The Incapacitation Effect of Incarceration: Evidence from Several Italian Collective Pardons*

Alessandro Barbarino† and Giovanni Mastrobuoni‡

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Abstract

Incarceration of criminals reduces crime through two main channels: deterrence and incapacitation. Because of the simultaneity between crime and incarceration—arrested criminals increase the prison population—it is difficult to measure these effects. This paper estimates the incapacitation effect on crime using a unique quasi-natural experiment namely, the recurrent collective pardoning between 1962 and 1995 of up to 35 percent of the Italian prison population. Since these pardons were enacted on a national level, unlike in Levitt (1996), we can control for the endogeneity of these laws that might be driven also by criminals' expectations: it is optimal to commit crimes shortly before a collective pardon gets enacted. This is the deterrence effect, which, if not properly controlled for, would bias our instrumental variables estimates toward zero. The incapacitation effect is large and precisely estimated. The elasticity of crime with respect to prison population ranges, depending on the type of crime, between 0 and 49 percent. These numbers are increasing during our sample period, which suggests that habitual criminals are now more likely to be subject to pardons than in the past. A cost-benefit analysis suggests that pardons, sometimes seen as a short-term solution to prison overcrowding, are very inefficient. The estimated marginal social cost of crime is more than two times the cost of incarceration. Our very conservative estimate of the total net social cost due to the July 2006 pardon is equal to 2 billion euro.

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JEL classification codes: K40, K42, H11

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†Research and Statistics, Federal Reserve Board, 20th & C Streets NW, Washington, DC 20551, USA, alessandro.barbarino@frb.gov

‡Collegio Carlo Alberto and CeRP, Via Real Collegio 30, Moncalieri, Italy, giovanni.mastrobuoni@carloalberto.org.

1 Introduction

This paper estimates the causal effect of incapacitation on crime and breaks the simultaneity between crime and incarceration using a unique quasi-natural experiment, namely, Italy's recurrent collective pardoning of up to 35 percent of the prison population. Simultaneity arises because an increase in crime leads to an increase in prison population, while, at the same time, increased incarceration is likely to reduce crime.

Our quasi-experiments[1] lead to the release of prisoners whose residual sentence length is less than a given number of years, usually two or three (Table 1). The last collective pardon was passed in July 2006, and within few days 22,000 inmates (more than one third of the whole prison population) were freed (DAP, 2006). Pardons and amnesties are deeply rooted in Italian history and culture, and since Italy's unification of 1865 more than 200 acts of clemency have been passed (35 after World War II).

These policies, which in more recent years have been used as a short-term solution to prison overcrowding, generate a large variation in prison population. We argue that pardons and amnesties represent a valid instrument for changes in prison population. Levitt (1996) also uses an instrumental variable approach to solve the simultaneity between crime and prison population. In his paper a set of indicator variables capture the status of overcrowding litigation, which generate an exogenous variation in the U.S. prison population. The channel through which litigation is supposed to affect prison population in the short run is by influencing the inflows of prisoners (i.e. fewer offenders sentenced to prison terms) and the outflow (i.e. early release programs). Sometimes these court decision led also to the construction of new prison facilities and to a reallocation of prisoners across institutions. Our instrument, on the contrary, generates immediate and measurable changes in prison population.

Another important difference between Levitt's work and ours is that he estimates the sum of incapacitation and deterrence while we can exploit the national character of the law to isolate pure incapacitation. Overcrowding litigation status is likely to induce important changes in deterrence as criminals sense that it is less likely to end up in jail, or that once in jail it is likely to be released earlier. But overcrowding litigation statuses were state specific and their influence on deterrence is

[1] In Italian collective pardons and amnesties are called *indulti* and *amnistie*.

not distinguishable from incapacitation. Expectations about future pardons or amnesties are also likely to generate changes in deterrence, but the national character of the law allows us to control for these expectations.[2]

Our identification strategy takes into account that crime is likely to respond to collective pardons in different ways. Since pardons reduce the expected sanction, everything else being equal, we should expect crime rates to be higher in a society that occasionally makes use of them (long-term deterrence effect). Given the unavailability of a counterfactual Italian society without pardons, this effect is hard to estimate, but it can be differenced out.[3] Criminals might also try to strategically time their criminal activity in order to minimize their expected sanction, especially if the expected sentence length is similar to the usually pardoned sentence length (short-term deterrence effect)[4]. Criminals might change their criminal activity depending on whether they believe that a pardon will to be issued in the near future. Fortunately, whenever pardons get enacted, they only apply to crimes committed up to a specific date, the ending date of coverage, usually three to six months before the signing of the law. The risk of committing a crime that is too close to a pardon, and is therefore excluded from the pardon, is likely to significantly reduce the incentive to commit pardonable crimes shortly before the law passes. Criminals might also decrease their criminal activity immediately after a pardon, simply because the next pardon is not likely to occur for several years.

Not controlling for these two types of deterrence effects would certainly downward bias the estimate of the incapacitation effect. Not only. It would probably make pardons (or overcrowding litigation in the case studied by Levitt) less likely to be truly exogenous. We assume that we can control for both types using time effects and justify this assumption reverting to the inherent national character of our pardons; under the assumption that deterrence effects are equal across regions we do not need time-region fixed effects, impossible to identify, to control for them: time effects alone will do. A "negative" incapacitation effect is the last way collective pardons might affect crime, that is by releasing potential criminals. This is the effect we want to estimate. It depends on the criminals physical presence on the criminal scene. Most of the effect is likely to be driven by recidivists, but

[2]Italys administrative regions represent our unit of analysis, the analogous of Levitts states for the USA.

[3]In case the long-term deterrence effect did not change in the time span covered by our sample the constant will absorb it, otherwise time effects will.

