Juvenile Incarceration and Crime after Release: Evidence from a Harsher Law*

Néstor Gandelman
Universidad ORT Uruguay

&

Ignacio Munyo
Universidad de Montevideo

July 2016

Abstract

We analyze the impact of longer sentence lengths in juvenile correctional facilities on criminal recidivism. We exploit a quasi-natural experiment given by a recent legal modification in Uruguay. We find that more time in custody, even under very harsh conditions; does not increase future criminal activities. Moreover, in most specifications we find a negative and statistically significant effect on recidivism. Our findings question recent empirical findings in the literature suggesting that juvenile incarceration increases post-release criminal activity.

Keywords: juvenile crime; recidivism: legal modifications.
JEL Code: K42.

* Néstor Gandelman, gandelman@ort.edu.uy; Ignacio Munyo, imunyo@um.edu.uy. We are grateful to Ruben Villaverde and Gabriel Fulco (former and current directors) of the *SIRPA-INAU (Sistema de Responsabilidad Penal Adolescente - Instituto del Niño y del Adolescente del Uruguay)* for opening the door for collaboration by approving the subsequent data releases for this project. We are also helpful to Cristina Alayón, Virginia Cura and Ivnonne Martinez, for generous conversations related to the data. We thank Daniel Mejía, Fabiana Machado and seminar participants at the IADB organized workshop "Public Policies for the Reduction and Prevention of Urban Crime in Latin America and the Caribbean" for useful comments and suggestions. We thank Eyal Brenner for his research assistance. Errors and omissions are the authors' only responsibility.

This work benefited from funding provided by the Inter-American Development Bank.

I. Introduction

We present new evidence on an open public policy discussion: How longer periods in juvenile correctional facilities affect crime after release? To answer this question we exploit a quasi-natural experiment given by a recent legal modification in Uruguay. We find that more time in custody, even under very harsh conditions, does not increase criminal recidivism.

Criminal court records in Uruguay indicate that youth crime tripled between 2001 and 2010. In 2010, minors aged 13-17 comprised roughly 8 percent of the total population, but accounted for 15 percent of total offenses, 26 percent of the homicides and more than 40 percent of all robberies in the country (Munyo 2013). Uruguay is not an exception as juvenile delinquency is increasing in almost every country in Latin America (Frühling and Martínez 2011), and rose in almost every part of the world in the 1990s (United Nations 2004, 2007). This spike in juvenile delinquency has triggered a strong debate over the effectiveness to increase the level of punishment to deal with young offenders.[1]

From a theoretical point of view, an increase in the sentence length has ambiguous effects on the propensity of inmates to commit crimes after release. On the one hand, deterrence theories predict that harsher punishments will decrease the likelihood to recidivate (Smith and Gartin 1989). The unpleasantness of life in custody and the negative social stigma associated with incarceration should serve as deterrents to later criminal behavior. On the other hand, both correctional facilities as a criminal learning environment (Chen and Shapiro 2007; Bayer at al. 2009; Camp and Gaes 2009; DeLisi et al. 2011) and the interruption in the accumulation of work-related skills coupled with labor market stigmatization after incarceration (Western 2002; Holzer 2007) may increase the likelihood to recidivate. In this case, a longer spell of incarceration would generate incentives for criminal involvement after release. In line with this theoretical ambiguity, recent empirical evidence in the Netherlands finds no effects of sentence length on recidivism (Snodgrass et al. 2011). Moreover, after a deep review of the criminological literature on the effects of incarceration, Nagin et al. (2009) state the existing research is

[1] Juvenile offending refers to a wide range of violations of legal and social norms, from minor offenses to serious crimes. The focus of this paper is on serious juvenile crime.

limited in size, in quality, and in its insights into why a prison term might be preventative or *criminogenic*.

More specifically, the empirical evidence on the effects of harsher punishment to juvenile crime is also inconclusive in the literature. Whereas several criminological studies in the U.S. find no evidence of general deterrent effects (Singer 1988; Jensen and Metsger 1994; Steiner et al. 2006), the economic literature all over the world finds that harsher punishments deter potential juvenile offenders (Levitt 1998; Imai and Krishna 2004; Mocan and Rees 2005; Oka 2009; Entoff 2011; Ibáñez et al. 2013).[2]

Recent empirical work on specific deterrence effect of juvenile incarceration is also ambiguous.[3] On the one hand, Hjalmarsson (2009) finds that juvenile incarceration reduces recidivism by 13 percentage points after taking advantage on discontinuities in punishment that arise in Washington State's juvenile sentencing guidelines, The deterrent effect is observed for a wide range of youths, including those who are older, criminally experienced, and charged with a violent offense, contradicting assertions that juvenile correctional facilities are ineffective at combating crime. On the other hand, Aizer and Doyle (2015) examine the outcomes of comparable youths in the U.S. who are randomly assigned to judges who differ in their sentencing severity and find that confined juvenile have 25-year reconviction rates 22 percentage points higher than juveniles charged with a crime in court but not incarcerated. In Latin America, Romero (2012) studies the approval of a lenient juvenile crime regulation juvenile in Colombia. In the same line, he finds that criminal recidivism among adolescents sent to serve their punishment in correctional facilities is 15 percent higher than the recidivism of similar juveniles sentenced to alternative punishments.

Moestue et al. (2013) systematically review the empirical evidence on youth violence prevention programs in Latin America and conclude that given the limited number of high-quality impact evaluations of youth violence interventions, there is still weak empirical evidence for determining what works and what does not. Following an alternative approach, Munyo (2015) develops a dynamic model

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[2] General or indirect deterrence aims to discourage persons other than the offender, from committing a similar offence.

[3] Specific deterrence aims to persuade the person who committed the crime from future criminal acts by instilling an understanding of the consequences.

of adolescent behavior to analyze alternative measures in the fight against juvenile crime along the lines of Becker (1968) rational model of crime. The calibrated model to Uruguay suggests that longer sentences in correctional facilities could be an effective measure in dealing with juvenile offending. However, he also finds that if the transmission of crime-related skills in correctional facilities were strong enough, a longer confinement would increase the likelihood of recidivism.

