is capacity.¹² If none of the above-mentioned determinants applies, the DPPS may assign criminals in an institution according to their municipality of residence.¹³

Moreover, young inmates change institutions more often than older inmates so that they can, for instance, be closer to education or vocational training facilities in their area of residence and, thus, slowly prepare for the post-release period. Our data allow us to follow an individual across different institutions and to account for possible factors behind prison assignment such as age, level

⁸ For some groups of offenders alternative sentencing forms exist. For instance, juveniles and persons with medical needs may serve their full sentence in treatment institutions, including half-way houses and offenders with a sentence of less than five months can avoid custodial serving via electronic monitoring since 2005.

⁹ A few institutions (e.g., the open prisons of Kragshovede and Møgelkær) also have half-open sections with an intermediary security level.

¹⁰ In addition to the country's 36 local prisons, the term local prison encompasses the arrest departments in three closed state prisons (Nyborg, Vridsløselille and Østjylland). Local prisons generally apply the same rules as the closed prisons (DPPS, 2013).

¹¹ In contrast to the dossier provided by the Police, the content of the visitation form cannot be encrypted and is therefore unobserved by us. Most information in the form is relevant for inmates with incarceration history, and we choose to look only at peer effects for individuals incarcerated for the first time. A blank version of the form can be obtained from the authors.

¹² Capacity represents an increasingly important issue over the past two decades particularly due to the development of gang wars, which has led to an overcrowding of highly secured sections.

¹³ Assignment according to the municipality of residence follows the DPPS internal guidelines.

of education at time of incarceration, family situation, and municipality of residence. In the remaining text, we will use interchangeably the terms prison, institution, and facility to refer to all types of prison.

1.2. Inmates' Interactions within Facilities

Each facility houses several sections and is responsible for offender assignment to a particular section. For instance, gang members serve time in highly secured sections fully separated from the remaining sections, while juveniles serve time in juvenile sections. However, according to the DPPS the composition of sections cannot always be predetermined.

Possibilities for interactions between inmates are multiple. Except if they are placed in highly secured sections, inmates can meet across sections during the day while attending classes and workshops or exercising in the yard. Inmates usually share kitchen amenities with the rest of the section. Some open prisons have double cells. The composition of a cells varies constantly with the facilities' accurate needs, and thus cell composition is not registered. Possibilities for electronic communication are limited; inmates have access to new technologies when necessary for daytime training, but only relevant websites are accessible and mobile phones are prohibited.¹⁴ Finally, toward the end of their sentence, young inmates typically enroll in an education program outside the prison. Young inmates then can interact with persons from other sections or from outside the facility.

Although inmates have the possibility to interact and become acquainted with one another, they do not necessarily do so. In a qualitative study of a Danish closed state prison, Minke (2012) explores the applicability of the prisonization theory and, more generally, social life in a closed institution. In her survey among 615 inmates, half of the inmates report that they have become friends with other inmates, but interestingly this finding varies with age and offending background. Indeed, inmates below the age of 23 experience a strong cohesion among inmates way more often than older inmates, and inmates are sometimes reluctant to interact with drug sellers (Minke 2012: 163). Moreover, the city of origin and social networks out of prison often play a central role in the social integration of young newcomers in the prison.

¹⁴ Yet, entrepreneurs in open prisons may get access to a computer and the internet in order to continue running their business.

2. Data

2.1. Primary Data Sources, Sample Construction, and Peer definitions

Our data stem from five primary sources: (1) the Central Police registers on individual incarcerations in a Danish sentencing institution for the entire population, irrespective of the country of residence; (2) the Central Police registers on individual crime convictions for the entire Danish population; (3) the Central Police registers on individual crime charges; (4) the administrative registers, which provide individual demographic characteristics for the entire Danish population (age, marital status, number of children below age 18, current residence, country of origin, and immigrant status); and (5) the Educational Institution Register and Surveys, which provide information about individual educational attainment. All registers are available for the period 1980-2009. However, we limit our observations to the years between 1991 and 2006 for two reasons. First, the Central Police registers lack information about the date of release before 1991. Second, following a reform that modified Police districts in 2007, Statistics Denmark stopped converting the coding of sentencing institutions registered by the Police, and since then institutions have been coded differently. We can link individual records from the five registers using a unique person identifier for Danish residents.

In our observation period, the Central Police registers on incarcerations contain information about the date of incarceration, the date of release, the reason for incarceration, the reason for release, and the identifier of the sentencing institution. We use this information to construct facility-specific spells of incarcerations for all persons in Danish sentencing institutions. The Central Police registers on crime convictions include information about the date of conviction, the verdict, the sentence, and the type of offense. We link this information to the first charge in an individual's lifetime using the Central Police registers on individual charges to construct individual crime histories.

To construct our sample, we link individual records from all five registers and extract observations for offenders who were incarcerated for the first time between 1994 and 1997 at age 18 to 22. We use age 18 as the lower age limit because most juvenile offenders serve time in a half-way house, which unfortunately does not appear in the registers before 2007. Moreover, according to the DPPS, juvenile offenders who are incarcerated for the first time have most likely already committed a series of criminal activities unpunished due to their young age; i.e., they are habitual offenders. By contrast, older first-time incarcerated offenders are not necessarily habitual offenders. Fortunately, the number of juvenile offenders who receive an unconditional prison sentence is quite

low. In 2007, only 88 juveniles received an unconditional sentence compared to 1,376 offenders aged 18 to 22 (Statistics Denmark, 2012). We use age 22 as the upper age limit because this age threshold is often used in the decision on prison and prison section assignment (e.g., the prison of Ringe houses mainly men under 23, while all men in the institution of Vridsløselille are 23 or above). Moreover, to ensure that individuals are not influenced by peers from earlier incarcerations, and given that a prison stay is more likely to encourage later recidivism for first-time incarcerated inmates than for other inmates (Gendreau, Goggin and Smith, 2002), we look only at persons incarcerated for the first time. We look at persons incarcerated from 1994, i.e., three years after the first year of observation of the release period in the Central Police registers given that the Danish age of criminal responsibility is 15. We exclude individuals incarcerated after 1997 to avoid potential bias stemming from a reform voted in 1997 (*Voldspakke II*).¹⁵ The resulting sample counts 1,928 individuals.

In addition, we construct a data set with facility-specific spells of incarceration, individual crime histories, and individual demographic characteristics for all persons serving time in a Danish sentencing institution over the 1994-2003 period.¹⁶ This data set allows us to construct the peer groups with respect to criminal background and demographic characteristics. In our baseline specification, we define peers as inmates below the age of 26 at the time of incarceration (thereafter *young* peers). We construct this peer group as the share of *young* peers who have a criminal history with offense h weighted by the time-serving overlap with young inmates with criminal history with offense h relative to the time-serving overlap with all young inmates, irrespective of criminal history.

To construct this weighted share of young inmates with a criminal history with offense h , we first calculate for each facility j and at any date t in our observation period the share of young individuals who have a criminal history with offense h as the number of young individuals who have been convicted of offense h divided by the total number of young individuals. Next, for each individual i in our sample we construct the share of young inmates who have a criminal history with offense h by leaving out individual i 's own criminal history from the calculation of the share of young individuals who have been convicted of offense h in facility j at date t . Finally, for each

¹⁵ *Voldspakke II* was voted in May 1997 (law nr. 350 on 23 May 1997). To our knowledge, the only study that evaluates the causal effect of the reform on incarceration length for violent crime is Landersø (2012), who shows a significant increase by 13 percent (p10) of a 2002 change of the reform in the penal code, and no other study documents any effects of the reform before 2002. Nevertheless, as we cannot exclude that *Voldspakke II* might have caused a sudden increase in sentence for violent offenders convicted after the reform, we restrict our observations to people incarcerated before 1997. See Sections 3 and 4 for tests of our identification strategy.

¹⁶ Criminal history and demographic characteristics are only observed for Danish residents. As some individuals in our sample are only released as late as 2003, our data set covers the 1994-2003 period.

individual i in our sample we construct the share of young inmates with a criminal history with offense h weighted by the number of days overlap between the serving time of individual i and the serving time of her inmates with criminal history in offense h relative to the number of days overlap between the serving time of individual i and the serving time of inmates with criminal history in all offenses.

We repeat the same technique to construct the criminal type composition of the peer group for each alternative definition of the peer group: (1) Peer definition II: inmates from the same ethnic origin (Western or non-Western); (2) Peer definition III: inmates from the same ethnic origin and below the age of 26; (3) Peer definition IV: inmates from the same county and below the age of 26; (4) Peer definition V: inmates above the age of 26; (5) Peer definition VI: all other inmates irrespective of demographic characteristics.

2.2. *Descriptive Statistics*

Table 1 depicts some summary statistics of our main variables. 95% of individuals in our sample are males and 88% are ethnic Danes (i.e., neither immigrants nor descendants).¹⁷ At the time of first incarceration (early 1996 on average), 10% of the individuals have children under the age of six and 0.2% are married. Moreover, only 0.8% of the individuals in the sample have completed a vocational education degree at the time of incarceration. The average age at incarceration is 19.

27% of individuals in our sample are transferred to another facility during their sentence and thus the overall incarceration duration of individuals consists of one or more facility-specific spells. For individuals with more than one facility-specific spell, we keep only the longest spell. The average duration of the longest facility-specific spell is 43 days.¹⁸ Most individuals serve their longest spell in an open institution (66%), while only few serve it in a closed prison (7%) or a local prison (27%).

At the present stage we focus on six categories of offenses: misdemeanor assault (or simple violence), burglary, theft, handling of stolen goods, vandalism, and offenses against the drugs act. We choose these 6 crime categories on the basis of two selection criteria: (1) the crime category should be easily interpretable for policy purposes (unlike “other penal code offenses” or “unknown type of crime”); and (2) the probability of recidivism with the crime category should be high enough for a precise estimation. We then disregard offense categories such as “arson” and “murder

¹⁷ We follow the definition of Statistics Denmark. Immigrants are born abroad of parents without Danish citizenship and born outside Denmark. Descendants are born in Denmark and none of their parents are both Danish citizen and born in Denmark. The average overall share of the immigrant and descendant population in Denmark is about 7.5% in the same period (Statistics Denmark, 2012).

¹⁸ For individuals who serve their sentence across several institutions, the longest spell represents about 40% of the total duration of incarceration.

or murder attempt” with which less than one percent of the individuals in our sample recidivate. When we look at individual criminal histories, 38% of the sample have been convicted at least once for misdemeanor assault, 28% for theft, and 21% for burglary. Yet most individuals recidivate with theft (10%), burglary (9%), or drug-related offenses (6%).

Turning to peers’ characteristics, we observe that most inmate fellows are males (96%), above 26 years old (70%), of Western origin (92%), Danish residents (97%), and without a vocational education degree (75%). The average number of inmates vary across facility types. While overall a prison houses daily 57 inmates, of whom 17 are below the age of 26, an open prison count 124 inmates, of whom 33 are below the age of 26. As far as peers’ criminal background is concerned, we note that 12% of young peers have at least one earlier conviction for burglary, 11% for theft, 11% for misdemeanor assault, and 6% for drug-related offenses. The respective shares of peers’ criminal characteristics are fairly similar across peer definitions, although misdemeanor assault is much less represented among peers defined without an age restriction (6% for Peer definitions II and VI).

We also have information on individuals’ and peers’ municipality characteristics, i.e., socioeconomic and criminal environments that may influence criminal behavior. **Table 1** shows, among other things, that the average real gross income per capita is approximately DKK 200,000 (USD 34,000), the unemployment rate is 9.3%, and the overall youth crime conviction rate (after exclusion of traffic offenses) is 2.4% in the municipality of residence of individuals at the time of incarceration. The peers’ average municipality unemployment rate is 9.6% and peer’s average overall crime conviction rate is 2.3% at the time of incarceration.

[Table 1 about here]

3. Methodology

3.1. Studying Peer Effects

The estimation of peer effects contains several identification challenges. The most commonly applied model considers an individual outcome (Y_i) a function of individual characteristics (X_i), individual’s peers’ average characteristics (\bar{X}_{-i}), and individual’s peers’ average outcome (\bar{Y}_{-i}). This model, also known as the linear-in-means model, can formally be written as:

$$Y_i = \theta + \varphi_1 * \bar{Y}_{-i} + \omega_1 * X_i + \omega_2 * \bar{X}_{-i} + \varepsilon_i . \quad (1)$$

The work of Manski (1993) highlights the *reflection problem* that arises when studying peer effects with simple OLS regressions in Eq. (1). This issue typifies in that the outcome of each member i

potentially affects the outcome of the rest of the group $-i$ (*endogenous effect*) and, thus, reverse causality may exist between Y_i and \bar{Y}_{-i} in Eq. (1). This endogenous effect may be accompanied by what Manski (1993) calls an *exogenous effect*, or the effect of average peer's characteristics. The endogenous effect and the exogenous effect make it difficult to distinguish the effect of average peers' outcome, φ_1 in Eq.(1), from the effects of average peers' characteristics, ω_2 in Eq. (1), since peers' characteristics determine peers' outcomes. An additional identification problem relates to the difficulty of eliminating potential bias from selection into the group.

3.2. Model and Identification Strategy

We introduce our empirical model by presenting how we deal with the issues just described. First, strong functional form assumptions are necessary to eliminate the reflection problem. Similarly to previous works, e.g., Bayer et al. (2009) and Corno (2012), we assume that φ_1 is zero, i.e., peer effects take place through interactions within the group only due to peers' characteristics rather than subsequent peer outcomes. Therefore, we do not include a measure of peers' average outcome (\bar{Y}_{-i}) on the right-hand side.