[4]With quite strong assumptions it might actually be possible to estimate this effect, but we preferred to focus our attention on incapacitation.

there might also be some spillovers. On the one hand, the increased supply of criminals might reduce the probability of crime detection, and so attract new entrants on the criminal scene, while on the other hand, released criminals might drive some of the old criminals out of the market (Freeman, 1999).

It can be argued that even controlling for deterrence our instrument is still not truly exogenous. Increased crime rates may lead, if no new prisons are built, to prison overcrowding, which may lead to a collective release.[5] We deal with overcrowding in two ways: first we difference the data. Most probably it is the crime level that is correlated with overcrowding, using the change in crimes will weaken such correlation[6] The second way we deal with this endogeneity is, again, by exploiting the national character of these pardons. If anything, it is the total crime level in the whole country that is related to overcrowding in the country, so that the event of a pardon being enacted is only very weakly dependent on the number of inmates in any particular region. The within-year between Italian regions fraction of pardoned inmates depends on the distribution of the residual sentence length and on the distribution of criminal types residing in a region. We investigate the source of variation using data on the average sentence length of single crime categories. The source of the variation in the number of pardoned prisoners seems to be mainly due to differences in the timing of the crime and not due to differences in the types of crimes, and is, therefore, plausibly exogenous.

Focusing on the regional variation in crime and prison population allows us to identify the incapacitation effect dealing with both the endogeneity of the policy and the deterrence effects.[7] We find that changes in incapacitation that are driven by collective pardons and amnesties have a significant positive effect on changes in crime. Elasticities of crime with respect to prison population lie between 0 percent and 49 percent, with drug crimes, frauds, and bank robberies showing the largest responses.

Once we are able to isolate the incapacitation effect we next turn to a preliminary evaluation of pardons as part of an imprisonment policy. Heterogeneity of criminals generates a distribution of criminal-specific social costs. Pardons might act as an imperfect screening device that frees criminals

[5]Tartaglione (1978) argues that pardons in the 60s and 70s were difficult to justify other than for a political preference for clemency, but Figure 1 does show that after 1982 prisons started to be overcrowded.

[6]Differencing the data is also important in case crime levels and prison population are non-stationary. A regression in levels might then give spurious results.

[7]In Levitt (1996) instead, changes in prison populations are found to be due to overcrowding litigation carried out at the state level. Two recent papers have identified the deterrence effect (Kessler and Levitt, 1999, Lee and McCrary, 2005), but to our knowledge our paper is the first to identify a pure incapacitation effect.

whose social cost lies below the cost of incarceration.[8] A preliminary cost-benefit analysis[9] of pardons compared with expansions in prison capacity seems to indicate that the latter should be preferred, though we do believe that the cost of pardons and amnesties could be significantly reduced by using more selective procedures: keeping in jail criminals who are more likely to recommit more socially costly crimes.

Several papers have tried to estimate the effect of prison population on crime, though without separating incapacitation from deterrence. Marvell and Moody (1994) use state-level panel data and, after rejecting that crime Granger causes prison population, estimate an elasticity of crime with respect to prison population of -0.16. Spelman (1994) finds similar effects. Levitt (1996) controls for the simultaneity using an instrumental variables (IV) approach and finds elasticities that are two to three times larger. Only a few papers have studied the effect of pardons on crime. One reason for this is that most empirical research on the criminal justice system studies the United States (Levitt and Miles, 2004), where pardons are rare. One exception is a study by Mocan and Gittings (2001), which estimates the deterrence effect of gubernatorial pardons of persons on death row and finds that three additional pardons generate 1 to 1.5 additional homicides.

In Italy, despite the recurrent use of pardons, there has been only one empirical study on the relationship between pardons and crime. The study Tartaglione (1978) found that after the 1954, 1959, 1966, and 1970 pardons, national changes in crime tended to be above average. The exceptions were the 1963 pardon, in which only one year was pardoned, and the 1968 pardon, which applied only to certain crimes committed during student demonstrations. The study also documents that pardoned inmates have a recidivism rate of 31.2 percent, which is not that different from 32.9 percent, the recidivism rate of prisoners who re released at the end of their term. Standard errors are not shown, so we do not know whether these differences are significant or not. The judges who worked on this pioneering study did not use regression methods, which makes it impracticable to analyze

[8] In the spirit of this "selective incapacitation," the Italian penal code establishes that pardons and amnesties should not be given to recidivist, recurrent, or career criminals (art. 151). Despite this article, in the 1990 and 2006 pardons and in the 1990 amnesty, the legislators decided to extend the benefits to career criminals. Moreover, because of evidence that criminal activity decreases with age, the legislators have sometimes increased the number of pardoned years for older criminals (usually defined as being older than 65 or 70 years of age). Other preferred treatments for elderly inmates were introduced in 1974 (law n. 220).

[9] Our cost-benefit analysis abstracts from deterrence effects. In this dimension the benefits we compute are only a lower bound to the true achievable benefits.

the link between prison population and crime or to use regional variation in the fraction of released prisoners. The judges also made no attempt to value the monetary cost of the increased crime, or to separate the incapacitation effect from the total effect.

The paper proceeds as follow: in the next section we provide some essential historical and institutional background on Italys pardons and we present some descriptive facts about imprisonment policy in Italy. Section 3 describes our data. Section 4 presents the counterfactual experiment we have in mind, sets up our model and reports the results of our estimation. Section 5 contains some back-of-the-envelope computations for a preliminary assessment of the optimality of pardons as part of the imprisonment policy. The last section concludes.