In this paper, we go to new data to evaluate the impact on recidivism of a recent legal modification in Uruguay that significantly increases the level of punishment of young offenders. More specifically, we exploit an increase of the sentence length faced by Uruguayan youths after the enactment of the law 19,055 (in January 2013) that establishes a minimum sentence of one year for those committing serious crimes such as robberies, rapes, kidnappings, or homicides.[4] Our identification strategy follows a *difference-in-difference* estimation based on the analysis of the behavior of those that committed robberies vis á vis the behavior of those that committed thefts (also a property crime but not affected by the law), before and after the new law. We find that more time in custody, even under very harsh conditions; does not increase future criminal activities. Moreover, in most specifications we find a negative and statistically significant effect on recidivism. An increase of 50 percent in the average sentence length came hand in hand with a 20 percent reduction in recidivism. We report various robustness tests and all of our results imply that longer sentence lengths do not increase juvenile crime after release.

The paper continues as follows: Section II presents the institutional background for the quasi-natural experiment; Section III describes the data and presents the empirical strategy; Section IV reports the results; and Section V concludes.

II. Institutional background and quasi experiment

The *Instituto del Niño y del Adolescente del Uruguay* (INAU, Child and Adolescent Uruguayan Agency) is the public agency in charge of safe-warding the rights of children and adolescents in

[4] This law amended the lenient juvenile crime code approved in 2004 (law 17,823) to align Uruguay legislation with international treaties and agreements.

Uruguay. INAU is a large institution with many programs, among them the control of participation of minors in shows, their contents, and attending juvenile crime. Within INAU, the *Sistema de Responsabilidad Penal Adolescente* (SIRPA, Juvenile Penal System) is responsible to implement the judicial decisions in regards to adolescents that have committed crimes. In doing so, SIRPA explicitly promotes a socio-educational process to favor reentry: the reincorporation of this youth into society.

According to the 2012 annual report, in that year SIRPA-INAU attended a monthly average population of 619 adolescent inmates that by judicial decision have been deprived of their liberty (INAU 2012). This was done in juvenile correctional facilities most of them located in the metropolitan area of Montevideo (the capital of Uruguay, roughly 1.5 million of inhabitants). The rotation of the inmates is high with an average incoming of 60 adolescents per month.

There is a wide variability in confinement conditions in the juvenile correctional facilities: some of them with lower security levels, some of them of higher security levels. According to INDDHH (2014), the living conditions for the inmates in correctional facilities are inadequate, to say the least. In addition, rehabilitation and social reinsertion activities are practically absent as opportunity to engage in productive activities when convicted are very scarce. The assignment criterion of juveniles to each facility was not random by design. However, there was no a formal protocol of assignment. The former Director of SIRPA told us that previous authorities used to assign according to spot availability in correctional facilities. After several conversations with SIRPA's officials and different answers to the question of how juveniles are assigned, we interpret that the process is obscure (almost random, in fact). In the Appendix we present evidence that for the most there are no statistical difference in assignment of juveniles by type of crime (thefts or robberies) and that there are no statistical significant difference in recidivism that can be attributed to particular correctional facilities.[5]

Under the law 17,823 approved in 2004, the average sentence length in the period 2009-2010 in juvenile correctional facilities was about 7 months (López and Palummo 2013). By the approval of the

[5] In Table A1 of the appendix we present difference in means t-test in the assignment to juvenile correctional facilities. We assign the corresponding dummy variable to the facility in which the minors spent most of their time in custody.

law 19,055 in January 2013, there was a legal modification that increased the minimum incarceration period for a specific set of severe offenses but did not alter others. These offenses include homicide, rape and robberies. For all these crimes the minimum sentence was established to be at least one year of incarceration. We interviewed qualified agents in the adolescent penal system, and they confirmed us the new law is strictly followed by every judge in each adolescent trial. Therefore, this legal change provides a quasi-natural experimental framework to test the effects of the time of juvenile incarceration on recidivism.

It is worth mentioning that in July 2011, the government approved two laws modifying the law 17,823 of 2004. The law 18,777 criminalized attempted theft and attempted severe offenses committed by adolescents as well as complicity in theft and severe offenses. The law 18,778 allows juvenile prosecutors to ask to the judge for the maintenance (for a maximum of two years) of juvenile criminal records for severe offenses, which were unsealed from adult courts. According to qualified informants in the juvenile justice system, prosecutors rarely applied this option. Though important, laws (18,777 and 18,778) are irrelevant for our results because both were effective, without changes in their application, during all the period of our study.

III. Data and Methods

Data

We gather data from the government agency in charge of the conviction of juvenile offenders: SIRPA-INAU. The database includes information on age, gender, crime committed, type of measures requested by the court, previous educational level, and some information on his family or group with whom it used to live. We have this data for the universe of juvenile offenders in Uruguay from the beginning of 2011 to February 2016. This paper analyzes those that committed robberies or thefts.

Every individual in the juvenile system has a code that allows us to identify them over time. However, due to legislative protection of the anonymity of minors that have engaged in criminal activities, we are not able to track the behavior of these juveniles in the adult penal system. In Uruguay, the adult penal system attends crimes committed after 18 years old. This presents a limitation to our study since we are only able to measure recidivism within the juvenile system. To avoid any bias of our estimates we work with individuals that were less than 17.5 years old when released so that to have a 180-day window to evaluate potential recidivism.

We have to take into account that our database considers the effective detention time of juveniles, not their sentence time. For this reason, in the raw data there were some cases with very few days under custody released as soon as there was no judicial sentence that impose confinement as well as some extreme sentences lengths for especially problematic minors. In order to be sure that our results are not produced by outliers we drop the observations corresponding to the top and bottom fifth percentile of sentence length.

In Table 1 we present the number the juveniles of the database in terms of episodes of releases and escapes from juvenile correctional facilities. The dataset comprises information on the universe of juveniles (473) under study. In the case of the escapes, we extract the exact time outside the correctional facility to measure the effective detention length.