Second, we deal with possible selection into prisons by inserting facility-by-prior-offense fixed effects in our specification.¹⁹ Such fixed effects enable us to control for the non-randomness of assignment to prisons due to criminal background and other observables and to identify the probability of recidivism with offense h from the variation in the duration of sentence-serving overlap between each pair of inmates in a facility. We include these fixed effects separately for individuals with and without prior experience in offense h , and thus we account for the possibility that peer effects are not linear-in-means but heterogeneous across individuals' criminal history.

For this method to be valid, first, some within-variation of peer characteristics within prisons should be observed, and this variation should be uncorrelated to individual characteristics. Second, the validity of this method is conditional on the close-to-randomness of the timing of assignment of individuals with respect to the other inmates' characteristics. In other words, the presence of a criminal trend in our sample period would undermine the validity of our results. Although a simple test does not show strong systematic evidence of trends in criminality, we include quarter-of-release fixed effects to rule out any time trend. Furthermore, we test the first condition and show the results in Section 4. We do not find any strong correlations between the weighted share of peers with a

¹⁹ Similar fixed effects are used in Bayer et al. (2009). Our interviews with the DPPS have allowed us to identify the most decisive criteria, which we can observe, used to assign young offenders to a particular prison. Moreover, we have learned that young criminals were more likely to be randomly assigned to prisons in our sample period than what they are today. We show results with and without prison fixed effects alternatively (**Table 4**).

criminal past in offense h and recidivism with offense h predicted by individual and municipality characteristics once we account for facility-by-prior-offense fixed effects. This latter result supports the validity of our identification strategy.

Formally, we apply the following model as our baseline specification:

$$R_{ijt}^h = \beta_0(Offense_{ijt}^h * peer_{ijt}^h) + \beta_1(No_Offense_{ijt}^h * peer_{ijt}^h) + \alpha P_{ijt} + \gamma X_{ijt} + \lambda_j + Offense_{ijt}^h * \mu_j + \eta_t + \varepsilon_{ijt}^h. \quad (2)$$

R_{ijt}^h equals 1 if a young criminal i , first-time incarcerated in prison j , recidivates (i.e., is convicted) with offense h ($h = 1, \dots, 6$) at date t and within 12 months after release. $Offense_{ijt}^h$ is 1 if individual i has committed an offense of type h before her first incarceration, while $No_offense_{ijt}^h$ is 1 if individual i has no recorded history of offense h .²⁰ In the baseline specification the vector $peer_{ijt}^h$ measures individual i 's exposure to peers with experience in offense h and below the age of 26, i.e., Peer definition 1. β_0 is our main parameter of interest. It shows the effect of the weighted share of peers with experience in offense type h on the individual's probability of recidivism with offense h , given that the individual has past experience with offense h . Henceforth, we refer to this effect as the *reinforcing* peer effect. Exposure to peers with experience in offense h may also increase the probability of recidivism with an offense h for individuals with no prior experience with offense h . β_1 captures this type of peer effect which we henceforth refer to as the *introductory* peer effect. P_{ijt} and X_{ijt} capture, respectively, weighted peer and individual demographic characteristics such as age, gender, ethnicity, whether the person had completed a vocational education at the time of incarceration,²¹ and criminal histories in all types of offenses h . The vector $Offense_{ijt}^h * \mu_j$ captures facility-by-prior-offense fixed effects and λ_j represents prison fixed-effects. The vector η_t accounts for possible time trends and represents dummies for each quarter of release represented in our sample.

To investigate whether inmates sort into groups in prisons, we test for reinforcing and introductory peer effects using the alternative peer definitions presented at the end of Section 2.1, that is inmate fellows from the same ethnic origin (Western vs. non-Western) (Peer definition II);

²⁰ Similar to Bayer et al. (2009), we argue that any history of crime of type h must be accounted for as opposed to the most recent crime only, as—especially young—criminals might be incarcerated not only as a result of their most recent criminal activity but also due to their entire criminal history.

²¹ See Appendix **Error! Reference source not found.** for an overview of all controls included in the baseline specifications. Information on employment status at the time of incarceration is available to us, but we decide to disregard this variable because of its obvious endogeneity with incarceration and recidivism. Due to endogeneity concerns, we do not control for the prison spell duration in Eq.(1). Instead, we run a robustness test with an interaction between the weighted share of criminals of type h in the peer group and the spell duration in **Table 7**.

from the same ethnic origin and below the age of 26 (Peer definition III); from the same county and below the age of 26 (Peer definition IV); above the age of 26 (Peer definition V); irrespective of demographic characteristics (Peer definition VI). Moreover, we conduct pairwise comparisons of peer effects using alternative peer definitions applying the following model to our data:

$$R_{ijt}^h = \beta_0(Offense_{ijt}^h * peerA_{ijt}^h) + \beta_1(No_offense_{ijt}^h * peerA_{ijt}^h) + \beta_2(Offense_{ijt}^h * peerB_{ijt}^h) + \beta_3(No_Offense_{ijt}^h * peerB_{ijt}^h) + \alpha P_{ijt} + \gamma X_{ijt} + \lambda_j + Offense_{ijt}^h * \mu_j + \eta_t + \varepsilon_{ijt}^h, \quad (3)$$

where the vector $peerA_{ijt}^h$ measures individual i 's exposure to peers with experience in offense h according to Peer definition I and the vector $peerB_{ijt}^h$ measures individual i 's exposure to peers with experience in offense h according to Peer definitions III, IV, and V.

4. Results

4.1. Baseline Specifications

We introduce the empirical results from the baseline specification (Eq. 2) in three steps: by presenting results on specialization in crime without accounting for peer effects, by testing the validity of our identification strategy, and finally by discussing the coefficient estimates from running Eq. (2). First, in **Table 2**, we present the results of simple OLS regressions of an individual's probability to recidivate with a particular offense conditioning on criminal history in all types of offenses. The coefficient estimates show that having been convicted for a particular offense is positively and significantly correlated with the propensity to recidivate with the same offense. For instance, a first-time incarcerated offender with earlier convictions of burglary is 11% more likely to be convicted of burglary within one year upon first release compared to an individual with no earlier conviction of burglary (column 2). Interestingly, the average of the off-diagonal coefficients, which represent criminal history in all the other types of offense, is close to zero in all columns and always smaller than the diagonal coefficient. **Table 2** shows the relevance of distinguishing peer effects by individual's conviction history in the particular crime category in Eq. (2) and (3).

[**Table 2** about here]

Second, we test our identification strategy. We identify peer effects on crime-specific recidivism from the random variation in overlap between the incarceration spells of two inmates in a facility. This variation is random if our interacted peer composition measures ($Offense_{ijt}^h * Peer_{ijt}^h$) and ($No_Offense_{ijt}^h * Peer_{ijt}^h$) are unrelated to individual characteristics within a facility (cond. 1) and if criminal behavior of young delinquents is not influenced by any criminal trend over

time (cond. 2). We account for cond. 2 by including time fixed effects (i.e., dummies for each quarter of release for each individual).²² To deal with cond. 1, we first construct a predicted indicator for recidivism with offense h using individual and municipality characteristics and facility fixed effects. Then, we run a regression of the predicted indicator on the two interacted weighted shares of peers convicted of offense type h with and without facility-by-prior-offense fixed effects. **Table 3** presents the results. Without facility-by-prior-offense fixed effects (Panel A), the two interacted weighted shares of peers convicted of offense type h appear significantly correlated with the characteristics used to construct the predicted indicator of recidivism, although the coefficients are small. Hence, using across-facility variation our interacted weighted shares of peers convicted of offense type h associate with individual attributes behind recidivism in each crime category, which likely also determine prison assignment.

When we add facility-by-prior-offense fixed effects (Panel B) and thus use only within-facility variation in the weighted share of peers convicted of offense type h , the significance of the interacted weighted shares disappears. Although one out of twelve coefficients turns significant (*burglary*, column 8), all coefficients are very close to zero. Therefore, the weighted share of peers convicted of offense type h and individual characteristics are not related within a facility when we add facility-by-prior-offense fixed effects to the model. As a result, these fixed effects allow us to identify peer effects from the random variation in time-serving overlap between two inmates in a facility.

[**Table 3** about here]

Table 4 presents the main empirical results with peer definition I for different sets of controls. In Panel A, we report the correlations between the weighted share of peers convicted of offense type h and crime-specific recidivism using Control set 1: the share of peers with criminal background in each of the other five offenses and indicators for having a criminal history in each of the six offense categories. Virtually all estimated correlations in Panel A are insignificant, although the correlation between the share of peers with a drug-related offense and recidivism with a drug-related offense is rather large in magnitude (column 6, Panel A). In Panel B, we report estimated correlations using Control set 2: Control set 1, other individuals characteristics, characteristics of municipality of residence at the time of incarceration, weighted demographic characteristics of peers and time and prison fixed effects. The estimated correlation between the weighted share of peers with a history in drug-related offending and individual recidivism with drug-related offending

²² Alternatively, we use a dummy for each quarter of incarceration. Results (available upon request) are very similar.

increases in magnitude and turns significant at a 5-percent significance level (column 6, Panel B). Finally, we estimate the causal effects of the weighted share of peers convicted of offense type h on crime-specific recidivism using Control set 3: Control set 2 and facility-by-prior-offense fixed effects. The results are reported in Panel C. Two estimates of peer effects are significant: the reinforcing peer effect on recidivism with a drug-related offense of 2.7 percentage points (significant at a 1-percent level) and the introductory but negative peer effect on recidivism with misdemeanor assault (significant at a 5-percent level). Also notice that the coefficient estimates in Panel B are overall very close to the estimates in Panel C, suggesting that non-randomness of offenders' assignment to a particular prison and time-serving overlap between two inmates may not be a critical issue in our sample.²³

To sum up, in **Table 4**, we find significant evidence that young drug-criminals strengthen criminal capital behind bars, increasing the probability of recidivism in drug-related offenses. A way to interpret our finding is to see by how much the propensity to commit new drug crime varies for drug convicts due to peer effects in prison. To do so one can compare the estimates in **Table 4** (i.e., recidivism due to peer effects) to the numbers in **Table 2** (i.e., individual propensity to specialize in crime irrespective of peer effects). A standard deviation increase in the number of inmates under the age of 26 with drug-related criminal background (3.4) increases the likelihood of recidivism with drugs for individuals with a background in drugs from 17% (**Table 2**) to 26% (**Table 4**), i.e., by 9 percentage points.

[**Table 4** about here]

Comparing our results to Bayer et al. (2009)

Our findings are partly in line with those of Bayer et al. (2009), who provide strong evidence of reinforcing peer effects among juveniles in Florida (USA) for several offenses including offenses related to drugs.

At first sight, the Bayer et al. (2009) point estimate of reinforcing peer effects for drug-related offending is significantly smaller than ours (0.31 vs. 2.7). Yet, the dissimilarity between the estimates of the two studies becomes substantially smaller if we compare changes in recidivism probability due to a standard deviation increase: 3 percentage points in Bayer et al. (2009) against 9 percentage points in our study.

²³ We estimate Eq. (2) with the same set of controls as in Control set 2 simultaneously for ten crime-specific recidivism indicators instead of the six crime-specific recidivism indicators in **Table 4**. Results are shown with all control variables in **Error! Reference source not found.**. We still find reinforcing peer effects only on drug-related recidivism.

One should keep in mind though that the two studies look at two different populations—juveniles vs. young adults—in different institutional contexts. Previous studies have shown that juveniles have a higher likelihood to commit crime than adults for at least two reasons. First, they lack maturity to reflect on the consequences of crime (Moffitt, 1993; Pichler and Romer, 2011). Second, they tend to experience a lower employment penalty than older offenders as employers consider juveniles relatively less culpable when committing crime (Mears et al., 2007). Furthermore, Danish and Floridian sentencing facilities are likely to differ in terms of monitoring practices, trainings, treatment, and other programs provided during incarceration. Similarly, labor market, educational, and criminal opportunities are likely to differ between the two countries.

4.2. *Network sorting*

Next, we investigate whether inmates sort into networks in prison by testing whether peer effects vary with the definition of peers. In particular, we investigate if social interactions take place more often among individuals not only from the same age group but also from the same ethnic group or from the same residential area. **Table 5** presents the results when we change the definition of peers and use Peer definitions II to VI. All specifications in **Table 5** include the full set of control variables and facility-by-prior-offense fixed effects.²⁴ Using Peer definition II (Panel A), other inmates from the same ethnic group (Western or non-Western origin), we do not find any significant peer effects on crime-specific recidivism.

Using Peer definition III (Panel B), other inmates from the same ethnic group and below 26 years old, we find evidence of reinforcing peer effects on drug-related offenses (estimate of 2.1 percentage points in column 6) of a magnitude similar to that of the estimate in **Table 4** (estimate of 2.7 percentage points, column 6, Panel C, **Table 4**), but less precisely estimated. Moreover, in contrast to the findings in **Table 4**, we now find negative but small estimates of introductory peer effects on vandalism and drug-related offenses (estimates of 0.3 and 0.4 percentage point, columns 5 and 6, respectively, Panel B, **Table 5**). The later results suggest that exposure to peers with a criminal history in vandalism (drug-related crimes) decreases the probability of recidivism with vandalism (drug-related crimes) for individuals without experience in vandalism (drug-related crimes).

²⁴ See in the Appendix Tables A3, A4, A5, A6, and A7 for the validity test of our identification strategy (similar to the test presented in **Table 3**) when defining peers as inmates from the same ethnic origin (Western vs. non-Western), as inmates from the same ethnic origin and below the age of 26, as inmates from the same county and below the age of 26, as inmates above age 26, and as inmates irrespective of age or ethnicity, respectively.