2 Italy's Collective Pardons and Prison Population

Historical remarks – Pardons and amnesties are deeply rooted in the Italian legislative history and culture. Between the unification of Italy in 1865 and the defeat of Mussolini in 1943 there have been approximately 200 pardons or amnesties, though some of these were just fiscal pardons, or amnesties for very specific crimes. Some of these pardons were aimed at easing social tensions, others were passed to magnify the royal family. A pardon was passed when the Prince of Naples was born (1869) and one when he got married (1896). Other pardons followed the colonization of Eritrea, Somalia, Cyrenaica, Tripolitania and later Ethiopia, the peace treaty between Italy and Austria (1919), the annexation of Slavic territories in the North-East of Italy. Though sometimes even local tensions led to pardons (wood thefts in the Montello region, illegal cutting of olive and mulberry trees (1920), crimes committed in occupied Greece, etc.) The use of amnesties and pardons in Italy has been the norm, and the fact that an entire article of the 1945 Constitution is devoted to these acts (art. 79) shows that after World War II nothing changed. Between 1945 and today there have been more than a dozen pardons (mostly coupled with amnesties). Although these were firstly aimed at reconciling a politically divided nation, in more recent times an additional goal has been to reduce prison overcrowding.

Legal definition – Starting in 1992, collective amnesties and pardons in Italy have been issued by the legislators with an absolute majority requirement of two-thirds (constitutional law n.6 of 1992).

Before that year, the President could issue them but only after they had been mandated by a simple majority of the parliament. The main difference between amnesties and pardons is that amnesties eliminate both the sentence and the crime, as if they never happened, whereas pardons eliminate only part of the sentence. Given that Italian prosecutors are required by law to investigate all felonies (art. 112 of the Constitution), pardons are usually followed by amnesties.[10] Otherwise, prosecutors would have to spend time and effort investigating pardoned crimes, even if it was impossible to actually punish the perpetrators. Another difference between the two is that whenever the pardoned prisoner recommits a crime within five years, the commuted prison term gets added to the new term.[11] Amnesties, instead, are permanent.

Both pardons and amnesties have the effect of reducing the prison population.[12][13] Pardons and amnesties also reduce the number of arrestees who are subject to restrictive measures that are different from imprisonment namely, social work outside prison, semi-liberty, and house arrest. Between 1975, the year in which these measures were introduced in Italy, and 1995, 19 percent of apprehended criminals (or alleged criminals) were subject to these alternative measures. It has been shown that recidivism rates for these individuals are significantly lower than those for prisoners (Santoro and Tucci, 2004) and that some of these individuals might commit crimes even while subject to these alternative measures. Nevertheless, changes in crime might be due in part to these additional pardoned individuals.

Figure 1 shows that the official prison capacity (measured as the number of beds per 100,000 Italian citizens) declined between 1962 and 1975, significantly reducing the cushion between the total prison population and the total capacity. Although 81 new prisons were build between 1971 and 2003, 87 older ones were dismissed during the same period because of obsolescence (de Franciscis, 2003). As a result, between 1975 and 1991, prison capacity was basically flat at almost 50 beds per 100,000 residents. Only in more recent times has capacity increased. In 1983, as a result of flat capacity and a steady increase in crime, the prison population exceeded the "official" capacity (even

[10] The 2006 pardon was an exception to this rule.

[11] Drago et al. (2007) exploit this rule to identify the deterrence effect of prison.

[12] The Italian Statistical Office (ISTAT) groups together pardoned and amnestied prisoners.

[13] The great majority of pardoned prisoners are convicted criminals, though some might be in preventive detention with an expected sentence that is below the maximum number of pardoned years. For example, in 2006 when the number of pardoned years was three, 10.7 percent of the prisoners that were freed were in preventive detention (Marietti, 2006).

if aggregated at the national level) for the first time.[14] The 1986 pardon was the first one to solve a situation of overcrowding. Partly because of the tougher majority requirements, 16 years passed between the most recent pardon, in 2006, and the pardon before that. During the same period, the prison population tripled from about 20,000 to 60,000, dropping to about 35,000 after the 2006 pardon.[15]