For our estimations we construct two databases. First we consider only the first incarceration period and its posterior release, for a total of 473 observations. In doing so we are omitting the use of relevant data but focusing on a set of more homogeneous individuals. In our second database we make use of the additional data that comes from the subsequent releases of multiple offenders. To do so we considered as a new observation each additional release per juvenile who completed their sentence. In theory, this could increase the number of observations to 677 (see Table 1: 677 = 324+ 107*2 + 32*3 +7*4 + 3*5). In practice we end up with 561 observations since some individuals are released from their second or third sentence after being 17.5 years old or the second time they are incarcerated is not due to a theft or robbery.[6]

[6] In our estimates we control for common shocks for individuals that appear more than once.

Summary statistics for key variables are reported in Table 2. About 65 percent committed robberies. The average sentence length is 220 for the database that considers only the first release and 209 days for the dataset that considers every release. In both datasets, the median sentence is six months. The difference between the age at release and the age at conviction is coherent with the average sentence length. The education level of inmates is very low. In Uruguay there is almost no illiteracy but on average inmates have not finished primary school. There are a small percentage of inmates that attended special educational facilities due to some type of intellectual or psychological disorder.

Given the date of the legal modification (January 2013), in order to have enough observations, we consider a window of 180 days as the maximum possible for recidivism. This is not a major shortcoming as long as empirical evidence shows that most criminal recidivism occurs within the first year after release (Langan and Levin 2002). For instance, recidivism within the first year after release is close to 50 percent in the U. S. and Australia (Jones et al. 2006).

For robustness, we report two other measures of recidivism: 60 and 30 days. Note that by construction 180-day recidivism potentially includes fewer cases than 60-day and 30-day recidivism. This is because in our dataset ends in February 2016 and for some cases there were less than 180 days since the date of the release. For these individuals we do not compute the variable recidivism. Similarly, 30-day recidivism includes more cases than 60-day recidivism. As expected, recidivism at 180 days is larger than at 60 days that is it larger than at 30 days.

In the second database where we considered each additional release of multi-offenders as a new observation, recidivism is larger than in the first one. By definition, those that have been released more than once have committed crimes more than once. They seem to be more prone to repeat this pattern in the future.

Empirical strategy

In January 2013, by the approval law 19,055 the Uruguayan government introduced a legal modification that defined a minimum incarceration period of one year for a specific set of severe juvenile offenses. In particular, the legal modification increased the conviction time for robberies but not for thefts.[7] Robberies and thefts are the two more common crimes committed by juveniles.[8] Robbery is defined as depriving a person of property with the use of violence or threat of violence. Theft is defined as depriving a person of property without the use of violence or threat of violence.

Given that robberies and thefts are both property crimes with the only difference in the use or threat of violence, they became natural candidates to exploit the quasi-natural experiment produced by the law 19,055. Therefore, we consider those juveniles who committed robberies as the treated group and those juveniles who committed thefts as the control group. Munyo and Rossi (2013) provide evidence to support the assumption that thefts and robberies react in a similar way to observable characteristics. Both types of crimes have a similar daily pattern, have a similar weekly pattern, have a positive trend during the sample period, rise with temperature and hours of sunshine, and decrease with temperature squared, rainfall, and during holidays.

In Table 3 we present mean difference's t-tests between those juveniles committing thefts and those committing robberies. Both groups seem to be fairly similar in observed characteristics. The only notable difference is that those committing thefts are more likely to have a brother incarcerated within the SIRPA system. We consider dummies for the year in which the crime was committed and there are no differences in the average occurrence over time.

In order to provide a rigorous estimation we use a *difference-in-difference* framework (Card 1992; Gruber 1994). The *difference-in-difference* methodology controls not only for selection bias due to observable characteristics but also to unobservable characteristics that remain constant along the time (Abadie 2005; Athey and Imbens 2006; Donald and Lang 2007). In our setting, this involves a comparison of changes in the probability of recidivism before and after the intervention (the legal modification) and between the treatment (robberies) and control (thefts) groups.

[7] Strictly speaking the judicial measure is a privation of freedom and not an incarceration in the sense that the correctional facilities used for allocating offenders are not prisons.
[8] According to López and Palummo (2013), in the period 2005-2010, 65 percent of the offenses committed by adolescents were robberies and 20 percent thefts.

The first order of business is to check whether the legal modification in fact affect sentence length. In Table 4 we present evidence in this line. The mean sentence length of those affected by the new law substantially increased from 227 to 348 days if we consider only the first release from the juvenile correctional facility or from 222 to 340 if we consider every release as a new observation. The median sentence length increased from six months to one year after the legal modification in the case of robberies in both databases. As expected, law 19,055 in fact was effective to introduce harsher punishment for robberies. At the same time, the effective sentence length for thefts also increased but by a much lower amount. The mean sentence length increased from 158 days to 195 if we consider only the first release from the juvenile correctional facility or from 154 to 171 if we consider every release as a new observation.

We then proceed to analyze the effect of longer sentence lengths on recidivism. Under the *difference-in-difference* methodology we compare recidivism rates in four groups: (i) recidivism of those committing a robbery before the law 19,055; (ii) recidivism of those committing a robbery after the law 19,055; (iii) recidivism of those committing a theft before the law 19,055; (iv) recidivism of those committing a theft after the law 19,055. The average values are depicted in Table 5.

The effect of a longer sentence length cannot be measured as the difference between (iv) and (iii) since something might have happened over time in Uruguay that could affect recidivism rates. For instance, an increase in policy presence in the streets might be a deterrent of crime and if this increase was implemented concomitant with law 19,055, the difference between (iv) and (iii) would be a downward biased estimate of the effect of the longer incarceration time. The difference between (iv) and (ii) informs of differences in the average recidivism between those committing robberies and those committing thefts after the approval of the new law. This cannot be attributed to the law because there might be some ex ante differences in recidivism between the treatment and the control group. Assuming that all other things affecting robberies also affect thefts in a similar way, the difference in the difference [(iv)-(iii)]-[(ii)-(i)] would be the proper measure. According to Table 5, by considering only the first release, the *difference-in-difference* are -0.166 for 180-day recidivism, -0.135 for 60-day recidivism, and -0.128 for 30-day recidivism Once we take into account the observations after every release, the *difference-in-difference* is -0.234 for 180-day recidivism, -0.184 for 60-day recidivism, and -0.135 for 30-day recidivism. At first sight, these numbers suggest a reduction in the likelihood of re-offence after the legal modification.