Using Peer definition IV, young inmates from the same county of residence, we do not find any statistical evidence of peer effects (Panel C).

Finally, defining peers as inmates above the age of 26 (Peer definition V) in Panel D, we do not find any significant positive crime-specific peer effects. This finding is confirmed in Panel E, where we define peers as other inmates irrespective of demographic characteristics (Peer definition VI). Nevertheless, in both Panels D and E we find a *negative* and highly significant reinforcing peer effect on recidivism with misdemeanor assault. This result suggests that older inmates with past experience in simple violence discourage young offenders to recidivate with simple violence.

[Table 5 about here]

To be able to conclude more clearly on which peer definition best characterizes social interactions of inmates, we propose to compare pairwise peer effects from different peer groups in the same econometric specification. Tables 4 and 5 show evidence of reinforcing peer effect on drug-related recidivism, when defining peers according to Peer definitions I (young inmates) and III (young inmates of the same ethnic origin), respectively. In **Table 6**, we present estimates when applying Eq. (3) and include as explanatory variables the weighted share of peers convicted of offense type h for two alternative peer definitions simultaneously. Panel A of **Table 6** reports estimates when we control for the weighted share of peers convicted of offense type h using both Peer definitions I and III. The estimate of the reinforcing peer effect on recidivism with a drug-related offense using Peer definition I is of similar magnitude as the baseline estimate in **Table 4**, whereas the reinforcing peer effect on recidivism with a drug-related offense using Peer definition III approaches zero. Moreover, a simple post estimation test rejects the null-hypothesis that both reinforcing peer effects in Panel A (column 6) are statistically insignificant at a 5-percent level. Taken together these findings suggest that Peer definition I captures social interactions of young inmates better than Peer definition III and that reinforcing peer effects exist for recidivism with drug-related offending.

In Panel B of **Table 6**, we report the estimated peer effects when using Peer definition I (young inmates) and Peer definition V (older inmates). By including the weighted share of peers convicted of offense type h with both Peer definitions I and V as explanatory variables, we can distinguish peer effects from young inmates from peer effects from older inmates. Comparing peer effects from young and older inmates is relevant, particularly in terms of transmission of criminal capital along two opposing hypotheses. First, novice criminals may learn from older and confirmed offenders behind the bars. Second, a young inmate may become discouraged to commit new

criminality when exposed to older inmates with similar criminal records as the young inmate realizes that he, similarly to older inmates, may end up having a life punctuated by frequent prison stays. In other words, exposure to older inmates with a similar criminal background may exacerbate the criminality deterrence effect of a prison stay. The estimates in Panel B of **Table 6** appear to corroborate the later hypothesis. Indeed, we find evidence of a significant and negative reinforcing effect on recidivism with misdemeanor assault due to exposure to older inmates convicted of misdemeanor assault (-2.3 percentage points, column 1). According to this estimate a standard deviation increase in the share of inmates earlier convicted of simple violence reduces the likelihood of reiterating with simple violence from 6.4% to 4.4%. In addition, our finding of a significant and positive reinforcing peer effect for drug-related offenses due to exposure to other young inmates reported in **Table 4** (column 6, Panel C) remains significant and very similar in magnitude when we include simultaneously the two interacted weighted shares of peers convicted of offense h using Peer definition V in **Table 6** (column 6, Panel B).

Panel C of **Table 6** reports estimated peer effects when we control for the weighted share of peers convicted of offense type h using both Peer definition I (young inmates) and Peer definition IV (young inmates from the same county). The positive and significant reinforcing effect on recidivism with a drug-related crime reported in **Table 4** (column 6, Panel C) is robust to the inclusion of the weighted share of peers convicted of offense type h with Peer definition IV. In fact, the point estimate in **Table 6** (column 6, Panel C) increases somewhat (4.2 percentage points). The reason is that the estimate of the reinforcing peer effect for drug-related offenses due to peers under the age of 26 from the same county is negative and significant in **Table 6** (-2.1 percentage points) in the same column. Thus, surprisingly, serving time with other young drug offenders from the same county appears to dissuade young drug offenders from recidivism with drug-related offenses, possibly to avoid competing for the same market.

[**Table 6** about here]

We draw three main conclusions from our findings in Tables 4, 5, and 6. First, our finding of a positive reinforcing peer effect on recidivism with drug-related offending reported in **Table 4** (Panel C) is robust to the inclusion of the weighted share of peers convicted of offense type h using alternative peer definitions in Tables 5 and 6. This robustness suggests that the peer definition that best captures social interactions in Danish prisons is Peer definition I, inmates under the age of 26 irrespective of ethnic origin and county of residence. The alternative peer definitions are either too narrow (Peer definitions II, III and IV) or too broad (Peer definitions V and VI). Second, we find

little evidence of reinforcing and introductory peer effects for the five other types of offenses (misdemeanor assault, burglary, theft, handling of stolen goods, vandalism). Nevertheless, a third conclusion is that exposure to older inmates with the same criminal background may prevent young inmates from continuing down the criminal path as shown in **Table 6**, Panel B. At least we find robust evidence of such a protective peer effect for misdemeanor assault. This finding may partly reflect the implementation of proper training and treatment programs, such as anger management programs, that seem to be successful in reducing simple violence crimes also via learning from older peers.

5. The Nature of Peer Influence

In this section we shed more light on the nature of the peer influence. Is it due to informational or networks spillover or due to social norms spillover?

The significant result for recidivism with offenses related to drugs may reveal the presence and, of greater concern, the development of networks involving drugs in prisons. If this is true, we might expect stronger peer effects in institutions where inmates have a greater opportunity to interact. In our data, we can distinguish three types of institution: closed state prison, open state prison, and local prison. Closed prisons are characterized by the highest level of monitoring and security, little possibility for bringing illegal objects in the institution, and fewer social interactions across the prison's sections. By contrast, inmates in open prisons typically move more freely within the institution and sometimes participate in daytime activities outside the facility. Local prisons' main purpose is to house individuals in custody, but offenders in our sample may get to serve their whole sentence in a local prison if, for instance, their sentence does not exceed the number of days already spent in custody. Rules about security and monitoring in local and closed prisons are alike in many cases (DPPS, 2013). However, talking with the DPPS, we have learned that local prisons do not always have the resources to apply all rules. For instance, inmates and visitors in non-highly secured sections might not systematically get checked upon entry and the offer of training and treatment preparing for reinsertion is often more modest in local prisons. As a result, inmates are more likely to possess illegal objects facilitating continued drug operations and to interact with other inmates off training hours in local prisons than in closed prisons.

Given these differences between prison types, we first investigate whether peer effects vary by facility type. Due to the obvious possibility of selection on unobservables into a particular type of facility, we use interacted terms between our two weighted shares of peers convicted of offense type h and the facility type instead of running regressions separately for each facility type. We

report our results in Panel A of **Table 7** where the peer definition refers to inmates under the age of 26. We do not find evidence that the magnitude of the peer effects vary across facility types. The specification for drug-related offenses (column 5) shows the same coefficient as in **Table 4**, 2.7 percentage points, and we do not find any statistical estimate for any of the interaction terms.

[**Table 7** about here]

Further, we investigate whether peer effects vary with the duration of time serving. The reason is that we expect a social norms effect to operate more slowly than informational and network spillovers. In Panel B of **Table 7**, we present the results of a specification in which we include an interaction term between the number of days spent in the longest incarceration spell (*duration*) and our favorite peer definition (Peer definition I). We do not find any evidence of a stronger peer effect for individuals who spent more time in prison. Rather, we can confirm the presence of reinforcing peer effects on drugs crime among young inmates which we interpret as suggestive evidence that the peer effects operate through the information or network channel. The coefficient in column (6) is still of similar magnitude to that in the previous tables (2.8 percentage point). The raw coefficient of *duration* is nil.

In another specification, we investigate whether an individual who serves time in the same facility for longer than average is more exposed to peer effects. For this we interact the weighted share of young peers convicted of offense type h (Peer definition I) with a dummy for serving time longer than average (i.e., 43 days). Panel C of **Table 7** shows the results. We again find a positive reinforcing peer effect of similar magnitude for drugs recidivism, while the new interacted measure does not turn significant. Interestingly, the raw coefficient of serving time longer than average is positive for drugs convicts. Hence, a longer sentence as such may make an individual more likely to recidivate with drugs but not necessarily via peer effects with other inmates, and a young drug convict with both longer and shorter sentence is likely to recidivate with drugs due to interactions with other young drug convicts.

Next, we investigate the persistence of the reinforcing peer effect in drug-related crimes. We do so by estimating Eq. 1 using two alternative dependent variables: an indicator for a new conviction for offending with offense type h within 24 and 36 months after release, respectively. The results are reported in **Table 8**. Both Panel A (24-month time span) and Panel B (36-month time span) depict insignificant estimates of either reinforcing or introductory peer effects on for all types of crime categories, including drugs crimes. In other words, the reinforcing peer effects on recidivism with drugs that we show in Tables 4 to 7 is short-lived; it is only significant within one

year after release. If the peer effect operates through the network channel, it suggests that the networks between former inmates dissolve after one year or that such networks go undetected by the policy if they also exist in the medium term. Suppose instead the peer effects operate through the social norms channel in line with the prisonization theories (Clemmer 1940; Sykes 1958)²⁵, which discuss how inmates become more criminal in prison due to inmates' transmission of oppositional norms, behavior, and attitudes. In that case the short-lived nature of the reinforcing peer effect in drug-related offenses suggests that the social norms effects gradually wear off after release. Irrespective of the channel by which the peer effects operate, the explanation of their short-lived nature could be that individuals in our sample stay behind bars for a relatively short period (43 days on average).

[Table 8 about here]

If our finding of reinforcing peer effects reflects the formation of drug-related criminal networks, we will expect inmates to commit new drugs crimes together upon release. The Danish Central Police registers offer a unique opportunity to explore whether co-offending takes place among former inmates, because we can connect person and case identifiers. Therefore, we shall now investigate whether individuals in our sample recidivate jointly with former inmates.

Co-offending is an internationally common pattern in criminality (Reiss & Farrington 1991). It rarely involves members of gangs or other highly structured groups (Reiss & Farrington 1991) but tends to happen with changing social constellations and in spontaneous forms (Reiss 1988; Sarnecki 2001; Roxell 2011). Consequently, repeat co-offending with the same group of offenders is less common. Co-offending is more likely for some types of offense: especially burglary, robbery (Reiss & Farrington 1991; Carrington 2009), and to some extent drug offenses (Roxell 2011).

There is limited empirical literature on the effect of social interactions on co-offending and even more restricted evidence on co-offending with previous fellow inmates. In theory, incarceration can increase the propensity to recidivate with fellow inmates for several reasons. First, we can draw on the social exchange theory (Weerman 2003) to understand that individuals get extra benefits and satisfaction from offending with other individuals compared to offending solo. Second, theories of *prisonization* (Clemmer 1940; Sykes 1958) tells us that inmates become more criminals in prison due to the internal transmission of oppositional norms, behavior, and attitudes that make the reintegration in the society after release almost impossible. The transmission of prisonization norms intensifies with the number of inmates (Roxell 2011), is greater for young inmates, inmates

²⁵ Prisonization theories might explain why post-incarceration recidivism rates positively correlate with longer sentences (Gendreau et al. 2002).

convicted of drugs, property crimes or violent crimes, and peaks at the second third of a completed sentence (Minke 2012). Moreover, given the illegal nature of criminality, criminal capital is likely to be learned via social interactions and thus prisons—where all inmates own some form of criminal capital—represent an ideal environment for the transmission of knowledge on how to commit crime (Hagan & McCarthy 1997). A recent experiment also shows that the attitudes and norms that inmates acquire due to prisonization convey criminal identity strengthen dishonest behavior (Cohn et al. 2013). Third, incapacitation implies *proprinquity*, which eases opportunities to plan co-offending post release (Reiss & Farrington 1991).

To our knowledge, the only empirical study of co-offending among previous prison inmates is Roxell (2011) who uses Swedish criminal registers. Using a restricted sample of released prisoners, Roxell does not find much evidence of co-offending among previous inmates. She argues that the few offenders who commit new crime with former inmates use prison to widen their criminal network.

We find that ... [TO BE COMPLETED]

6. Conclusion

In this paper, we use very detailed Danish criminal and administrative registers for the entire Danish population over a ten year period to investigate peer effects on crime-specific recidivism among offenders incarcerated for the first time at age 18 to 22. We take into account selection and possible time trends in criminal activity by including facility-by-prior-offense fixed effects and quarter-of-release fixed effects. We thus identify peer effects from the random variation in time-serving overlap between each pair of inmates in a facility. We define peers alternatively as other inmates: (1) under the age of 26, (2) from the same ethnic group, (3) under the age of 26 and from the same ethnic group, (4) under the age of 26 and from the same county, (5) above age 26, and (6) irrespective of any demographic characteristics.

For drug offenders we find robust evidence that exposure to other young drug offenders while serving time increases the probability of recidivism with a drug-related offense within one year, i.e., reinforcing peer effects for drug criminals. By contrast, we find little evidence of peer effects on recidivism with simple violence, burglary, theft, handling of stolen goods, or vandalism.