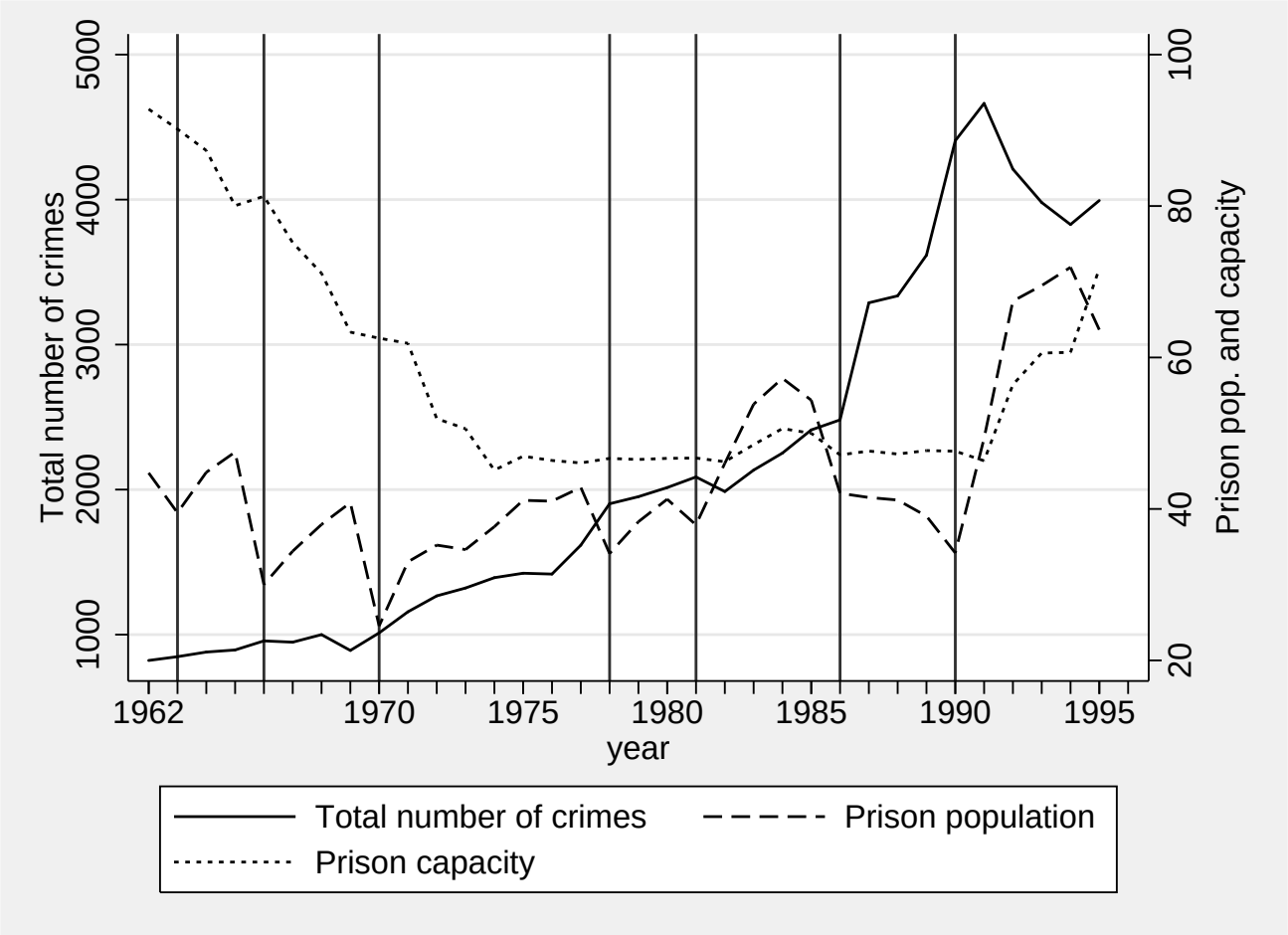

Figure 1: End of the year prison population, prison capacity, and the total number of crimes (per 100,000 residents)

Pardons and Prison Population – Figure 2 shows the log-changes in prison population and the fraction of pardoned prisoners. It is evident that collective pardons induce an almost one-for-one change in prison population. Overall the fraction of inmates who get freed can be as high as 35 percent, and it sometimes reaches 80 percent in single regions. But the effect of pardons on prison population appears to be short-lived. Within one year, the inmate population recovers more than

[14] If necessary the prison administration can add new beds to existing cells, to reach what is defined as "tolerable" capacity. Unfortunately, there are no data on capacity based on this definition.

[15] No regional data are yet available for the 2006 pardon.

half of the size of the initial jump. Between 1959 and 1995, for example, the inmate population increased, on average, by 449 inmates per year, but with large fluctuations that were driven by the pardons. The inmate population decreased by an average of 3,700 inmates after pardons, but increase by an average of 2,944 inmates immediately afterwards. In all other years the average increase is by 1,165 inmates. In other words, in the year immediately after the pardons, and excluding the year of the pardon, the inmate population grew two and a half times faster.

Pardons generate also variation across regions. Table 2 shows the fraction of pardoned inmates across regions. Table 3 shows, for example, that in the Abruzzo and Molise regions, aggregated because of data limitations, the 1966 pardon freed 85 percent of the inmate population, while in Sardinia only 38 percent left the jail. The 1968 pardon, which applied to crimes committed during student demonstrations, led to a release of very few prisoners. Two years later,instead, in five regions—namely, Abruzzo, Molise, Friuli-Venezia Giulia, Liguria, and Trentino-Alto Adige—more than 70 percent of prisoners were freed. Later pardons have led to fewer releases. The last pardon in our sample happened in 1990, as the judicial data about the 2006 pardon are not available yet.

Ideal Data – As for how these pardons affect crime, ideally one would compare monthly crime-level statistics with the number of pardoned criminals. Unfortunately, the only available data of this kind are for bank robberies, and they relate only to the 31st of July 2006 pardon. Figure 3 shows the number of bank robberies per 100 bank branches between January 2004 and December 2007. The vertical line represents the end of July, when the prison population dropped from 60,710 to 38,847 (-37 percent). Within a month the number of bank robberies doubled (p-value= 0.004), which corresponds to an elasticity of more than 1. Such a large elasticity might be explained in part by an overrepresentation of potential bank robbers among the pardoned prison population.

Distribution of Pardoned Prisoners – Table 4 shows, indeed, that the number of criminals who committed crimes against wealth (including banks) dropped by 43 percent, thus moving the elasticity toward one. The number of bank robberies started declining afterward, as more and more criminals reentered jail. Overall the distribution of the type of crimes committed by prisoners serving jail just before and just after the July 2006 pardon are very similar. Most crime types show a reduction in prison population that is close to the overall 37 percent decline. Since Mafia related crimes are excluded from pardons, criminals who had committed these crimes were less likely to exit jail