We have to check the statistical significance of both the treatment given by the approval of the law 19,055 and its effects on recidivism. In order to do so, we run Equation (1) by Ordinary Least Squares:

$$Y_{ijt} = \beta_0 + \beta_1 Robbery_i + \beta_2 After_t + \beta_3 After_i * Robbery_i + \gamma X_{ijt} + \varepsilon_j + \varepsilon_{it} \quad (1)$$

Y_{ij} is the effective sentence length of the *i-th* juvenile released at any point of time included in the dataset, or a binary variable that takes the value 1 if the *i-th* juvenile performs a new crime within a certain time frame after released. The *i-th* juvenile may belong to a certain group *j* that is affected by some common shock (ε_j). For instance, in the database with multiple releases it is natural to assume that the error terms of the first and subsequent releases are correlated. Even in the database with only the first release, there are many cases of brothers (that we observe by an individual code assigned to mothers of inmates) that are also affected by common shocks. In our estimations we cluster by brother and same individuals in order to properly correct the standard errors. To do so we define one cluster for each *j* group. In the database with only the first release two individual belong to the same group if they are brothers. In the complete database, two observations belong to the same group either if they refer to the same individual (e.g. his first and second release) or if they refer to brothers. The error form assumed in Equation (1) allows for intragroup correlation, relaxing the requirement that the observations are individually independent. We assume that they are independent across clusters but not necessarily within them. This assumption does not affect the point estimates; it only affects the covariance matrix of the estimators and therefore its significant levels.

$Robbery_i$ is a dummy variable taking the value one for those juveniles committing robberies (before or after the passing of the law 19,055; i.e. January 2013). $After_i$ takes the value one for all crimes committed since February 2013. The coefficient multiplying $Robbery_i$ reflects baseline differences in the probability of committing a new crime between those that committed robberies (the treatment group) and those that committed thefts (the control group). The coefficient of $After_t$ reflects changes in the effective sentence length due to the passing of time. The effect of the legal modification on the effective sentence length or on recidivism on those who committed a robbery is captured by the interaction term (coefficient β_3).

Given the quasi-experimental framework and not a randomized trial or pure experiment, we include in X_{ijt} a set of controls for other individual variables that could affect recidivism such as age, gender, educational background, and type of juvenile correctional facility. In the estimations with controls we have less observations due to incomplete records for some control variables.

Our main identifying assumption is that, in absence of the legislative change, sentence length and recidivism rates would have followed a similar trend for those committing robberies and those committing thefts. Figure 1 allows for visual inspection of this parallel trends assumption for the average sentence length in both databases. In spite of differences in levels, most graphs do seem to meet this criterion. The same holds true for recidivism as depicted in Figure 2.

IV. Results

The results stated in Table 6 confirm that the treatment given by the legal modification in Uruguay was statistically significant.

In all the specifications we find an increase of more than two months in the average sentence length for those juveniles who committed robberies. There are no relevant difference if we consider as the dependent variable the effective sentence length of the first conviction in the correctional facility in the model without controls (column (1)) and in the model including controls (column (2)), or once we consider each period in the correctional facility as a different observation in the model without controls (column (3)) and in the model including controls (column (4)). In all the estimations we also find that, ex ante, there were differences in sentence length between those committing thefts and robberies of about 70 days. Therefore, the increased in sentence length captured by the interaction term is of a similar magnitude that the ex ante differences. This is equivalent to say that the law duplicated the differences in sentence length between those committing thefts and robberies.

The main results of the paper come from the estimates of recidivism presented in Table 7. We start by estimating the basic *difference-in-difference* specification. Then we include controls for individual characteristics and controls for the jurisdictional facility were spent most of their incarceration time.

The results on 180-day recidivism suggest that the treatment given by the legal modification in Uruguay affected recidivism. In all the specifications we find a negative coefficient for the impact on re-offense after release once juveniles have finished a conviction period for robberies. The relevant coefficient is statistically significant in the estimations based on the first conviction in the model without controls (column (1)) but not in the model including controls (columns (2) and (3)). However, as long as we increase the number of observations by considering each period in the correctional facility as a different observation, the results become statistically significant both in the model without controls (column (4)) and in the model including controls (columns (5) and (6)). The result is not only statistically significant but also economically relevant: a longer period of juvenile conviction causes a 20 percent reduction in 180-day recidivism. In other words, given that the average increase in sentence length was 50 percent, the elasticity of recidivism for those committing robberies is about 0.4.

In order to present further evidence on the effect of longer sentences on juvenile criminal recidivism, we run a series of robustness checks. We first rerun the same regressions but now considering shorter time window for recidivism: 60 and 30 days after release. The results reported in Table 8 are similar in both cases. Almost in all the specification, the relevant coefficient is statistically significant. The estimated reduction on recidivism ranges from 13 to 17 percentage points.

Finally, in Table 9 we report two placebo tests. We present both false experiments in the bigger database considering every release but the results are the same in either one. In the first placebo test we artificially modify the time of application of the treatment to compare two time windows where the treatment was not in place. Instead of considering the data after the law, we consider the window February 2012 -January 2013. In the second placebo test we change the control group: Instead of using thefts we use those committing violent crimes different from robbery (murder, rape, etc.). This group was also affected by the increase in incarceration time produced by the legal modification. In columns (I.1) to (I.3) we report the first placebo and in columns (II.1) to (II.3) the second. In all these estimations the statistically significant results disappear.

V. Conclusion

There is a longstanding debate over the effectiveness of juvenile punishment. There are arguments suggesting incarceration could deter future offenders as well as others suggesting the experience of being incarcerated causes individuals to increase the likelihood to recidivate. Thus, solving this debate is an open empirical question with key policy implications.

Here we present new evidence that longer punishment in a harsh context could be consistent with a reduction in recidivism rates. A caveat that we acknowledge is that as long as we do not have data for adults we do not consider long run effects on future adult crime. Therefore, we are unable to compare our results with those of Aizer and Doyle (2015).