We also provide evidence that inmates sort into networks in the facilities in terms of age: when defining peers as inmates of similar criminal age we find strong evidence of reinforcing peer

effects, whereas we find little evidence of peer effects when defining peers as all inmates, irrespective of their demographic characteristics. Our preferred estimate shows that a percentage increase in the share of young convicts of drug-related offenses increases an individual's propensity to commit a new drug-related offense by 2.7 percentage points if the individual has past experience with drug-related offending—or by 9 percentage points for a standard deviation increase. This reinforcing peer effect on recidivism with drug offenses remains across all types of facility (local, open, and closed prisons) and does not depend on the duration of imprisonment. However, it is short-lived; we find little evidence on a reinforcing peer effect on recidivism with drug offenses two and three years after release.

Our findings partly differ from those of Bayer et al. (2009) since they find evidence of peer effects not only on drug-related offenses, but also on violent offenses and property crimes. The difference of our findings may arise from the two distinct populations (juveniles vs. first-time incarcerated young adults) and institutional dissimilarities such as the extent of training programs in prisons, educational and labor market opportunities upon release, or(and)—on the other end of the spectrum—different criminal opportunities.

Moreover, our results highlight that the definition of peers is of key importance for investigating the existence of peer effects in prisons. More explicitly, we find little evidence of peer effects in prisons when defining peers as older inmates or as all other inmates irrespective of demographic characteristics. We interpret our results as evidence of social interactions among inmates in the same age group. A major policy implication of our findings is that grouping inmates convicted of drug-related crime by age is not optimal as it increases the probability to recidivate with drug-related crime. Furthermore, no evidence of peer effects for other types of offenses than drugs may reflect the effectiveness of training programs offered during incarceration, such as anger management programs for violent offenders, in reducing peer effects on crime.

Future extensions of this paper include digging into the possible development of networks among former co-inmates that are also drug-related offenders. Specifically, we will connect person and case identifiers available in the Central Police registers to assess whether individuals in our sample recidivate jointly with former inmates. Our study will increase knowledge about the early steps of a criminal career and the formation of social networks in sentencing facilities.

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List of Tables

Table 1: Summary statistics

	Mean	Std. Dev.	
		Overall	Within
<i>Recidivism rates (at least once within 12 months upon first release)</i>			
Overall	0.532	0.50	0.48
Misdemeanor assault	0.059	0.23	0.23
Burglary	0.091	0.29	0.28
Theft	0.104	0.30	0.29
Stolen goods (handling)	0.023	0.15	0.15
Vandalism	0.030	0.17	0.16
Drug-related offense	0.064	0.24	0.24
Other offenses	0.358	0.48	0.47
<i>Recidivism rates (at least once within 24 months upon first release)</i>			
Overall	0.690	0.46	0.45
Misdemeanor assault	0.102	0.30	0.30
Burglary	0.138	0.35	0.33
Theft	0.160	0.36	0.35
Stolen goods (handling)	0.044	0.21	0.20
Vandalism	0.056	0.23	0.23
Drug-related offense	0.112	0.32	0.31
Other offenses	0.531	0.50	0.48
<i>Recidivism rates (at least once within 36 months upon first release)</i>			
Overall	0.757	0.43	0.42
Misdemeanor assault	0.131	0.34	0.33
Burglary	0.176	0.38	0.37
Theft	0.205	0.40	0.39
Stolen goods (handling)	0.061	0.24	0.24
Vandalism	0.075	0.26	0.26
Drug-related offense	0.163	0.37	0.36
Other offenses	0.613	0.49	0.48
<i>Socioeconomic characteristics in the year of incarceration</i>			
Male	0.951	0.22	0.19
Ethnic Dane	0.879	0.33	0.32
Married	0.002	0.04	0.04
Has at least one child under 6	0.096	0.29	0.29
Year	1996	0.89	0.87
Age	18.93	0.91	0.89
Years of completed education	9.11	1.01	0.98
Has a vocational education degree	0.008	0.09	0.09
<i>Incarceration conditions</i>			
Duration (of the longest spell) in days	43.17	105.31	94.70

	Mean	Std. Dev.	
		Overall	Within
Closed prison	0.074	0.26	0
of which Copenhagen prison	0.060	0.24	0
Open prison	0.657	0.47	0
Local prison	0.269	0.44	0
<i>Criminal behavior before first incarceration (1 if at least one conviction in offense h)</i>			
Misdemeanor assault	0.384	0.49	0.47
Burglary	0.212	0.41	0.40
Theft	0.276	0.45	0.44
Stolen goods (handling)	0.061	0.24	0.24
Vandalism	0.131	0.34	0.33
Drug-related offense	0.108	0.31	0.30
Other offenses	0.744	0.44	0.43
<i>Peer definition I: share (in%) of peers under the age of 26 (weighted averages) with criminal history characteristics in</i>			
Misdemeanor assault	10.79	5.74	4.48
Burglary	11.71	5.39	4.15
Theft	11.04	4.05	3.34
Stolen goods (handling)	3.281	2.40	2.15
Vandalism	4.931	2.85	2.44
Drug-related offense	6.034	3.40	2.78
Other offenses	52.22	7.40	6.21
<i>Peer definition II: share (in%) of peers of the same ethnic origin (weighted averages) with criminal history characteristics in</i>			
Misdemeanor assault	5.962	3.68	3.43
Burglary	9.078	3.44	2.59
Theft	10.81	2.84	2.54
Stolen goods (handling)	3.999	2.10	1.91
Vandalism	4.137	1.95	1.84
Drug-related offense	6.420	2.71	2.22
Other offenses	59.39	6.78	5.40
<i>Peer definition III: share (in%) of peers of the same ethnic origin and under the age of 26 (weighted averages) with criminal history characteristics in</i>			
Misdemeanor assault	11.23	8.37	7.47
Burglary	11.40	6.46	5.51
Theft	10.93	5.29	4.83
Stolen goods (handling)	3.270	3.38	3.16
Vandalism	4.815	3.40	3.09
Drug-related offense	5.971	4.56	4.12
Other offenses	51.92	10.48	9.49
<i>Peer definition IV: share (in%) of peers living in the same county prior to incarceration and under the age of 26 (weighted averages) with criminal history characteristics in</i>			
Misdemeanor assault	11.00	12.92	11.94
Burglary	10.39	11.27	10.37

	Mean	Std. Dev.	
		Overall	Within
Theft	9.89	8.85	8.48
Stolen goods (handling)	2.74	4.06	3.89
Vandalism	4.34	5.67	5.42
Drug-related offense	4.97	5.97	5.64
Other offenses	46.92	21.62	20.46
<i>Peer definition V: Share (in%) of older peers, above age 26 (weighted averages) with criminal history characteristics in</i>			
Misdemeanor assault	3.84	1.93	1.61
Burglary	8.05	2.67	1.95
Theft	10.28	2.29	1.96
Stolen goods (handling)	4.21	1.64	1.36
Vandalism	3.83	1.49	1.32
Drug-related offense	6.42	2.25	1.64
Other offenses	62.22	8.44	6.68
<i>Peer definition VI: Share (in%) of all peers (weighted averages) with criminal history characteristics in</i>			
Misdemeanor assault	5.644	1.98	1.59
Burglary	9.209	2.68	1.49
Theft	10.63	1.79	1.35
Stolen goods (handling)	3.987	1.28	1.04
Vandalism	4.171	1.31	1.13
Drug-related offense	6.394	1.98	1.31
Other offenses	59.96	4.72	2.97
<i>Individual characteristics of the municipality of residence in the year of incarceration (averages)</i>			
Real gross income in DKK	206,027	17,836	16,790
Unemployment rate	9.286	2.68	2.47
Share of population of non-Western origin	4.257	3.59	3.13
Gini coefficient	0.263	0.02	0.02
Overall youth crime conviction rate	2.386	0.73	0.63
Crime detection rate	19.95	4.02	3.82
Reported crimes per capita	10.78	4.42	4.06
Reported violent crimes per 10,000 inhabitants	0.276	0.12	0.11
Number of police officers per 1,000 inhabitants	1.610	0.90	0.78
Labor market participation rate	77.43	3.04	2.89
Number of pupils per class	19.12	1.62	1.46
<i>Peer characteristics (general definition) at the time of incarceration</i>			
Share of male inmates	0.959	0.10	0.02
Share of inmates below the age of 26	0.301	0.10	0.06
Share of inmates of non-Western origin	0.078	0.06	0.03
Share of inmates non-Danish residents	0.027	0.07	0.03
Share of inmates with a vocational education degree	0.255	0.09	0.04
Unemployment rate in the peer's municipality of residence (weighted average)	9.591	1.60	1.26

	Mean	Std. Dev.	
		Overall	Within
Overall youth crime conviction rate in the peer's municipality of residence (weighted average)	2.342	0.35	0.10
<i>Other peer characteristics (not controlled for in the specifications)</i>			
Average daily number of inmates in a facility	57		
Average daily number of inmates under the age of 26 in a facility	17		
Average daily number of inmates in a closed prison	69		
Average daily number of inmates under the age of 26 in a closed prison	30		
Average daily number of inmates in an open prison	124		
Average daily number of inmates under the age of 26 in an open prison	33		
Average daily number of inmates in a local prison	51		
Average daily number of inmates under the age of 26 in a local prison	18		
Observations	1.928		

Notes: own calculations based on our sample of young inmates incarcerated for the first time between 1994 and 1997 at the age of 18 to 22. See the main text for more information on the data.

Table 2: Specialization in crime

	Dep. var.: Indicator for recidivism with					
	Misd. assault	Burglary	Theft	Stolen goods	Vandalism	Drugs
	(1)	(2)	(3)	(4)	(5)	(6)
Prior offense	0.064** (0.012)	0.114** (0.024)	0.084** (0.021)	0.018 (0.018)	0.027* (0.010)	0.110** (0.025)
No prior offense (aver. of off-diagonal coefficients)	0.006	-0.009	-0.007	0.012	0.003	0.002
Constant	0.015 (0.008)	0.115** (0.020)	0.128** (0.027)	0.005 (0.011)	0.040** (0.012)	0.056** (0.018)
R-squared	0.021	0.057	0.038	0.010	0.011	0.032
Observations	1,928					

Notes: OLS estimations of the propensity to recidivate (i.e., be convicted at least once within the year following the first release) on crime history (i.e., convicted at least once). “Prior offense” represents the offense stated in the head of each column. Each specification includes controls for criminal history in all types of offenses. Robust standard errors clustered at the facility level are in parentheses. **: p<0.01, *: p<0.05.

Table 3: Predicted recidivism on the interacted weighted shares of peers convicted of offense type h (Peer definition I: inmates under the age of 26)

	Dependent variable: Indicator for predicted recidivism with											
	Misd. assault	Burglary	Theft	Stolen goods	Vandalism	Drugs	Misd. Assault	Burglary	Theft	Stolen goods	Vandalism	Drugs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OffenseXpeers_h	0.003** (0.001)	0.012** (0.002)	0.009** (0.002)	0.003** (0.001)	0.003** (0.001)	0.014** (0.003)	-0.001 (0.001)	0.000 (0.002)	0.001 (0.001)	0.004 (0.002)	-0.001 (0.001)	-0.003 (0.002)
No_offenseXpeers_h	-0.001* (0.001)	0.002 (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.002)	0.001 (0.001)	0.003** (0.001)	0.001 (0.002)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)
Facility-by-prior-offense fixed effects	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
R-squared	0.065	0.186	0.095	0.003	0.011	0.109	0.322	0.496	0.424	0.305	0.286	0.368
Observations	1,928						1,928					

Notes: The dependent variable is recidivism in h offense within 12 months after release predicted using individual and municipality characteristics, including municipality dummies, in the year of incarceration and facility fixed effects. We exclude municipality characteristics that present high multicollinearity from the set of regressors. Predicted recidivism is then regressed only on the interacted weighted share of peers convicted of offense type h (in the head of each column) and facility-by-prior-offense fixed effects in columns (7) to (12). Each column represents a different specification. For instance, offense h in the two interacted weighted shares of peers convicted of offense type h in columns (1) and (7) is misdemeanor assault. Specifications (1) to (12) are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table 4: Crime-specific peer effects on recidivism (Peer definition I: inmates under the age of 26)

	Dependent variable: Indicator for recidivism with misd. assault (1), burglary (2), theft (3), stolen goods (4), vandalism (5), drugs (6)																	
	Panel A; Control set 1						Panel B; Control set 2						Panel C; Control set 3					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
OffenseXpeers_h (β_0)	-0.001 (0.002)	0.008 (0.005)	0.009 (0.005)	-0.014 (0.007)	-0.002 (0.002)	0.017 (0.009)	-0.003 (0.002)	0.005 (0.005)	0.007 (0.006)	-0.010 (0.006)	-0.000 (0.003)	0.021* (0.009)	0.001 (0.003)	0.006 (0.006)	-0.002 (0.006)	-0.021 (0.015)	-0.005 (0.004)	0.027** (0.010)
No_offenseXpeers_h (β_1)	0.000 (0.001)	0.000 (0.001)	0.001 (0.002)	-0.000 (0.002)	-0.002* (0.001)	-0.001 (0.002)	-0.002 (0.001)	-0.003 (0.002)	0.001 (0.003)	0.000 (0.001)	-0.002 (0.001)	-0.002 (0.002)	-0.004* (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.001 (0.001)	-0.003 (0.002)	-0.000 (0.002)
Individ. charact.	Restrict						YES						YES					
Municipality charact.	NO						YES						YES					
Peer characteristics	NO						YES						YES					
Time fixed effects	NO						YES						YES					
Facility fixed effects	NO						YES						YES					
Facility-by-prior-offense fixed effects	NO						NO						YES					
R-squared	0.024	0.065	0.047	0.019	0.010	0.051	0.201	0.217	0.233	0.173	0.237	0.207	0.319	0.386	0.410	0.345	0.363	0.353
Observations	1,928						1,928						1,928					