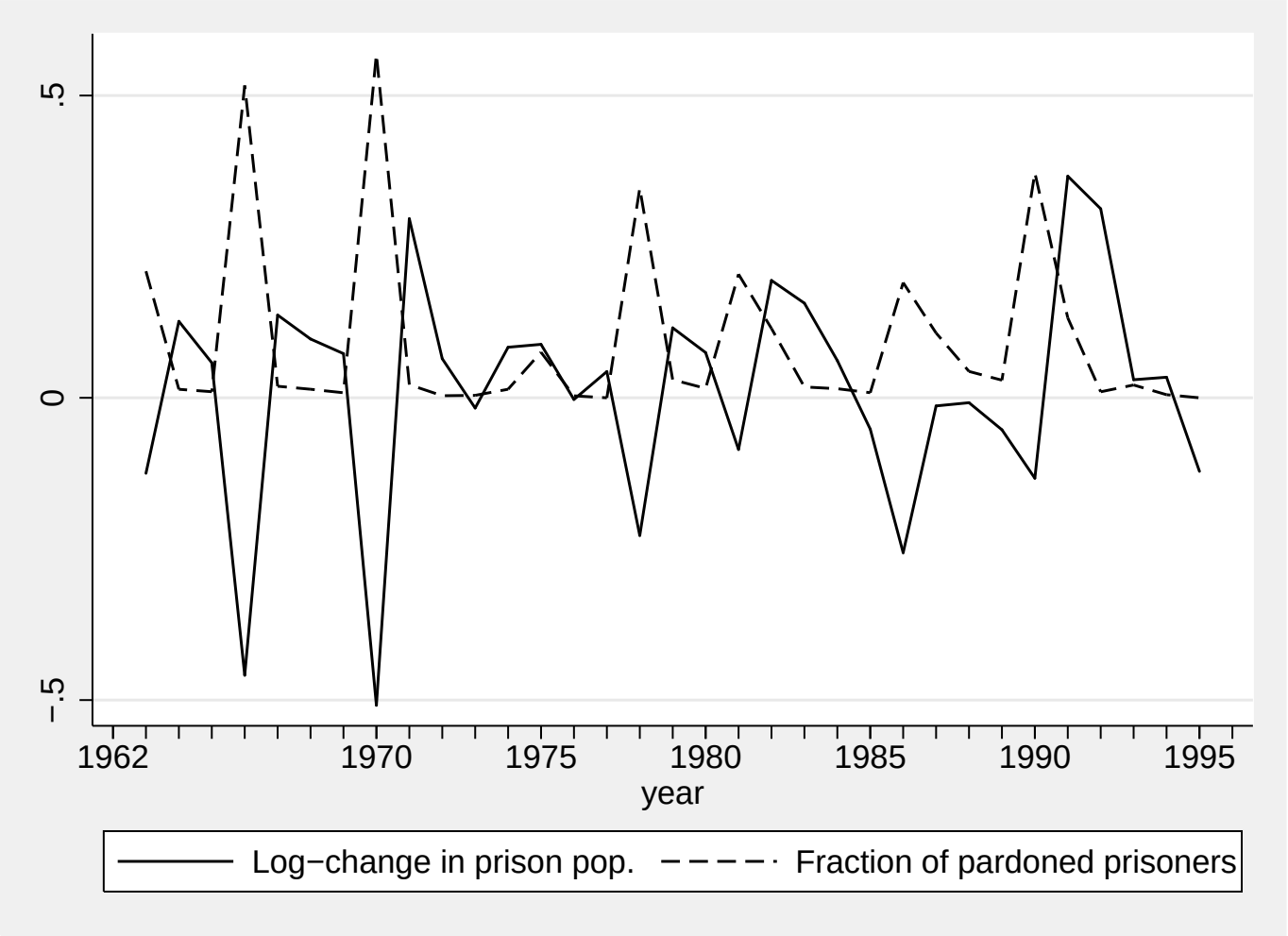

Figure 2: Fraction of pardoned inmates and change in inmate population

in August. Seventeen percent of them did leave jail, probably, by having pardoned the part of their crime that was not related to the "mafia-type criminal association" felony (*Associazione per Delinquere di Tipo Mafioso*, art. 416 of the penal codex). The 2006 pardon did not apply to some drug-related criminals, which is why their decline is smaller than the average decline.

Criminals that have committed crimes against persons are less likely to exit jail than criminals that have committed crimes against wealth, but the differences are small. We do not have the month-by-month distribution of crime types for the other pardons, but the results would only differ depending on the single crime categories that were excluded from the pardons and the amnesties (see Table 1 for their complete list).

Figure 3 does not present evidence of the endogeneity of pardons with respect to crimes. If anything the last pardon seems to be correlated with a reduction in crime. The legislators passed the July