Our result apparently contradicts recent empirical findings in the literature suggesting that harsh prison conditions increase post-release criminal activity (e.g. Drago et al. 2011). However, our results could favor the literature that suggests a U-shaped relationship between severity of punishment and future criminal behavior, with an optimal level of punishment minimizing the likelihood of recidivism (Pinchler and Romer 2011). Harsher punishments would reduce recidivism if the levels of punishments are relatively low, and harshness would increase recidivism if punishments are too high. Thus, the optimal level of punishment should deter offenders and minimize re-offense by facilitating future reintroduction into the legal economy. In this line, the legal modification in Uruguay suggests the increase in the level of punishment within the juvenile system seems to be on the downward side of this theoretical "U".

The introduction of harsher punishments should seek to avoid crossing the line in which the "cure could prove to be worse than the disease". If the acceleration in the transmission of crime-related skills and the interruption in the accumulation of work-related skills in detention centers were strong enough they could offset the potential reduction in juvenile crime achieved through deterrence from harsher punishments.

At the end, this study questions the general perception that the increase in incarceration rates is not an effective public policy and suggests digging further on this issue.

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Tables

Table 1. Classification of Juveniles

		Release 1	2	3	4	5	Total
Escape	0	303	89	27	5	3	427
	1	19	13	4	2	0	38
	2	2	3	1	0	0	6
	3	0	2	0	0	0	2
	Total	324	107	32	7	3	473

Notes: Each cell denotes number of juveniles.

Table 2. Summary Statistics

	Mean	Median	St. Dev.	Min.	Max.	Obs.
Database considering only first release						
Sentence length (days)	220	183	156	19	596	473
180-day recidivism	0.302	0.000	0.460	0.000	1.000	467
60-day recidivism	0.127	0.000	0.333	0.000	1.000	473
30-day recidivism	0.070	0.000	0.255	0.000	1.000	473
Robbery	0.660	1.000	0.474	0.000	1.000	473
Male	0.932	1.000	0.251	0.000	1.000	473
Age at conviction	15.7	15.8	0.9	13.2	17.4	473
Age at release	16.3	16.5	0.9	13.7	17.5	473
Years of schooling	5.3	6.0	1.9	0.0	8.0	320
Special education	0.031	0.000	0.172	0.000	1.000	327
Escape record	0.097	0.000	0.297	0.000	1.000	473
Database considering every release						
Sentence length (days)	209	180	152	19	554	561
180-day recidivism	0.350	0.000	0.477	0.000	1.000	551
60-day recidivism	0.163	0.000	0.369	0.000	1.000	560
30-day recidivism	0.089	0.000	0.285	0.000	1.000	561
Robbery	0.611	1.000	0.488	0.000	1.000	561
Male	0.930	1.000	0.255	0.000	1.000	561
Age at conviction	15.8	15.9	0.9	13.2	17.4	561
Age at release	16.4	16.6	0.9	13.7	17.5	561
Years of schooling	5.3	6.0	1.8	0.0	8.0	395
Special education	0.027	0.000	0.164	0.000	1.000	401
Escape record	0.103	0.000	0.305	0.000	1.000	561

Table 3. Mean Difference Between Juveniles Who Committed Thefts and Robberies

	Thefts			Robberies					
	Mean	SD	Obs.	Mean	SD	Obs.	Mean diff.	t-test	
Age first incarceration	15,8	1,0	161	15,7	0,8	312	0,1	1,3	
Education (years)	5,4	1,8	106	5,3	1,9	214	0,1	0,5	
Escaped after incarceration	0,07	0,26	161	0,11	0,31	312	0,0	-1,2	
Male	0,94	0,24	161	0,93	0,26	312	0,0	0,3	
Has a brother incarcerated	0,12	0,32	161	0,04	0,21	312	0,1	3,0	***
Dummy 2011	0,22	0,42	218	0,23	0,42	343	0,0	-0,2	
Dummy 2012	0,31	0,46	218	0,27	0,45	343	0,0	1,0	
Dummy 2013	0,23	0,42	218	0,27	0,45	343	0,0	-1,1	
Dummy 2014	0,15	0,35	218	0,16	0,37	343	0,0	-0,4	

Notes: *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.

Table 4. Sentence Length in days by Type of Crime Before and After Law 19,055

	Theft		**Robbery**	
	Before	**After**	**Before**	**After**
Database considering only first release				
Mean	158	195	227	348
Median	**112**	**153**	**183**	**364**
Min.	19	19	19	19
Max.	595	587	596	595
Obs.	151	94	285	311
Database considering every release				
Mean	154	171	222	340
Median	**113**	**100**	**184**	**364**
Min.	19	19	19	19
Max.	545	553	554	549
Obs.	194	156	329	365

Table 5. Average Recidivism by Type of Crime Before and After Law 19,055

	Theft		Robbery	
	Before	**After**	**Before**	**After**
Database considering only first release	(i)	(ii)	(iii)	(iv)
180-day recidivism	0.337	0.317	0.368	0.182
60-day recidivism	0.089	0.133	0.178	0.087
30-day recidivism	0.040	0.100	0.103	0.036
Database considering every release	(i)	(ii)	(iii)	(iv)
180-day recidivism	0.395	0.424	0.401	0.196
60-day recidivism	0.145	0.202	0.214	0.087
30-day recidivism	0.073	0.128	0.120	0.040

Table 6. Impact of the Law 19,055 on Sentence Length

	Dependent variable: Sentence length			
	(1)	(2)	(3)	(4)
Robbery	75.22***	74.82***	70.83***	70.30***
	(17.55)	(20.58)	(15.77)	(18.29)
After	46.31*	45.33*	30.25	31.12
	(23.72)	(26.87)	(19.24)	(22.46)
Robbery*After	61.50**	63.14*	66.53***	60.17**
	(28.38)	(32.57)	(24.93)	(28.81)
Male		56.34*		51.64**
		(29.83)		(24.47)
Age at conviction		-46.34***		-49.78***
		(8.601)		(8.566)
Years of schooling		-6.394		-2.874
		(4.144)		(3.561)
Special education		-4.412		18.68
		(43.85)		(39.80)
Constant	133.5***	858.2***	134.6***	902.6***
	(13.26)	(136.9)	(11.83)	(138.1)
Observations	473	320	561	395
R squared	0.189	0.273	0.169	0.249

Notes: All regressions are OLS models. Clustered standard errors are in parentheses, which are adjusted for common shocks due to brothers or multiply convictions. In columns (1) and (2) the dependent variable is the effective sentence length of the first conviction in the correctional facility. In columns (3) and (4) we consider each period in the correctional facility (for juveniles that completed sentence length for more than one offense) as a different observation. *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.