Notes: The dependent variable is an indicator for whether an individual is convicted of offense h within 12 months after release. Each column represents a different specification. For instance, offense h in the two interacted weighted shares of peers convicted of offense type h for columns (1) is misd. assault. In this table, peers are defined as other inmates below the age of 26. "Restrict" refers to a set of controls for individual characteristics restricted to criminal history in all offense categories and the weighted shares of peers convicted of each of the off-diagonal offenses. "Individ. charact." refers to the complete set of controls for individual characteristics including criminal history, weighted shares of peers convicted of each of the off-diagonal offenses, and socioeconomic variables. "Municipality charact." refers to a set of controls for the individual's municipality (at the time of incarceration) characteristics and municipality dummies. "Peer characteristics" refers to controls for weighted share of inmates in particular demographic groups: under the age of 26, of non-Western origin, non-Danish residents, male, who have completed vocational education degree; and to controls for peer municipality characteristics such as average unemployment rate and average youth crime conviction rate. See **Error! Reference source not found.** in the Appendix for the estimated coefficients of all control variables with the specifications in Panel C. All specifications are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table 5: Crime-specific peer effects on recidivism: alternative definitions of peers

Peer definition	Dep. variable: indicator for recidivism with:					
	Misd. assault (1)	Burglary (2)	Theft (3)	Stolen goods (4)	Vandalism (5)	Drugs (6)
Panel A: Peer definition II						
OffenseX own ethnic group peers_h (β_0)	-0.002 (0.003)	0.003 (0.009)	-0.001 (0.005)	-0.003 (0.012)	0.009 (0.008)	0.020 (0.018)
No_offenseX own ethnic group peers_h (β_1)	-0.001 (0.002)	-0.004 (0.003)	0.004 (0.004)	0.002 (0.001)	-0.003 (0.002)	-0.004 (0.003)
R-squared	0.314	0.384	0.408	0.342	0.356	0.346
Panel B: Peer definition III						
OffenseX young own ethnic group peers_h (β_0)	0.002 (0.001)	0.003 (0.005)	0.003 (0.003)	-0.011 (0.009)	-0.002 (0.003)	0.021* (0.010)
No_offenseX young own ethnic group peers_h (β_1)	-0.001 (0.001)	-0.000 (0.002)	0.002 (0.003)	0.003 (0.002)	-0.004** (0.001)	-0.003* (0.001)
R-squared	0.320	0.383	0.411	0.345	0.359	0.351
Panel C: Peer definition IV						
OffenseX young own county peers_h (β_0)	-0.000 (0.001)	0.002 (0.002)	-0.003 (0.002)	-0.010 (0.006)	0.001 (0.002)	-0.011 (0.007)
No_offenseX young own county peers_h (β_1)	-0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)	0.001 (0.001)
R-squared	0.316	0.383	0.407	0.341	0.361	0.343
Panel D: Peer definition V						
OffenseX older peers_h (β_0)	-0.022** (0.008)	-0.011 (0.012)	0.008 (0.010)	0.006 (0.011)	0.021 (0.013)	-0.008 (0.019)
No_offenseX older peers_h (β_1)	-0.000 (0.004)	-0.005 (0.005)	-0.008 (0.005)	-0.002 (0.003)	-0.007* (0.003)	-0.002 (0.004)
R-squared	0.322	0.383	0.409	0.340	0.364	0.341
Panel E: Peer definition VI						
OffenseX overall peers_h (β_0)	-0.017* (0.007)	-0.002 (0.015)	-0.001 (0.013)	-0.014 (0.024)	0.011 (0.016)	0.011 (0.021)
No_offenseX overall peers_h (β_1)	-0.005 (0.005)	-0.006 (0.006)	-0.015* (0.007)	0.001 (0.003)	-0.009* (0.004)	-0.003 (0.005)
R-squared	0.320	0.383	0.411	0.345	0.359	0.351
Individ. charact.			YES			
Municip. charact.			YES			
Peer characteristics			YES			
Time fixed effects			YES			
Facility-by-prior-offense fixed effects			YES			
Observations			1,928			

Notes: The dependent variable is an indicator for whether an individual is convicted of offense h within 12 months after release. Offense h in column (1) is misd. assault; in column (2) burglary, and so forth.. Each panel uses a different peer definition: (Panel A) other inmates from the same ethnic origin—Western vs. non-Western—or Peer definition II; (Panel B) other inmates below the age of 26 and from the same ethnic origin or Peer definition III; (Panel C) other inmates below the age of 26 and from the same residence county at the time of incarceration or Peer definition IV, (Panel D) inmates above the age of 26 or Peer definition V; and (Panel E) all inmates in general (Peer definition V). “Individ. charact.” refers to the complete set of controls for individual characteristics including criminal history, weighted shares of peers convicted of each of the off-diagonal offenses, and socioeconomic variables. “Municipality charact.” refers to a set of controls for the individual's municipality (at the time of incarceration) characteristics and municipality dummies. “Peer characteristics” refers to controls for weighted share of inmates in particular demographic groups: under the age of 26, of non-Western origin, non-Danish residents, male, who have completed vocational education degree; and to controls for peer municipality characteristics such as average unemployment rate and average youth crime conviction rate. All specifications are simultaneously estimated as a SUR and include facility fixed effects. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table 6: Crime-specific peer effects on recidivism: comparing peer groups

Dependent variable: Indicator for recidivism with misd. assault (1), burglary (2), theft (3), stolen goods (4), vandalism (5), drugs (6)																		
	Panel A						Panel B						Panel C					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
OffenseXyoung peers_h (β_0)	-0.000 (0.003)	0.009 (0.012)	-0.006 (0.007)	-0.025 (0.017)	-0.009 (0.006)	0.022 (0.019)	0.001 (0.003)	0.007 (0.006)	-0.002 (0.006)	-0.020 (0.015)	-0.004 (0.004)	0.027** (0.010)	0.001 (0.003)	0.005 (0.006)	0.000 (0.006)	-0.019 (0.014)	-0.010** (0.004)	0.042** (0.010)
No_offenseXyoung peers_h (β_1)	-0.003 (0.002)	-0.004 (0.003)	-0.008* (0.003)	-0.007 (0.004)	-0.000 (0.003)	0.005 (0.003)	-0.004* (0.002)	-0.002 (0.002)	-0.003 (0.003)	-0.001 (0.001)	-0.003 (0.002)	-0.000 (0.002)	-0.005* (0.002)	-0.003 (0.002)	-0.004 (0.003)	-0.001 (0.001)	-0.003 (0.002)	-0.001 (0.002)
OffenseXyoung own ethnic peers_h (β_2)	0.001 (0.001)	-0.003 (0.010)	0.005 (0.003)	0.003 (0.009)	0.004 (0.005)	0.007 (0.017)												
No_offenseXyoung own ethnic peers_h (β_3)	-0.001 (0.001)	0.002 (0.002)	0.006 (0.003)	0.005 (0.003)	-0.003 (0.002)	-0.004** (0.002)												
OffenseXolder peers_h (β_2)							-0.023** (0.008)	-0.015 (0.013)	0.009 (0.010)	0.007 (0.011)	0.021 (0.013)	-0.002 (0.018)						
No_offenseXolder peers_h (β_3)							0.001 (0.004)	-0.006 (0.005)	-0.006 (0.005)	-0.001 (0.003)	-0.007* (0.004)	-0.002 (0.004)						
OffenseXyoung own county peers_h (β_2)													-0.000 (0.001)	0.001 (0.002)	-0.003 (0.003)	-0.008 (0.006)	0.003 (0.003)	-0.021** (0.006)
No_offenseXyoung own county peers_h (β_3)													0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.000 (0.001)	-0.001 (0.001)	0.001 (0.001)
Individ. charact			YES							YES					YES			
Municip. charact.			YES							YES					YES			
Peer characteristics			YES							YES					YES			
Time fixed effects			YES							YES					YES			
F-P-O fixed effects			YES							YES					YES			
R-squared	0.322	0.388	0.417	0.350	0.366	0.358	0.327	0.389	0.413	0.347	0.366	0.354	0.321	0.388	0.413	0.348	0.371	0.363
	$H_0: \beta_0 = \beta_2 = 0$ for drug-related offenses (column 6) p = 0.0202						$H_0: \beta_0 = \beta_2 = 0$ for drug-related offenses (column 6) p = 0.0345						$H_0: \beta_0 = \beta_2 = 0$ for drug-related offenses (column 6) p = 0.0000					
Observations	1,928						1,928						1,928					

Notes: The dependent variable is an indicator for whether an individual is convicted of offense h within 12 months after release. Each column represents a different specification. For instance, offense h in the two peer measures for columns (1) is misd. assault. “Young peers” stands for peers under the age of 26 (Peer definition I in **Table 4**); “young own

ethnic peers” stands for peers under the age of 26 and of the same ethnic origin (Western or non-Western) (Peer definition III in **Table 5**); “older peers” refers to inmates above the age of 26 (Peer definition V in **Table 5**); “young own county peers” refers to peers residing in the same county and under the age of 26 (Peer definition IV in **Table 5**). “Individ. charact.” refers to the complete set of controls for individual characteristics including criminal history, weighted shares of peers convicted of each of the off-diagonal offenses, and socioeconomic variables. “Municip. charact.” refers to a set of controls for the individual’s municipality (at the time of incarceration) characteristics and municipality dummies. “Peer characteristics” refers to controls for weighted share of inmates in particular demographic groups: under the age of 26, of non-Western origin, non-Danish residents, male, who have completed vocational education degree and to controls for peer municipality characteristics such as average unemployment rate and average youth crime conviction rate. “F-P-O fixed effects“ refers to a set of interacted fixed effects for facility and criminal background fixed effects. All specifications are simultaneously estimated as a SUR and include facility fixed effects. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table 7: Crime-specific peer effects: additional robustness tests

Dependent variable: Indicator for recidivism with misd. assault (1), burglary (2), theft (3), stolen goods (4), vandalism (5), drugs (6)																	
	Panel A: Type of Prison					Panel B: Imprisonment Duration						Panel C: Above Average of Imprisonment Duration					
	(1)	(2)	(3)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
OffenseXyoung peers_h (β_0)	0.001 (0.004)	0.011 (0.009)	0.018 (0.012)	-0.006 (0.006)	0.027* (0.014)	0.002 (0.003)	0.009 (0.006)	-0.001 (0.006)	-0.021 (0.015)	-0.005 (0.004)	0.028** (0.011)	0.001 (0.003)	0.008 (0.006)	-0.002 (0.006)	-0.020 (0.015)	-0.004 (0.004)	0.029** (0.010)
No_offenseXyoung peers_h (β_1)	-0.002 (0.003)	-0.005 (0.004)	0.002 (0.004)	-0.004 (0.003)	0.005 (0.004)	-0.003 (0.002)	-0.001 (0.002)	-0.002 (0.003)	-0.003 (0.002)	-0.005* (0.002)	0.001 (0.002)	-0.003* (0.002)	-0.002 (0.002)	-0.004 (0.003)	-0.002 (0.002)	-0.004* (0.002)	0.001 (0.002)
OffenseXpeers_hXclosed	0.028 (0.015)	-0.007 (0.045)	-0.033 (0.018)	0.030 (0.049)	0.058 (0.036)												
No_offenseXpeers_hXclosed	-0.009 (0.012)	0.027 (0.014)	-0.003 (0.011)	0.009 (0.007)	-0.028 (0.018)												
OffenseXpeers_hXlocal	-0.000 (0.007)	-0.016 (0.012)	-0.025 (0.014)	0.005 (0.007)	-0.013 (0.018)												
No_offenseXpeers_hXlocal	-0.001 (0.003)	0.003 (0.004)	-0.008 (0.005)	0.001 (0.004)	-0.007 (0.004)												
Closed prison	-0.018 (0.168)	-0.683* (0.276)	0.129 (0.189)	0.037 (0.063)	0.273 (0.178)												
Local prison	0.109 (0.158)	-0.162 (0.226)	0.124 (0.130)	-0.212** (0.074)	0.138 (0.179)												
Open prison			Ref.														
OffenseXpeers_hXduration						-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)						
No_offenseXpeers_hXduration						-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)						
Duration						0.001+ (0.000)	0.000 (0.000)	0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	0.001+ (0.000)						
OffenseXpeers_hXabove average duration												-0.003 (0.004)	-0.002 (0.004)	0.004 (0.004)	0.003 (0.003)	0.004 (0.004)	-0.011* (0.005)
No_offenseXpeers_hXabove average duration												0.001 (0.005)	-0.005 (0.005)	0.003 (0.005)	0.003 (0.007)	-0.003 (0.005)	-0.010 (0.013)
Above average duration												0.047 (0.042)	-0.016 (0.050)	-0.055 (0.046)	-0.022 (0.016)	-0.014 (0.019)	0.126** (0.036)
Individ. charact			YES					YES						YES			

Municip. charact.			YES					YES						YES			
Peer characteristics			YES					YES						YES			
Time fixed effects			YES					YES						YES			
F-P-O fixed effects			YES					YES						YES			
R-squared	0.517	0.369	0.389	0.339	0.343	0.321	0.391	0.411	0.345	0.364	0.356	0.321	0.389	0.411	0.345	0.364	0.358
Observations			1,928					1,928						1,928			