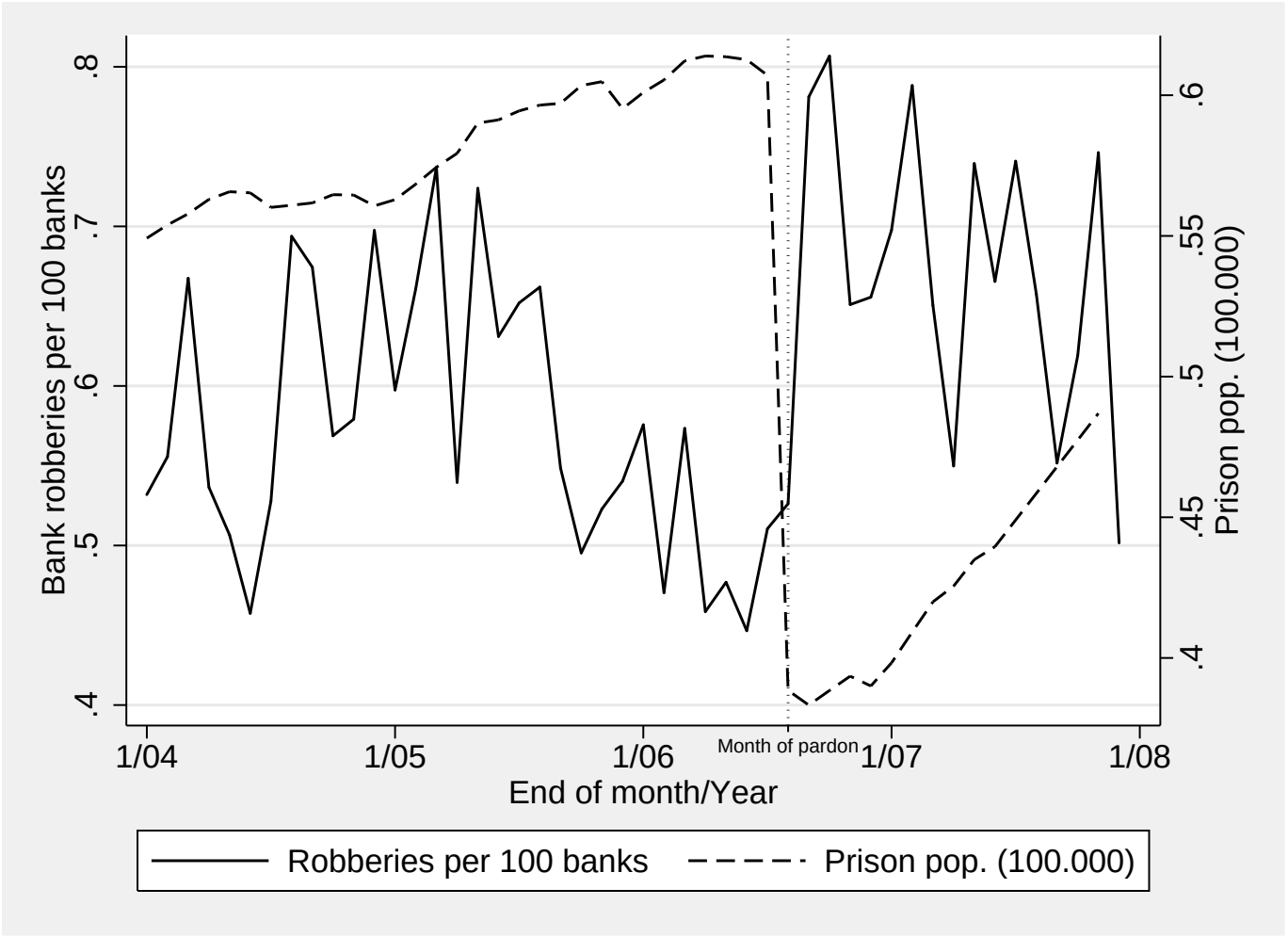

Figure 3: Bank robberies per 100 branches.

2006 pardon few months after being elected (April 2006). During these months the prison population was increasing and the number of bank robberies and most crime rates were declining. Moreover, this seems to suggest that criminals were not expecting a new pardon. Criminals' expectations about new pardons are likely to depend on the proposals presented in the House of representatives and in the Senate. But Table 5 shows that there are so many proposals that criminals would have a hard time predicting new pardons. There was a collection of proposals around April 2005, October 2002 and August 2001 that never became law.

The next section presents the additional crime data that is used to measure how other types of crime respond to collective pardons and amnesties in particular, those that were passed between 1962 and 1995. We have chosen to collect information on crime and on the prison population through 1995, because 1990 represents the last year in which a pardon was passed for which these data are

available.

3 Data

The Italian Statistical Office (ISTAT) publishes a yearly statistical supplement about the Italian judicial system. From these supplements, we collected information about the evolution of the prison population and about crime for 20 Italian regions between 1962 and 1995. ISTAT publishes two sets of crime statistics: those collected directly by the police corps (*Polizia di Stato*, *Carabinieri* and *Guardia di Finanza*) from people's complaints (*Le Statistiche della Delittuosità*), and those collected by the judicial system (*Le Statistiche della Criminalità*) when the penal prosecution, which in Italy is mandatory, starts. The two sets of statistics differ whenever at least one of the following things happen: i) the initial judge decides that the complaint does not depict a crime; ii) the judicial activity is delayed with respect to the time that the crime was committed; iii) a crime is reported to public officials who do not belong to the police corps. Since the exact timing of our statistic is important in most of our analysis we use crime as measured by the police. When single crime categories are unavailable in the police data, and as a robustness check, we also use the judicial statistics.[16]

Table 6 shows the summary statistics of the variable that we use. Between 1962 and 1995, there were on average 42 inmates per 100,000 residents. Levitt (1996) shows that during a similar time frame in the United States the inmate population was 168, exactly four times as large as in Italy. Our statistics indicate that the total amount of crimes per year per 100,000 residents was 1,983. This number is significantly smaller than Levitt's number for the United States (approximately 5,000), which might be due to underreporting. In 1984, ISTAT started separating reported crimes into more specific categories. Some categories are identical to those reported by Levitt, and allow a comparison between Italy and the United States. Burglaries seem less frequent in Italy (253 versus 1,200), and so seem larcenies (193 versus 2,700), though the definition of these crimes might differ as well. For motor vehicle thefts, where the definition is clear, and where underreporting and multiple offenses are less frequent, the two countries are similar: 303 per 100,000 residents in Italy and 402 in the

[16] In 1984, ISTAT changed the categorization of crimes in the police statistics, providing a more detailed crime categorization. Instead, for the judicial data we can use a sample on single crime categories that starts in 1970 (Marselli and Vannini, 1997).

United States.

4 The Estimated Incapacitation Effect

4.1 Identification Strategy

We instrument changes in regional prison population with the number of pardoned prisoners released in the region to solve the simultaneity problem between prison population and crime. As noted earlier, crime might respond positively to expected future pardons (deterrence effect), as well as to past and current pardons (incapacitation effect).