Table 7. Impact of Longer Sentences on Recidivism

	Dependent variable: 180-day recidivism					
	(1)	(2)	(3)	(4)	(5)	(6)
Robbery	0.031	-0.029	-0.059	0.006	0.001	-0.022
	(0.060)	(0.079)	(0.079)	(0.060)	(0.076)	(0.075)
After	-0.020	-0.115	-0.138	0.029	-0.041	-0.073
	(0.076)	(0.096)	(0.100)	(0.073)	(0.090)	(0.091)
Robbery*After	-0.166*	-0.133	-0.134	-0.234***	-0.217**	-0.201*
	(0.091)	(0.116)	(0.118)	(0.087)	(0.107)	(0.108)
Male		0.058	0.096		0.080	0.112
		(0.106)	(0.138)		(0.110)	(0.135)
Age at conviction		0.000	-0.013		0.024	0.015
		(0.032)	(0.043)		(0.029)	(0.039)
Years of schooling		-0.010	-0.011		-0.029*	-0.031*
		(0.017)	(0.018)		(0.018)	(0.018)
Special education		-0.066	-0.100		-0.221	-0.264
		(0.193)	(0.197)		(0.181)	(0.182)
Constant	0.337***	0.482	0.708	0.395***	0.203	0.372
	(0.047)	(0.505)	(0.666)	(0.049)	(0.472)	(0.611)
Juv.Correcional Facility Dummy	No	No	Yes	No	No	Yes
Observations	467	315	315	551	386	386
R squared	0.028	0.056	0.107	0.037	0.065	0.106

Notes: All regressions are Ordinary Least Squares models. Clustered standard errors are in parentheses, which are adjusted for common shocks due to brothers or multiply convictions. In columns (1), (2), and (3) the dependent variable takes a value of one if the juvenile commits crime exclusively after the first release from the correctional facility. In columns (4), (5), and (6) we consider each episode of recidivism observed (for juveniles that completed sentence length for more than one offense) as a different observation. *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.

Table 8. Impact of Longer Sentences on 60-Day and 30-Day Recidivism

	I. Dependent variable: 60-day recidivism						**II.** Dependent variable: 30-day recidivism					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Robbery	0.089**	0.101*	0.094*	0.068	0.099*	0.090	0.064**	0.086**	0.077**	0.047	0.066	0.051
	(0.041)	(0.056)	(0.056)	(0.045)	(0.057)	(0.056)	(0.030)	(0.038)	(0.038)	(0.033)	(0.045)	(0.043)
After	0.044	0.026	0.018	0.057	0.020	-0.002	0.060	0.086	0.074	0.055	0.056	0.029
	(0.052)	(0.067)	(0.072)	(0.054)	(0.068)	(0.069)	(0.043)	(0.053)	(0.058)	(0.042)	(0.054)	(0.053)
Robbery*After	-0.135**	-0.144*	-0.135	-0.184***	-0.180**	-0.154*	-0.128**	-0.174***	-0.163**	-0.135***	-0.164**	-0.135**
	(0.065)	(0.084)	(0.087)	(0.067)	(0.085)	(0.086)	(0.051)	(0.064)	(0.067)	(0.052)	(0.066)	(0.066)
Male		0.092*	0.135		0.145***	0.188***		0.013	0.093		0.051	0.112*
		(0.054)	(0.083)		(0.043)	(0.071)		(0.053)	(0.081)		(0.041)	(0.066)
Age at conviction		-0.014	-0.020		0.015	0.004		-0.025	-0.040*		0.000	-0.003
		(0.023)	(0.030)		(0.024)	(0.032)		(0.017)	(0.022)		(0.018)	(0.023)
Years of schooling		-0.015	-0.016		-0.033**	-0.034**		-0.015	-0.015		-0.027**	-0.025*
		(0.013)	(0.013)		(0.015)	(0.016)		(0.011)	(0.011)		(0.013)	(0.014)
Special education		-0.285***	-0.288***		-0.416***	-0.420***		-0.190***	-0.186***		-0.270***	-0.261***
		(0.082)	(0.090)		(0.094)	(0.102)		(0.068)	(0.071)		(0.080)	(0.085)
Constant	0.089***	0.335	0.448	0.145***	-0.014	0.170	0.040**	0.501*	0.745**	0.073***	0.187	0.245
	(0.028)	(0.373)	(0.477)	(0.035)	(0.385)	(0.506)	(0.019)	(0.271)	(0.345)	(0.025)	(0.293)	(0.360)
Juv.Correcional Facility Dummy	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Observations	473	320	320	560	394	394	473	320	320	561	395	395
R squared	0.016	0.039	0.066	0.020	0.065	0.098	0.016	0.049	0.075	0.016	0.050	0.087

Notes: All regressions are Ordinary Least Squares models. Standard errors are in parentheses, which are adjusted for common shocks due to brothers or multiply convictions. In columns (I.1), (I.2), (I.3), (II.1), (II.2), and (II.3) the dependent variable takes a value of one if the juvenile commits crime exclusively after the first release from the correctional facility. In columns (I.4), (I.5), (I.6), (II.4), (II.5), and (II.6) we consider each episode of recidivism observed (for juveniles that completed sentence length for more than one offense) as a different observation. *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.