Notes: The dependent variable is an indicator for whether an individual is convicted of offense h within 12 months after release. Each column represents a different specification. For instance, offense h in the two peer measures for columns (1) is misd. assault. In this table, peers are defined as other inmates below the age of 26. Note that it was not possible to include more than five types of offense in Panel A without further restrictions on the model. We then remove the offense that is the least committed with recidivism: handling stolen goods. In the interaction terms in Panel A, *closed*, *local*, and *open* refer to the type of prison an individual serves her longest spell in. "Individ. charact." refers to the complete set of controls for individual characteristics including criminal history, not interacted peer measures for off-diagonal offenses, and socioeconomic variables. "Municip. charact." refers to a set of controls for the individual's municipality (at the time of incarceration) characteristics and municipality dummies. "Peer characteristics" refers to controls for share of inmates in particular demographic groups: under the age of 26, of non-Western origin, non-Danish residents, male, who have completed vocational education degree; and to controls for peer municipality characteristics such as average unemployment rate and average youth crime conviction rate. "F-P-O fixed effects" refers to a set of interacted fixed effects for facility and criminal background fixed effects. All specifications are simultaneously estimated as a SUR and include facility fixed effects. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table 8: Crime-specific peer effects on recidivism within 24 months or 36 months

Dep. variable: indicator for recidivism with:												
	Panel A: within 24 months after release						Panel B: within 36 months after release					
	Misd. assault	Burglary	Theft	Stolen goods	Vandalism	Drugs	Misd. assault	Burglary	Theft	Stolen goods	Vandalism	Drugs
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
OffenseXpeers_h (β_0)	0.002 (0.004)	0.007 (0.007)	0.006 (0.006)	-0.018 (0.018)	-0.013* (0.006)	0.015 (0.012)	0.003 (0.004)	0.012 (0.008)	-0.007 (0.007)	-0.026 (0.017)	-0.010 (0.007)	0.013 (0.013)
No_offenseXpeers_h (β_1)	-0.005* (0.002)	-0.004+ (0.002)	-0.003 (0.003)	-0.003+ (0.002)	-0.003 (0.002)	-0.004+ (0.003)	-0.003 (0.002)	-0.002 (0.003)	-0.006+ (0.004)	-0.002 (0.002)	-0.005+ (0.003)	-0.007* (0.003)
Individ. charact.				YES						YES		
Municip. charact.				YES						YES		
Peer characteristics				YES						YES		
Time fixed effects				YES						YES		
F-P-O fixed effects				YES						YES		
R-squared	0.315	0.400	0.434	0.318	0.366	0.346	0.332	0.387	0.421	0.339	0.359	0.370
Observations				1,928						1,928		

Notes: The dependent variable in Panel A (Panel B) is an indicator for whether an individual is convicted of offense h within 24 (36) months after release. Each column represents a different specification. For instance, offense h in the two interacted weighted shares of peers convicted of offense h for columns (1) is misd. assault. In this table, peers are defined as other inmates below the age of 26. "Individ. charact." refers to the complete set of controls for individual characteristics including criminal history, weighted shares of peers convicted of each of the off-diagonal offenses, and socioeconomic variables. "Municipality charact." refers to a set of controls for the individual's municipality (at the time of incarceration) characteristics and municipality dummies. "Peer characteristics" refers to controls for weighted share of inmates in particular demographic groups: under the age of 26, of non-Western origin, non-Danish residents, male, who have completed vocational education degree; and to controls for peer municipality characteristics such as average unemployment rate and average youth crime conviction rate. All specifications are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table A 1 : Variable definitions and primary data sources

Variable	Definition	Primary data source
<i>Individual characteristics</i>		
Recidivism rate overall	Dummy for having been convicted (i.e., found guilty) of any offense within one year after release	Central Police Register, Statistics Denmark (DST)
Recidivism rate; criminal offense of type j	Dummy for having been convicted (i.e., found guilty) of an offense of type j (j =misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) within one year after release	Central Police Register, DST
Criminal history in crime category j prior to first incarceration	Dummy for having been convicted (i.e., found guilty) of at least one offense of type j (j =misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) prior to the first incarceration	Central Police Register, DST
Male	Dummy for male	Population register, DST
Has a vocational degree	Dummy for having completed a vocational (professional) education degree at the time of incarceration	Educational Institution Register and Surveys, DST
Ethnic Dane	Dummy for being born in Denmark of Danish parents. The dummy equals 0 for first-generation and second-generation immigrants.	Population register, DST
Married	Dummy for being married at the time of incarceration	Population register, DST
Has at least one child under 6	Dummy for having at least one child under the age of six at the time of incarceration	Population register, DST
Age	Age at the time of incarceration	Population register, DST
Duration in days	Duration in days of the time spent during the first incarceration (in the longest spell in case the individual transfers across facilities)	Central Police Register, DST
Closed prison	Dummy for spending the longest spell in a closed prison	Central Police Register, DST
Of which Copenhagen prison	Dummy for spending the longest spell in one of the closed prisons in Copenhagen	Central Police Register, DST
Open prison	Dummy for spending the longest spell in an open prison	Central Police Register, DST
Local prison	Dummy for spending the longest spell in a local prison	Central Police Register, DST
<i>Peer characteristics</i>		
Share (in %) of peer under the age of 26 with a criminal history in crime category j	Weighted average of the share of other inmates under the age of 26 with at least one conviction of type j (j =misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) at the individual's time of incarceration	Central Police Register, DST
Share (in %) of peer of the same ethnic origin with a criminal history in crime category j	Weighted average of the share of other inmates of the same ethnic origin (Western including Danish vs. non-Western) with at least one conviction of type j (j =misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) at the individual's time of incarceration	Central Police Register, DST

Variable	Definition	Primary data source
Share (in %) of peer of the same ethnic origin and below age 26 with a criminal history in crime category <i>j</i>	Weighted average of the share of other inmates of the same ethnic origin (Western including Danish vs. non-Western) and below age 26 with at least one conviction of type <i>j</i> (<i>j</i> =misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) at the individual's time of incarceration	Central Police Register, DST
Share (in %) of peer residing in the same county and below age 26 with a criminal history in crime category <i>j</i>	Weighted average of the share of other inmates residing in the same county and under the age of 26 at the individual's time of incarceration with at least one conviction of type <i>j</i> (<i>j</i> =misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) at the individual's time of incarceration	Central Police Register, DST
Share (in %) of peer - general definition - with a criminal history in crime category <i>j</i>	Weighted average of the share of other inmates with at least one conviction of type <i>j</i> (<i>j</i> =misdemeanor assault, burglary, theft, stolen goods handling, drug-related offenses, other offenses) at the individual's time of incarceration	Central Police Register, DST
Share of inmates below the age of 26	Share of other inmates (foreigners excluded) below age 26 in the individual's year of incarceration	Central Police Register, Population Register, DST
Share of male inmates	Share of inmates (foreigners excluded) who are male	Central Police Register, Population Register, DST
Share of inmates of non-Western origin	Share of other inmates (foreigners excluded) who are immigrants (first or second generation) from a non-Western country	Central Police Register, Population Register, DST
Share of inmates non-Danish residents	Share of other inmates who are foreigners, i.e., do not have registered residence in Denmark, in the individual's year of incarceration	Central Police Register, DST
Share of inmates with a vocational education degree	Share of other inmates (foreigners excluded) who have completed a vocational (professional) education degree in the individual's year of incarceration	Central Police Register, Educational Institution Register and Surveys, DST
Unemployment rate in the peer's municipality of residence	Weighted average of the unemployment rate (in %) in the municipality of residence of peers in the year of incarceration of peers	Central Police Register, Population Register, DST
Overall crime rate in the peer's municipality of residence	Weighted average of the share (in %) of individuals aged 15 to 25 who have been convicted of an offense (except traffic offenses) committed in the municipality of residence of peers in the year of the incarceration of peers	"Statistiske Efterretninger om Social Sikring og Retsvæsen", DST (1986-1998)
<i>Municipality Characteristics</i>		
Real gross income in DKK	Average real gross income in DKK in the municipality in the individual's year of incarceration (in 2000-prices)	Authors' construction from time series IF221 and BEF1A in Statistikbanken, DST.
Unemployment rate	The unemployment rate (in %) in the municipality in the individual's year of incarceration	Authors' construction from time series AARD in Statistikbanken, DST.
Share of population of non-Western origin	Share of the municipal population of non-Western origin in the individual's year of incarceration	Authors' calculations from population register, DST.
Gini coefficient	Gini coefficient of household incomes in the municipality in the individual's year of incarceration	Authors' calculations from tax register, DST.
Youth crime conviction rate	Share (in %) of individuals aged 15 to 25 living in the municipality who have been convicted of an offense (except traffic offenses) committed in the individual's year of incarceration	Central Police Register, DST

Variable	Definition	Primary data source
Crime detection rate	Annual number of charges divided by the annual number of reported crimes in the municipality (or police district) in the individual's year of incarceration	"Statistiske Efterretninger om Social Sikring og Retsvæsen", DST (1986-1998)
Reported crimes per capita	Number of reported crimes divided by the number of inhabitants in the municipality (or police district) in the year of the individual's incarceration	"Statistiske Efterretninger om Social Sikring og Retsvæsen", DST (1986-1998)
Reported violent crimes per 10,000 inhabitants	Number of reported violent crimes divided by the number of inhabitants in the municipality (or police district) and multiplied by 10,000 in the individual's year of the incarceration	"Statistiske Efterretninger om Social Sikring og Retsvæsen", DST (1986-1998)
Number of police agents per 1,000 inhabitants	Sum of number of detectives and uniformed police officers employed in the police district per 1,000 inhabitants.	Annual reports from the Police (1986-1999)
Labor market participation rate	Share of the population in the municipality who is active on the labor market in the year of the individual's incarceration	Authors' construction from time series RAS1 and BEF1A in Statistikbanken, DST.
Number of pupils per class	Average number of pupils per class (only normal classes) in the municipality in the individual's year of the incarceration	"Folkeskolen i de enkelte kommuner", Ministry of Education (1989-1993)

Table A 2: Crime-specific peer effects on recidivism (peers under the age of 26): All right hand-side variables

R.h.s. variables	Dep. var.: Indicator for recidivism with					
	Misd. assault	Burglary	Theft	Stolen goods	Vandalism	Drugs
	(1)	(2)	(3)	(4)	(5)	(6)
OffenseXpeers_h (β_0)	0.001 (0.003)	0.006 (0.006)	-0.002 (0.006)	-0.021 (0.015)	-0.005 (0.004)	0.027** (0.010)
No_offenseXpeers_h (β_1)	-0.004* (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.001 (0.001)	-0.003 (0.002)	-0.000 (0.002)
<i>Share (in%) of peers under the age of 26 (weighted averages) with criminal history characteristics in</i>						
Misdemeanor assault		-0.000 (0.002)	-0.001 (0.002)	-0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)
Burglary	-0.001 (0.001)		0.005* (0.002)	0.003** (0.001)	-0.001 (0.001)	0.003** (0.001)
Theft	-0.001 (0.002)	0.002 (0.002)		-0.001 (0.002)	0.001 (0.002)	-0.001 (0.002)
Stolen goods (handling)	-0.007** (0.003)	0.009* (0.004)	0.003 (0.004)		0.002 (0.002)	0.010** (0.004)
Vandalism	-0.004 (0.003)	0.006* (0.003)	0.001 (0.003)	0.001 (0.001)		-0.002 (0.003)
Drug-related offense	-0.003 (0.002)	0.001 (0.002)	-0.005 (0.003)	0.001 (0.002)	0.001 (0.002)	
<i>Criminal behavior before first incarceration (at least one conviction in offense h, ref. category: other types of offenses)</i>						
Misdemeanor assault	-0.231 (0.123)	-0.221 (0.145)	-0.018 (0.079)	-0.060 (0.031)	0.017 (0.030)	-0.059 (0.070)
Burglary	-0.067 (0.118)	-0.200 (0.186)	-0.014 (0.110)	-0.089 (0.062)	-0.041 (0.056)	0.345 (0.256)
Theft	-0.065 (0.072)	0.099 (0.107)	0.047 (0.125)	0.013 (0.031)	-0.063 (0.045)	-0.111 (0.102)
Stolen goods (handling)	-0.028 (0.075)	-0.119 (0.147)	-0.130 (0.127)	0.012 (0.071)	0.079 (0.082)	-0.312 (0.200)
Vandalism	0.102 (0.067)	0.043 (0.072)	-0.047 (0.085)	0.051 (0.037)	-0.088 (0.056)	-0.122 (0.111)
Drug-related offense	-0.167* (0.066)	0.015 (0.120)	-0.007 (0.105)	-0.037 (0.052)	-0.023 (0.108)	-0.393 (0.237)
<i>Peer characteristics (Peer definition VI: all other inmates) at the time of incarceration</i>						
Share of male inmates	0.563 (0.310)	0.140 (0.359)	-0.487 (0.408)	0.139 (0.188)	-0.041 (0.185)	-0.286 (0.317)
Share of inmates below the age of 26	-0.376** (0.114)	-0.025 (0.136)	-0.176 (0.137)	-0.055 (0.069)	0.171* (0.067)	0.022 (0.127)
Share of inmates of non-Western origin	0.285 (0.210)	0.050 (0.288)	-0.370 (0.270)	0.004 (0.130)	-0.342* (0.160)	0.383 (0.228)
Share of inmates non-Danish residents	-0.293 (0.287)	0.212 (0.406)	0.295 (0.411)	-0.551** (0.166)	-0.046 (0.220)	-0.420 (0.323)
Share of inmates with a vocational education degree	0.159 (0.138)	0.084 (0.172)	-0.181 (0.170)	-0.020 (0.068)	-0.107 (0.107)	0.078 (0.137)
Unemployment rate in the peer's municipality of residence	-0.011 (0.016)	0.010 (0.019)	-0.048* (0.020)	0.006 (0.009)	0.003 (0.014)	-0.018 (0.017)
Overall crime youth conviction rate in the	0.125	-0.038	0.124	0.018	-0.230**	0.078