The Behavioral Model – A simple model that abstracts from exogenous time-variant observable covariates can be used to formalize this intuition and to lead to our empirical specification. Suppose criminal i (the mass of criminals is normalized to 1 by dividing the number of criminals by the regional population), who is ex-ante identical to all other criminals, faces the following dichotomic problem at time t:

$$\max E[r_{i,t} - p_{t,r}J(S_t)|I_t]C_{i,t}, \tag{1}$$

where C takes the value 1 if the criminal chooses to commit the crime; the return from crime, $r_{i,t}$, is, for simplicity, uniformly distributed between 0 and R; the joint probability of apprehension and conviction varies across regions and the distribution of the disutility from jail, $J(S_t)$, depends on the expected sentence length, conditional on the information available up to time t, including information about possible future pardons.

Differences in the probability of apprehension and conviction are assumed to be temporary, with mean $E[p_{t,r}] = p_t$. Later in the empirical specification, we deal with possible systematic differences by controlling for proxies of p, by differencing the data, and by controlling for regional fixed effects. Information, I, does not vary across regions. The criminal will commit a crime if $r_{i,t} > p_t E[J(S_t)|I_t] = p_t J_t$.

In the simplified case of a sentence length of one year, the law of motion of criminals is

$$C_{t,r} = \underbrace{1}_{\text{total criminal pop}} - \underbrace{\left[\frac{p_t J_t}{R}\left(1 - p_{t-1,r}C_{t-1,r}\right)\right]}_{\text{fraction deterred of free population}} - \underbrace{p_{t-1,r}C_{t-1,r}}_{\text{fraction incapacitated}} .$$

It is possible to relax, in a reduced-form approach, the assumption that sentence length, S, equals 1. If S is equal to 2 the model becomes

$$C_{t,r} = \underbrace{1}_{\text{total criminal pop}} - \underbrace{\left[\frac{p_t J_t}{R}\left(1 - p_{t-1,r}C_{t-1,r} - p_{t-2,r}C_{t-2,r}\right)\right]}_{\text{fraction deterred of free population}} - \underbrace{p_{t-1,r}C_{t-1,r} - p_{t-2,r}C_{t-2,r}}_{\text{fraction incapacitated}},$$

and, after rearranging, it becomes

$$C_t = 1 - \frac{p_t J_t}{R} - \left(\frac{p_t J_t}{R}p_{t-1} - p_{t-1}\right)C_{t-1} - \left(\frac{p_t J_t}{R}p_{t-2} - p_{t-2}\right)C_{t-2}.$$

Generalizing to sentence lengths up to duration $S_{\max}$ gives the following:

$$C_{t,r} = 1 - \frac{p_t J_t}{R} - \sum_{s=1}^{S_{\max}}\left(\frac{p_t J_t}{R}p_{t-s} - p_{t-s}\right)C_{t-s,r} .$$

Now let us introduce a pardon. The effect of pardoning Z years is to free $W_{t,r}$ criminals at the beginning of period t, $1 - \frac{p_t \tilde{J}_t}{R}$ of whom will recommit crimes during the year:

$$\tilde{C}_{t,r} = 1 - \frac{p_t \tilde{J}_t}{R}\left(1 - \sum_{s=1}^{S_{\max}} p_{t-s,r}C_{t-s,r} + W_{t,r}\right) - \sum_{s=1}^{S_{\max}} p_{t-s,r}C_{t-s,r} + W_{t,r} .$$

We allow the pardon to have an effect on future expected sentence lengths, $\tilde{J}_t$. The difference

between the scenarios with and without a pardon will be:

$$\begin{aligned}\tilde{C}_{t,r} - C_{t,r} &= 1 - \frac{p_t \tilde{J}_t}{R}\left(1 - \sum_{s=1}^{S_{\max}} p_{t-s,r} C_{t-s,r} + W_{t,r}\right) - \sum_{s=1}^{S_{\max}} p_{t-s,r} C_{t-s,r} + W_{t,r} \\ &\quad -1 + \frac{p_t J_t}{R}\left(1 - \sum_{s=1}^{S_{\max}} p_{t-s,r} C_{t-s,r}\right) + \sum_{s=1}^{S_{\max}} p_{t-s,r} C_{t-s,r} \\ &= \left(\frac{p_t J_t}{R} - \frac{p_t \tilde{J}_t}{R}\right)\left(1 - \sum_{s=1}^{S_{\max}} p_{t-s,r} C_{t-s,r}\right) + W_{t,r}\left(1 - \frac{p_t \tilde{J}_t}{R}\right) . \qquad (2)\end{aligned}$$

Notice that the number of criminals in a region varies because of the incapacitation effect (which varies because of differences in the actual realizations of p) and because of the deterrence effect. Criminals might face changes in the deterrence effect, $\frac{p_t J_t}{R} - \frac{p_t \tilde{J}_t}{R}$, whenever the expected sentence length changes. This change influences the regional criminal population that is not incapacitated $1 - \sum_{s=1}^{S_{\max}} p_{t-s,r} C_{t-s,r}$.

The Empirical Model – We do not observe the counterfactual criminal scenario of a "pardon year" without a pardon. In our empirical specification we proxy for the counterfactual of crime using years that are contiguous to the pardon. The dependent variable is going to be the first difference in crime rates. To isolate the incapacitation effect, we need to realize that in Italy pardons are nationwide policies and that the deterrence effect is, therefore, unlikely to vary across regions. If regional effects, time effects, and time-varying variables capture changes in the deterrence effect, then the coefficient on the number of pardoned prisoners captures the incapacitation effect, $1 - \frac{p_t \tilde{J}_t}{R}$.