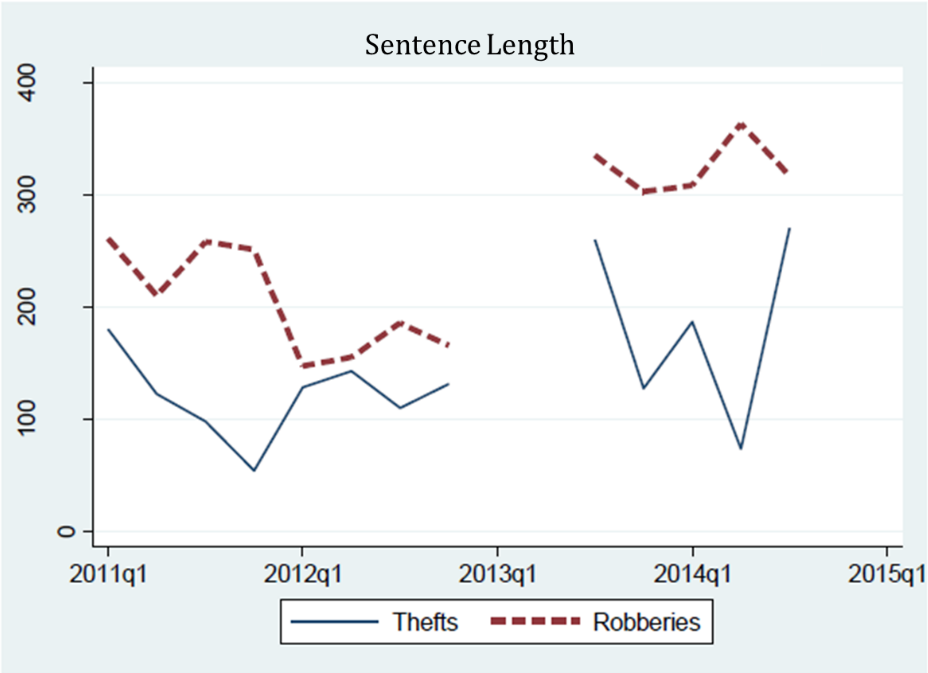
Table 9. Placebo tests (180 days recidivism)

	I. After defined before the application of law 19,055			II. Control group defined as those that committed violent crimes other than robberies		
	(1)	(2)	(3)	(1)	(2)	(3)
Treatment	0.059	0.024	-0.052	-0.185***	-0.245***	-0.252***
	(0.082)	(0.102)	(0.099)	(0.067)	(0.088)	(0.087)
After	0.048	-0.013	-0.087	0.029	-0.039	-0.034
	(0.093)	(0.115)	(0.120)	(0.073)	(0.091)	(0.092)
Treatment*After	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	-0.122	-0.059	0.037	-0.132	-0.069	-0.084
	(0.118)	(0.148)	(0.154)	(0.094)	(0.118)	(0.117)
Age at conviction		0.219*	0.342**		0.092	0.009
		(0.120)	(0.158)		(0.096)	(0.132)
Years of schooling		0.013	-0.035		0.025	-0.002
		(0.039)	(0.048)		(0.028)	(0.038)
Special education		-0.028	-0.033		-0.032	-0.032
		(0.025)	(0.027)		(0.021)	(0.023)
Constant		-0.309	-0.382		-0.055	-0.079
		(0.230)	(0.246)		(0.218)	(0.193)
Juv. Correcional Facility Dummy	No	Yes	Yes			
Observations	316	216	216	376	255	255
R squared	0.004	0.031	0.126	0.079	0.126	0.189

Notes: All regressions are Ordinary Least Squares models. Standard errors are in parentheses, which are adjusted for common shocks due to brothers or multiply convictions. The dependent variable takes a value of one if the juvenile commits a crime after being released from the correctional facility. We consider each episode of recidivism observed (for juveniles that completed sentence length for more than one offense) as a different observation. *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level.