peer's municipality of residence	(0.088)	(0.095)	(0.106)	(0.051)	(0.059)	(0.083)
	Dep. var.: Indicator for recidivism with					
R.h.s. variables	Misd. assault	Burglary	Theft	Stolen goods	Vandalism	Drugs
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Socioeconomic individual characteristics in the year of incarceration</i>						
Male	0.043 (0.022)	0.069 (0.037)	-0.084 (0.049)	0.004 (0.021)	0.026 (0.014)	-0.004 (0.045)
Has a vocational education degree	0.051 (0.062)	-0.011 (0.038)	0.014 (0.078)	-0.014 (0.023)	0.033 (0.058)	-0.002 (0.034)
Ethnic Dane	0.020 (0.020)	-0.015 (0.023)	-0.017 (0.026)	0.000 (0.010)	-0.004 (0.014)	-0.039 (0.021)
Married	0.055 (0.074)	0.008 (0.077)	-0.157 (0.081)	0.020 (0.033)	-0.010 (0.055)	-0.024 (0.082)
Has at least one child under 6	0.030 (0.022)	-0.037 (0.023)	0.010 (0.027)	-0.031** (0.009)	0.000 (0.015)	0.024 (0.019)
Age	-0.006 (0.007)	-0.029** (0.008)	-0.003 (0.009)	-0.006 (0.004)	-0.001 (0.006)	-0.001 (0.007)
<i>Individual characteristics of the municipality of residence in the year of incarceration (averages)</i>						
Log of real income in DKK	1.251 (0.971)	0.617 (1.115)	1.124 (1.164)	0.267 (0.576)	-1.324 (0.753)	0.035 (1.024)
Unemployment rate	-0.008 (0.013)	0.003 (0.016)	0.025 (0.013)	-0.011 (0.008)	-0.002 (0.010)	-0.000 (0.013)
Share of non-Western population	-0.002 (0.022)	0.022 (0.020)	0.021 (0.025)	-0.018 (0.013)	0.041* (0.017)	-0.005 (0.025)
Gini coefficient	-0.064 (0.492)	0.364 (0.486)	-1.014 (0.775)	-0.130 (0.267)	0.453 (0.339)	0.185 (0.573)
Crime detection rate	-0.003 (0.003)	-0.001 (0.003)	0.004 (0.003)	-0.001 (0.002)	0.004 (0.002)	0.003 (0.002)
Youth crime conviction rate	-0.024 (0.030)	-0.015 (0.030)	0.003 (0.034)	-0.029 (0.015)	0.003 (0.016)	0.047 (0.027)
Reported crimes per capita	-0.014 (0.012)	-0.013 (0.012)	0.012 (0.014)	-0.011 (0.007)	0.004 (0.009)	-0.005 (0.011)
Reported violent crimes per 10,000 inhabitants	-0.141 (0.121)	-0.206 (0.123)	0.192 (0.153)	-0.146 (0.086)	-0.022 (0.116)	0.151 (0.124)
Number of pupils per class	-0.007 (0.008)	0.005 (0.010)	-0.012 (0.011)	-0.005 (0.006)	0.007 (0.004)	-0.027** (0.009)
Number of police officers per 1,000 inhab.	0.034 (0.134)	-0.164 (0.157)	-0.284 (0.156)	0.094 (0.078)	0.064 (0.100)	0.108 (0.137)
Labor market participation rate	-0.018 (0.018)	-0.013 (0.019)	-0.006 (0.018)	-0.002 (0.012)	0.021 (0.011)	-0.008 (0.016)
Time fixed effects				YES		
Facility-by-prior-offense fixed effects				YES		
R-squared	0.319	0.386	0.410	0.345	0.363	0.353
Observations	1,928					

Notes: Each column represents a different specification. For instance, offense h in the two interacted weighted shares of peers convicted of offense h for column (1) is misd. assault. In this table, peers are defined as other inmates below the age of 26. All specifications are simultaneously estimated as a SUR and include facility fixed effects. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table A 3: Predicted recidivism on the interacted weighted shares of peers convicted of offense h (Peer definition II: inmates from the same ethnic group)

	Dependent variable: Indicator for predicted recidivism with											
	Panel A						Panel B					
	Misd. Assault	Burglary	Theft	Stolen goods	Vandalism	Drugs	Misd. Assault	Burglary	Theft	Stolen goods	Vandalism	Drugs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OffenseXpeers_h	0.005** (0.001)	0.015** (0.002)	0.011** (0.002)	0.002* (0.001)	0.005** (0.001)	0.017** (0.003)	0.001 (0.001)	-0.004 (0.003)	0.002 (0.002)	-0.004 (0.002)	0.001 (0.003)	0.001 (0.003)
No_offenseXpeers_h	-0.002 (0.001)	0.003 (0.002)	0.003 (0.002)	-0.001 (0.001)	-0.001 (0.001)	0.002 (0.002)	0.000 (0.001)	0.003 (0.001)	0.003 (0.002)	-0.001 (0.001)	-0.001 (0.001)	0.002 (0.002)
Facility-by-prior-offense fixed effects	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
R-squared	0.081	0.201	0.104	0.005	0.014	0.136	0.321	0.500	0.426	0.301	0.289	0.370
Observations	1,928						1,928					

Notes: The dependent variable is recidivism (in h offense) predicted using individual and municipality characteristics, including municipality dummies, in the year of incarceration and facility fixed effects. We exclude municipality characteristics that present high multicollinearity from the set of regressors. Predicted recidivism is then regressed only on the two interacted weighted shares of peers convicted of offense h (in the head of each column) and facility-by-prior-offense fixed effects in columns (7) to (12). Each column represents a different specification. For instance, offense h in the two interacted weighted shares of peers convicted of offense h in columns (1) and (7) is misdemeanor assault. Specifications (1) to (12) are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table A 4: Predicted recidivism on the interacted weighted shares of peers convicted of offense h (Peer definition III: inmates from the same ethnic group below age 26)

	Dependent variable: Indicator for predicted recidivism with											
	Panel A						Panel B					
	Misd. assault	Burglary	Theft	Stolen goods	Vandalism	Drugs	Misd. Assault	Burglary	Theft	Stolen goods	Vandalism	Drugs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OffenseXpeers_h	0.002** (0.000)	0.010** (0.001)	0.006** (0.001)	0.003** (0.001)	0.003** (0.001)	0.013** (0.002)	-0.000 (0.000)	-0.002 (0.001)	0.000 (0.001)	0.002 (0.002)	0.000 (0.001)	-0.004* (0.002)
No_offenseXpeers_h	-0.001* (0.000)	0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	0.000 (0.000)	0.001 (0.001)	0.000 (0.001)	-0.000 (0.000)	-0.000 (0.001)	-0.000 (0.001)
Facility-by-prior-offense fixed effects	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
R-squared	0.055	0.169	0.081	0.002	0.011	0.102	0.321	0.492	0.424	0.304	0.285	0.368
Observations	1,928						1,928					

Notes: The dependent variable is recidivism (in h offense) predicted using individual and municipality characteristics, including municipality dummies, in the year of incarceration and facility fixed effects. We exclude municipality characteristics that present high multicollinearity from the set of regressors. Predicted recidivism is then regressed only on the two interacted weighted shares of peers convicted of offense h (in the head of each column) and facility-by-prior-offense fixed effects in columns (7) to (12). Each column represents a different specification. For instance, offense h in the two interacted weighted shares of peers convicted of offense h in columns (1) and (7) is misdemeanor assault. Specifications (1) to (12) are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table A 5: Predicted recidivism on the interacted weighted shares of peers convicted of offense h (Peer definition IV: inmates from the same county below the age of 26)

	Dependent variable: Indicator for predicted recidivism with											
	Panel A						Panel B					
	Misd. assault	Burglary	Theft	Stolen goods	Vandalism	Drugs	Misd. Assault	Burglary	Theft	Stolen goods	Vandalism	Drugs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OffenseXpeers_h	0.001** (0.000)	0.006** (0.001)	0.006** (0.001)	0.001 (0.001)	0.002** (0.001)	0.011** (0.001)	-0.001** (0.000)	0.001* (0.001)	0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)
No_offenseXpeers_h	-0.001** (0.000)	0.000 (0.001)	-0.001 (0.000)	-0.001* (0.000)	-0.000 (0.000)	-0.001 (0.001)	-0.000 (0.000)	0.001** (0.000)	-0.000 (0.000)	-0.001* (0.000)	-0.000 (0.000)	-0.000 (0.000)
Facility-by-prior-offense fixed effects	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
R-squared	0.034	0.114	0.075	0.003	0.006	0.071	0.324	0.495	0.424	0.301	0.285	0.367
Observations	1,928						1,928					

Notes: The dependent variable is recidivism (in h offense) predicted using individual and municipality characteristics, including municipality dummies, in the year of incarceration and facility fixed effects. We exclude municipality characteristics that present high multicollinearity from the set of regressors. Predicted recidivism is then regressed only on the two interacted weighted shares of peers convicted of offense h (in the head of each column) and facility-by-prior-offense fixed effects in columns (7) to (12). Each column represents a different specification. For instance, offense h in the two weighted shares of peers convicted of offense h in columns (1) and (7) is misdemeanor assault. Specifications (1) to (12) are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table A 6: Predicted recidivism on the interacted weighted shares of peers convicted of offense h (Peer definition V: peers above age 26)

Dependent variable: Indicator for predicted recidivism with												
Panel A						Panel B						
Misd. assault	Burglary	Theft	Stolen goods	Vandalism	Drugs	Misd. Assault	Burglary	Theft	Stolen goods	Vandalism	Drugs	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
OffenseXpeers_h												
No_offenseXpeers_h												
Facility-by-prior-offense fixed effects	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	
R-squared	0.083	0.178	0.088	0.006	0.015	0.135	0.323	0.491	0.425	0.301	0.286	0.371
Observations	1,928					1,928						

Notes: The dependent variable is recidivism (in h offense) predicted using individual and municipality characteristics, including municipality dummies, in the year of incarceration and facility fixed effects. We exclude municipality characteristics that present high multicollinearity from the set of regressors. Predicted recidivism is then regressed only on the two interacted weighted shares of peers convicted of offense h (in the head of each column) and facility-by-prior-offense fixed effects in columns (7) to (12). Each column represents a different specification. For instance, offense h in the two weighted shares of peers convicted of offense h in columns (1) and (7) is misdemeanor assault. Specifications (1) to (12) are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table A 7: Predicted recidivism on the interacted weighted shares of peers convicted of offense h (Peer definition VI: all peers)

	Dependent variable: Indicator for predicted recidivism with											
	Panel A						Panel B					
	Misd. assault	Burglary	Theft	Stolen goods	Vandalism	Drugs	Misd. Assault	Burglary	Theft	Stolen goods	Vandalism	Drugs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OffenseXpeers_h	0.006** (0.002)	0.018** (0.003)	0.016** (0.004)	0.002 (0.002)	0.005* (0.002)	0.019** (0.004)	0.001 (0.002)	0.003 (0.004)	0.001 (0.004)	-0.005 (0.005)	0.001 (0.004)	-0.003 (0.005)
No_offenseXpeers_h	-0.003* (0.002)	0.005 (0.003)	0.007 (0.004)	-0.002 (0.002)	-0.001 (0.002)	0.002 (0.003)	0.001 (0.002)	0.007** (0.002)	0.005 (0.004)	-0.002 (0.002)	-0.001 (0.002)	0.004 (0.003)
Facility-by-prior-offense fixed effects	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
R-squared	0.081	0.201	0.104	0.005	0.014	0.136	0.321	0.500	0.426	0.301	0.289	0.370
Observations	1,928						1,928					

Notes: The dependent variable is recidivism (in h offense) predicted using individual and municipality characteristics, including municipality dummies, in the year of incarceration and facility fixed effects. We exclude municipality characteristics that present high multicollinearity from the set of regressors. Predicted recidivism is then regressed only on the two interacted weighted shares of peers convicted of offense h (in the head of each column) and facility-by-prior-offense fixed effects in columns (7) to (12). Each column represents a different specification. For instance, offense h in the two weighted shares of peers convicted of offense h in columns (1) and (7) is misdemeanor assault. Specifications (1) to (12) are simultaneously estimated as a SUR. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.