Figure 1. Parallel Trends in Sentence Length

<u>Database considering only first release</u>



<u>Database considering every release</u>

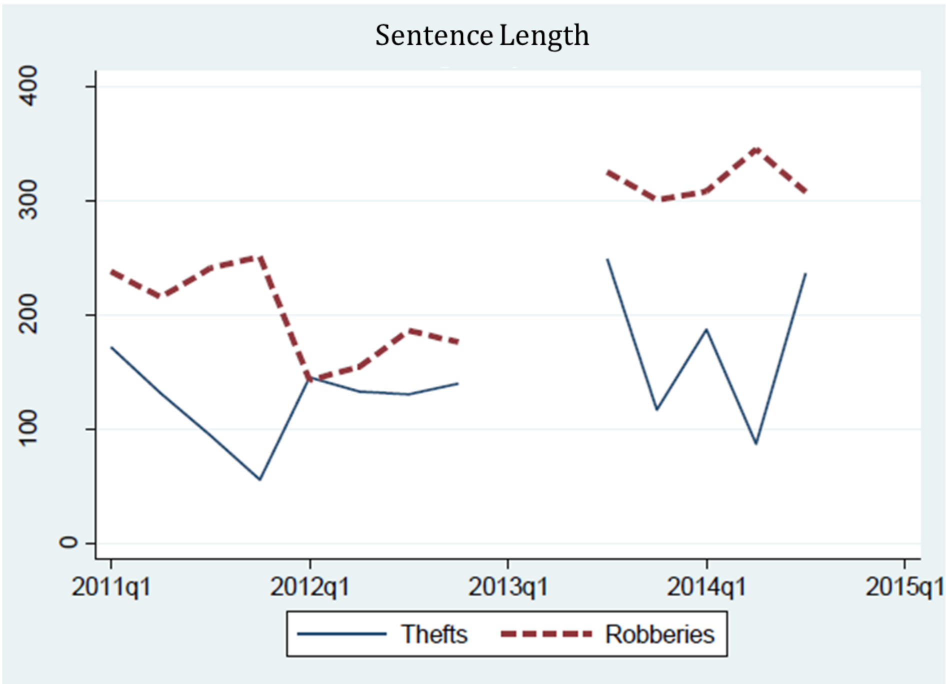
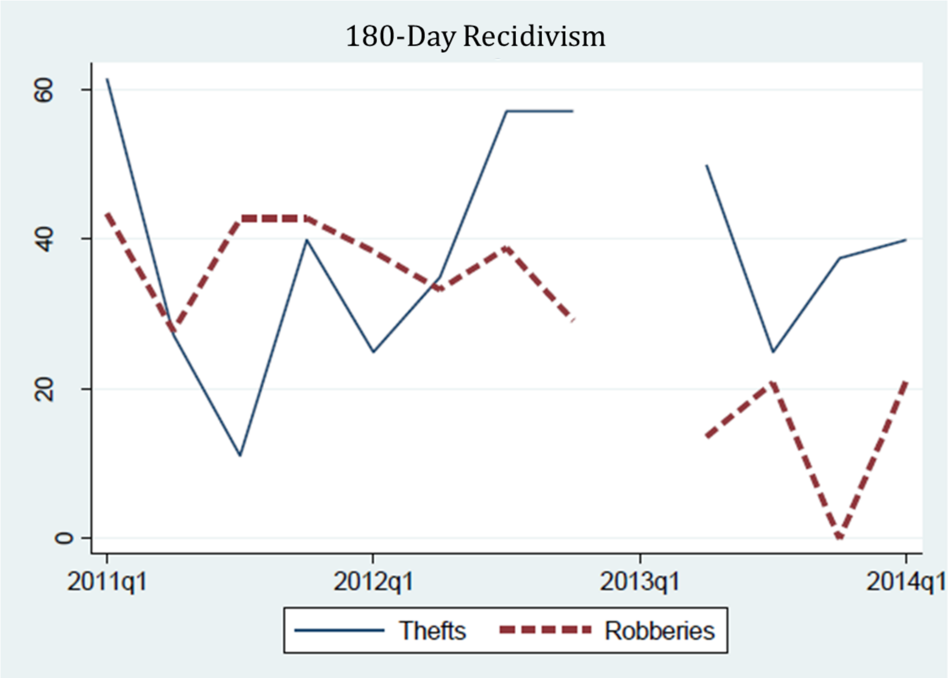
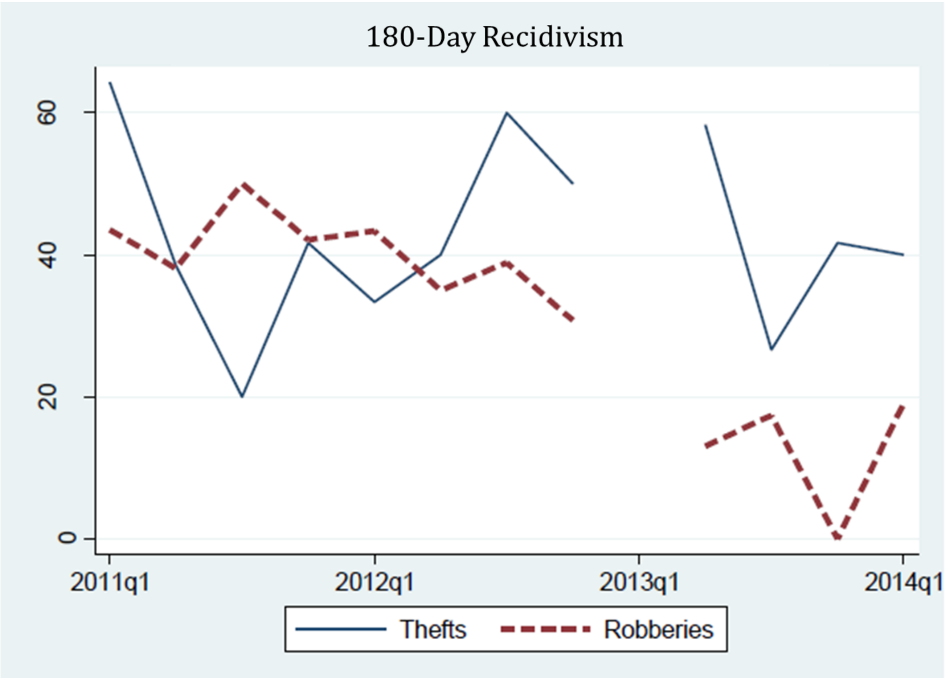


Figure 2. Parallel Trends in Recidivism

Database considering only first release



Database considering every release



Appendix

Table A1. Difference in Facility Assignments of Juveniles Who Committed Thefts and Robberies (Database considering every release)

	Thefts			Robberies					
	Mean	SD	Obs.	Mean	SD	Obs.	Mean diff.	t-test	
Facility 1	0,060	0,237	218	0,082	0,274	343	0,022	-1,0	
Facility 2	0,046	0,210	218	0,085	0,279	343	0,039	-1,8	**
Facility 3	0,037	0,188	218	0,047	0,211	343	-0,010	-0,6	
Facility 4	0,161	0,368	218	0,140	0,347	343	0,021	0,7	
Facility 5	0,069	0,254	218	0,070	0,255	343	0,001	-0,1	
Facility 6	0,023	0,150	218	0,035	0,184	343	0,012	-0,8	
Facility 7	0,005	0,068	218	0,003	0,054	343	0,002	0,3	
Facility 8	0,202	0,402	218	0,152	0,359	343	0,050	1,5	**
Facility 9	0,000	0,000	218	0,006	0,076	343	0,006	-1,1	
Facility 10	0,037	0,188	218	0,064	0,245	343	0,027	-1,4	*
Facility 11	0,032	0,177	218	0,029	0,168	343	0,003	0,2	
Facility 12	0,028	0,164	218	0,082	0,274	343	0,054	-2,6	***
Facility 13	0,041	0,199	218	0,032	0,176	343	0,009	0,6	
Facility 14	0,046	0,210	218	0,055	0,229	343	-0,010	-0,5	
Facility 15	0,055	0,229	218	0,044	0,205	343	0,011	0,6	
Facility 16	0,009	0,096	218	0,015	0,120	343	0,005	-0,6	
Facility 17	0,069	0,254	218	0,041	0,198	343	0,028	1,5	*
Facility 18	0,083	0,276	218	0,017	0,131	343	0,065	3,8	***
Facility 19	0,005	0,068	218	0,006	0,076	343	0,001	-0,2	

Notes. *Significant at 10 percent level. **Significant at 5 percent level. ***Significant at 1 percent level. The correctional facilities are: 1.Ser Berro 2. Ariel, 3.Cerrito, 4.Desafío, 5.CIAF, 6. Las Pierdas, 7.Puertas, 8. Ituzaingó, p. La Casona, 10. Paso a Paso, 11.Centro de Medidas Cautelares, 12.Sarandí, 13.El Hornero Berro, 14. Centro de Medidas Contención, 15.Centro Privación de Libertad, 16. Centro de Intervención Diagnóstico y Derivación, 17. Centro Diagnóstico y Derivación Burgues, 18.Centro de Ingreso Estudio y Derivación, 19.Others.