Table A 8: Crime-specific peer effects on recidivism (peers under the age of 26): All right hand side variables; 10 offense categories and no facility-by-prior-offense fixed effects

R.h.s. variables	Dep. var.: Indicator for recidivism with									
	Misd. assault (1)	Agg. assault (2)	Burglary (3)	Theft (4)	Fraud (5)	Stolen goods (6)	Robbery (7)	Vandalism (8)	Drugs (9)	Weapons (10)
OffenseXpeers_h (β_0)	-0.004 (0.002)	0.007 (0.007)	0.005 (0.005)	0.007 (0.006)	0.004 (0.002)	-0.010 (0.006)	0.003 (0.003)	-0.001 (0.003)	0.020* (0.009)	0.002 (0.003)
No_offenseXpeers_h (β_1)	-0.002 (0.002)	0.000 (0.001)	-0.003 (0.002)	0.002 (0.003)	-0.001 (0.001)	0.000 (0.001)	-0.001 (0.001)	-0.003* (0.001)	-0.002 (0.002)	-0.002 (0.001)
<i>Share (in%) of peers under the age of 26 (weighted averages) with criminal history characteristics in</i>										
Misdemeanor assault		-0.000 (0.001)	-0.000 (0.002)	0.002 (0.003)	-0.001 (0.001)	-0.000 (0.001)	0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)
Aggravated assault	-0.000 (0.002)		-0.002 (0.002)	0.001 (0.002)	-0.000 (0.000)	-0.001 (0.001)	0.001 (0.001)	-0.001 (0.002)	-0.001 (0.002)	0.001 (0.001)
Burglary	-0.002 (0.001)	0.000 (0.001)		0.004 (0.002)	0.000 (0.001)	0.002 (0.002)	0.000 (0.001)	-0.001 (0.001)	0.002 (0.002)	0.001 (0.001)
Theft	-0.001 (0.002)	-0.003** (0.001)	0.000 (0.002)		0.000 (0.001)	-0.001 (0.002)	0.001 (0.001)	-0.003* (0.001)	-0.002 (0.002)	0.003* (0.001)
Fraud	-0.006* (0.003)	-0.003 (0.002)	0.010* (0.005)	-0.006 (0.004)		0.002 (0.002)	0.005** (0.002)	-0.006* (0.003)	-0.004 (0.003)	-0.001 (0.002)
Stolen goods (handling)	-0.004 (0.002)	-0.001 (0.001)	0.008* (0.004)	0.004 (0.005)	-0.002 (0.001)		-0.001 (0.002)	0.001 (0.002)	0.008* (0.004)	-0.001 (0.001)
Robbery	0.000 (0.002)	-0.002 (0.001)	-0.002 (0.004)	0.003 (0.002)	0.000 (0.001)	0.000 (0.001)		-0.001 (0.002)	0.000 (0.002)	0.002 (0.001)
Vandalism	-0.004 (0.002)	-0.001 (0.001)	0.004 (0.003)	0.004 (0.004)	0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)		-0.001 (0.002)	-0.001 (0.001)
Drug-related offense	-0.003 (0.002)	-0.002* (0.001)	-0.000 (0.002)	-0.001 (0.003)	0.000 (0.001)	0.000 (0.002)	0.003** (0.001)	-0.001 (0.001)		0.001 (0.001)
Offenses against the weapons act	0.001 (0.003)	-0.001 (0.002)	0.004 (0.003)	0.000 (0.004)	0.004* (0.002)	-0.001 (0.002)	0.002 (0.002)	-0.001 (0.003)	0.005 (0.003)	
<i>Criminal behavior before first incarceration (at least one conviction in offense h, ref. category: other types of offenses)</i>										
Misdemeanor assault	0.079* (0.037)	0.002 (0.006)	-0.071** (0.010)	-0.054** (0.014)	-0.018** (0.005)	-0.004 (0.007)	0.000 (0.006)	-0.006 (0.007)	-0.026* (0.012)	-0.005 (0.005)
Aggravated assault	0.007 (0.024)	0.005 (0.027)	-0.111** (0.029)	-0.069* (0.032)	-0.002 (0.018)	-0.005 (0.014)	-0.003 (0.009)	0.009 (0.011)	0.001 (0.027)	-0.013 (0.009)
Burglary	-0.017 (0.010)	0.010 (0.010)	0.024 (0.063)	-0.039* (0.019)	-0.006 (0.008)	0.025** (0.009)	0.010 (0.013)	-0.012 (0.007)	0.010 (0.019)	0.011 (0.011)
Theft	0.046** (0.010)	-0.014** (0.005)	0.021 (0.015)	0.018 (0.056)	0.010 (0.006)	0.005 (0.006)	-0.002 (0.007)	0.019 (0.012)	0.027 (0.014)	-0.002 (0.010)
Fraud	0.009 (0.025)	-0.019* (0.009)	-0.001 (0.033)	-0.002 (0.030)	-0.030* (0.014)	0.033 (0.029)	0.010 (0.018)	-0.004 (0.014)	0.024 (0.029)	-0.019 (0.020)
Stolen goods (handling)	-0.021 (0.025)	0.008 (0.015)	-0.030 (0.024)	0.047 (0.036)	0.003 (0.015)	0.052 (0.029)	-0.010 (0.014)	0.008 (0.021)	0.009 (0.029)	-0.001 (0.020)

R.h.s. variables	Dep. var.: Indicator for recidivism with									
	Misd. assault	Agg. assault	Burglary	Theft	Fraud	Stolen goods	Robbery	Vandalism	Drugs	Weapons
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Robbery	0.038 (0.021)	0.006 (0.010)	-0.059* (0.024)	-0.102** (0.024)	-0.033** (0.009)	0.005 (0.014)	-0.011 (0.019)	-0.018* (0.007)	0.019 (0.022)	-0.007 (0.013)
Vandalism	0.019 (0.018)	-0.003 (0.007)	0.027 (0.021)	-0.024 (0.020)	-0.021** (0.006)	0.012 (0.013)	-0.001 (0.007)	0.018 (0.023)	0.011 (0.017)	-0.009 (0.009)
Drug-related offense	-0.007 (0.013)	-0.007 (0.009)	0.039 (0.026)	0.082** (0.031)	0.002 (0.012)	0.025* (0.013)	0.011 (0.012)	0.023 (0.016)	-0.023 (0.059)	0.018 (0.015)
Offenses against the weapons act	0.025 (0.015)	0.002 (0.012)	0.024 (0.025)	-0.009 (0.027)	-0.001 (0.010)	-0.005 (0.011)	-0.001 (0.012)	-0.007 (0.012)	0.012 (0.019)	-0.038* (0.020)
<i>Peer characteristics (general definition) at the time of incarceration</i>										
Share of male inmates	0.518* (0.238)	-0.027 (0.136)	-0.021 (0.312)	-0.381 (0.407)	0.116 (0.108)	0.116 (0.155)	-0.195 (0.190)	0.109 (0.200)	-0.067 (0.259)	0.047 (0.165)
Share of inmates below the age of 26	-0.270** (0.084)	-0.019 (0.066)	0.061 (0.141)	-0.066 (0.148)	-0.008 (0.035)	-0.041 (0.066)	-0.004 (0.068)	0.117 (0.080)	-0.000 (0.125)	-0.022 (0.068)
Share of inmates of non-Western origin	0.144 (0.185)	-0.026 (0.103)	0.152 (0.221)	-0.483* (0.229)	-0.111 (0.067)	-0.047 (0.141)	-0.083 (0.153)	-0.211* (0.100)	0.317 (0.252)	-0.043 (0.141)
Share of inmates non-Danish residents	-0.164 (0.260)	0.138 (0.214)	0.502 (0.344)	-0.028 (0.431)	0.081 (0.120)	-0.268* (0.136)	-0.126 (0.158)	0.109 (0.162)	-0.351* (0.169)	-0.013 (0.130)
Share of inmates with a vocational education degree	0.161 (0.150)	0.027 (0.080)	0.195 (0.186)	-0.019 (0.211)	0.024 (0.062)	-0.036 (0.055)	0.012 (0.078)	-0.130 (0.132)	-0.053 (0.093)	0.016 (0.084)
Unemployment rate in the peer's municipality of residence	-0.009 (0.014)	0.014* (0.006)	-0.005 (0.017)	-0.022 (0.024)	0.004 (0.008)	0.005 (0.010)	0.008 (0.010)	0.009 (0.011)	-0.018 (0.015)	-0.013 (0.009)
Overall youth crime conviction rate in the peer's municipality of residence	0.110 (0.064)	-0.051 (0.038)	-0.059 (0.080)	0.098 (0.090)	0.002 (0.041)	0.004 (0.047)	-0.023 (0.046)	-0.219** (0.041)	-0.019 (0.083)	0.162** (0.053)
<i>Socioeconomic individual characteristics in the year of incarceration</i>										
Male	0.070** (0.025)	0.002 (0.022)	0.103** (0.025)	-0.079 (0.041)	-0.018 (0.026)	0.009 (0.014)	0.037 (0.022)	0.026* (0.012)	-0.021 (0.031)	0.058** (0.018)
Has a vocational education degree	0.052 (0.071)	0.003 (0.009)	-0.024 (0.035)	0.096 (0.114)	0.041 (0.051)	-0.010 (0.014)	-0.007 (0.011)	0.074 (0.082)	-0.016 (0.026)	0.068 (0.076)
Ethnic Dane	0.023 (0.021)	-0.003 (0.009)	-0.007 (0.017)	-0.013 (0.027)	-0.010 (0.018)	-0.000 (0.011)	-0.016 (0.013)	-0.003 (0.010)	-0.021 (0.026)	-0.013 (0.017)
Married	0.055 (0.045)	-0.039 (0.038)	-0.001 (0.109)	0.141 (0.206)	-0.044 (0.046)	0.352 (0.272)	-0.018 (0.034)	0.003 (0.033)	0.154 (0.292)	-0.002 (0.021)
Has at least one child under 6	0.034 (0.023)	-0.004 (0.010)	-0.030* (0.015)	0.027 (0.025)	-0.002 (0.009)	-0.022** (0.008)	-0.003 (0.012)	0.006 (0.012)	0.024 (0.023)	-0.003 (0.012)
Age	-0.006 (0.005)	-0.003 (0.003)	-0.032** (0.007)	-0.024** (0.009)	-0.004 (0.004)	-0.005 (0.005)	-0.006 (0.003)	-0.002 (0.004)	-0.008 (0.011)	-0.005 (0.003)
<i>Characteristics of the municipality of residence in the year of incarceration (weighted averages)</i>										
Log of real income in DKK	1.049 (0.731)	0.377 (0.335)	1.051 (1.047)	0.687 (1.139)	-0.090 (0.386)	0.095 (0.709)	0.405 (0.444)	-1.084* (0.508)	-0.137 (0.805)	-0.667 (0.617)
Unemployment rate	-0.005 (0.012)	0.002 (0.004)	0.015 (0.013)	0.011 (0.015)	-0.002 (0.005)	-0.008 (0.009)	-0.006 (0.008)	0.007 (0.008)	-0.001 (0.013)	-0.013* (0.006)

R.h.s. variables	Dep. var.: Indicator for recidivism with									
	Misd. assault	Agg. assault	Burglary	Theft	Fraud	Stolen goods	Robbery	Vandalism	Drugs	Weapons
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Share of non-Western population	-0.005 (0.016)	0.006 (0.012)	0.009 (0.018)	0.025 (0.029)	-0.020* (0.009)	-0.019 (0.011)	0.001 (0.009)	0.046** (0.014)	-0.007 (0.019)	0.007 (0.009)
Gini coefficient	-0.331 (0.531)	-0.030 (0.226)	-0.134 (0.474)	-0.829 (0.642)	0.003 (0.173)	-0.233 (0.295)	-0.291 (0.260)	0.366 (0.306)	0.371 (0.544)	0.125 (0.187)
Crime detection rate	-0.002 (0.002)	-0.001 (0.001)	-0.000 (0.003)	0.003 (0.003)	0.002 (0.001)	-0.001 (0.002)	0.001 (0.002)	0.004* (0.002)	0.002 (0.002)	0.001 (0.001)
Youth crime conviction rate	-0.023 (0.026)	0.018 (0.016)	0.000 (0.027)	0.007 (0.026)	-0.003 (0.010)	-0.006 (0.014)	0.023* (0.011)	0.003 (0.012)	0.044* (0.021)	-0.017 (0.014)
Reported crimes per capita	-0.008 (0.008)	-0.012* (0.006)	-0.014 (0.013)	0.002 (0.015)	-0.005 (0.005)	-0.007 (0.007)	0.001 (0.007)	0.000 (0.006)	0.001 (0.010)	-0.004 (0.007)
Reported violent crimes per 10,000 inhabitants	-0.168* (0.072)	-0.015 (0.064)	-0.112 (0.115)	0.279 (0.159)	-0.026 (0.063)	-0.108 (0.071)	-0.057 (0.058)	-0.084 (0.121)	0.088 (0.104)	0.033 (0.054)
Number of pupils per class	-0.003 (0.007)	0.003 (0.002)	0.008 (0.008)	-0.007 (0.012)	-0.006 (0.005)	-0.002 (0.006)	-0.007 (0.005)	0.002 (0.003)	-0.022** (0.006)	0.011 (0.007)
Number of police officers per 1,000 inhab.	0.037 (0.132)	0.056 (0.041)	-0.176 (0.154)	-0.137 (0.178)	-0.017 (0.039)	0.026 (0.084)	-0.033 (0.104)	0.130 (0.080)	0.133 (0.155)	0.034 (0.054)
Labor market participation rate	-0.016 (0.014)	-0.007 (0.009)	-0.027 (0.017)	-0.009 (0.019)	-0.008 (0.007)	-0.008 (0.010)	0.003 (0.012)	0.013 (0.007)	-0.014 (0.011)	0.030** (0.011)
Time fixed effects	YES									
Facility-by-prior-offense fixed effects	NO									
R-squared	0.205	0.187	0.230	0.243	0.188	0.176	0.169	0.241	0.211	0.201
Observations	1,928									

Notes: Each column represents a different specification. For instance, offense h in the two interacted weighted shares of peers convicted of offense h for column (1) is misd. assault. In this table, peers are defined as other inmates below the age of 26. All specifications are simultaneously estimated as a SUR, include facility fixed effects but no facility-by-prior-offense fixed effects. The ten chosen offense categories represent offenses that are the most committed within one year upon first release and are easy to interpret for policy purposes. Robust standard errors clustered at the facility level are in parentheses. **: $p < 0.01$, *: $p < 0.05$.