When we analyze the effect of the prison population on total crime, we use two models—one in levels and one in logs. The model in levels is

$$\Delta CRIME_{t,r} = \beta \Delta PRISON_{t,r} + f(t) + \delta' X_{t,r} + \gamma_r + \epsilon_{t,r}. \qquad (3)$$

Changes in prison population are instrumented using the number of pardoned prisoners, while log-changes in prison population are instrumented using the number of pardoned prisoners over the number of prisoners in the preceding year.

Notice that the IV's reduced-form equation in levels,

$$\Delta CRIME_{t,r} = \tilde{\beta} PARDONED_{t,r} + \tilde{f(t)} + \tilde{\delta}' X_{t,r} + \tilde{\gamma}_r + \tilde{\epsilon}_{t,r} \quad , \tag{4}$$

is directly related to equation 2, with the counterfactual scenario being replaced with the scenario in the previous year. The term $f(t) + \gamma_r + \delta' X_{t,r}$ is supposed to capture the deterrence effect and isolate the incapacitation effect $\beta = 1 - \frac{p_t \tilde{J}_t}{R}$. Not controlling for the deterrence effect would probably bias downward the estimated incapacitation effect. The reason is that post-pardon increases in expected sentence lengths are likely to reduce crime (it is optimal to increase criminal activity before the pardon and reduce it afterwards). All variables except the average sentence length are first-differenced (which controls for systematic differences in the levels) and all but the average sentence length and the probabilities are expressed in terms of 100,000 residents. All regressions include regional fixed effects, which control for systematic differences in trends (for example, long-term changes in the probability of apprehension and conviction, or changes in the attractiveness of the legal labor market, etc.)

The Exogenous Sources of Variation: – The exogenous variation in the prison population that we exploit first is the variation in the fraction of prisoners who are pardoned across regions at a given point in time. This fraction depends on the distribution of the residual prison time of the inmate population, which at the time of the pardon is certainly predetermined.[17] [18]

The variation in number of released inmates comes from two sources: 1.) for a given crime, variation in the residual sentence length that is due to variations in the date of arrest or in the date of conviction, depending on whether the judge decides to keep the criminal in jail during his trial;[19] 2.) for a given date of conviction, variation in the residual sentence length which might or might not

[17] Kuziemko (2006) uses a similar variation to estimate the effect of time served on recidivism.

[18] The link between regional prison population and regional crime depends crucially on the law establishing that each arrested criminal must first be incarcerated in prisons that are located inside the competent judicial jurisdiction where the crime has been committed (*Competenza per Territorio*, Article 8 of the *Codice di Procedura Penale*) and might later be transferred to a prison that is closest to where the respective family resides (Article 42 of the 26 of July 1975 n. 354 law). Each region has one or more jurisdictions, with the exception of the Valle D'Aosta and Piedmont regions which share the jurisdiction of Torino. In the analysis that follows, we implicitly assume that criminals always operate inside the same region. A misclassification of the pardoned prisoner's region of criminal activity might bias the elasticities of incapacitation toward zero. There is, indeed, no clear evidence of criminal spillovers to contiguous regions, a sign that criminals act locally.

[19] Preliminary judges can keep suspected criminals in jail if at least one of these three risks is present: i) reiteration of the same crime, ii) escape, and iii) removal of the evidence

be due to differences in the distribution of crime seriousness.[20] With a variation in the distribution of crime seriousness that differs across regions and over time our estimated incapacitation effect might not measure the average effect, but rather a local one. If, for example, in Piedmont criminals commit frequent but petty crimes, while in Sicily crimes are less frequent but more serious, a pardon would tend to release more prisoners from Piedmont. The incapacitation effect would, therefore, give more weight to crimes which are on average less serious. The opposite would be true if criminals who are caught recidivating commit crimes more frequently, because these criminals receive sentences that are increased by at least a third (art. 81 of the Italian penal codex). The way we neutralize the variation in the distribution of crime seriousness is by focusing on specific types of crime and by interacting the average (log) sentence length of the same crime types with the fraction of pardoned prisoners.[21]

The Second Source of Variation: Controlling for Deterrence – As will be clear once we show the first stages of our IV strategy, little variation is left in the number and in the fraction of pardoned prisoners after we control for year fixed effects. To approximate the evolution of the criminals' expectations without giving up all the national variation in pardoned prisoners over time, we pursue two different solutions. In one specification, we control for a cubic spline using three-year intervals; in the other, we control for pardon-specific linear time trends. When we use splines, we are assuming that criminals' changes in expectations evolve smoothly without discontinuities. The complexity of the legislative process that leads to pardons makes it difficult to forecast their date of enactment. Moreover, criminals have to forecast not only the date of pardon but also its ending date of coverage. This is likely to smooth the deterrence effect. Notice that the identification strategy bears some analogies with a regression discontinuity approach. When we use pardon-specific linear trends, we assume that criminals' expectations jump to a new level in the year of the pardon but that they evolve linearly thereafter.

The different time controls are shown in Figure 4. The dotted line represents the estimate of $f(t)$

[20] The same crime might be judged differently by different judges and the ability of lawyers is also likely to influence the sentence length for the same kind of crime.

[21] Ideally we would like to measure the region-specific and crime specific average sentence length of pardoned prisoners and not the one of the whole prison population, though the two are likely to be correlated since pardoned prisoners are part of the prison population. The two measures would also be correlated within regions if sentence lengths contained a judge-specific fixed effect, though we do not have data to test for the existence of these fixed effects.

using year fixed effects. The estimated time effects are smoother when we use the three-year cubic spline (solid line), especially during the 1980s and 1990s. But the pardon-specific linear time trends (dashed line) are close to the fixed effects during the 1960s (it is the decade with the highest number of pardons). Figure 5 shows the same semi-parametric approximations as in Figure 4 but this time looks at changes in levels.

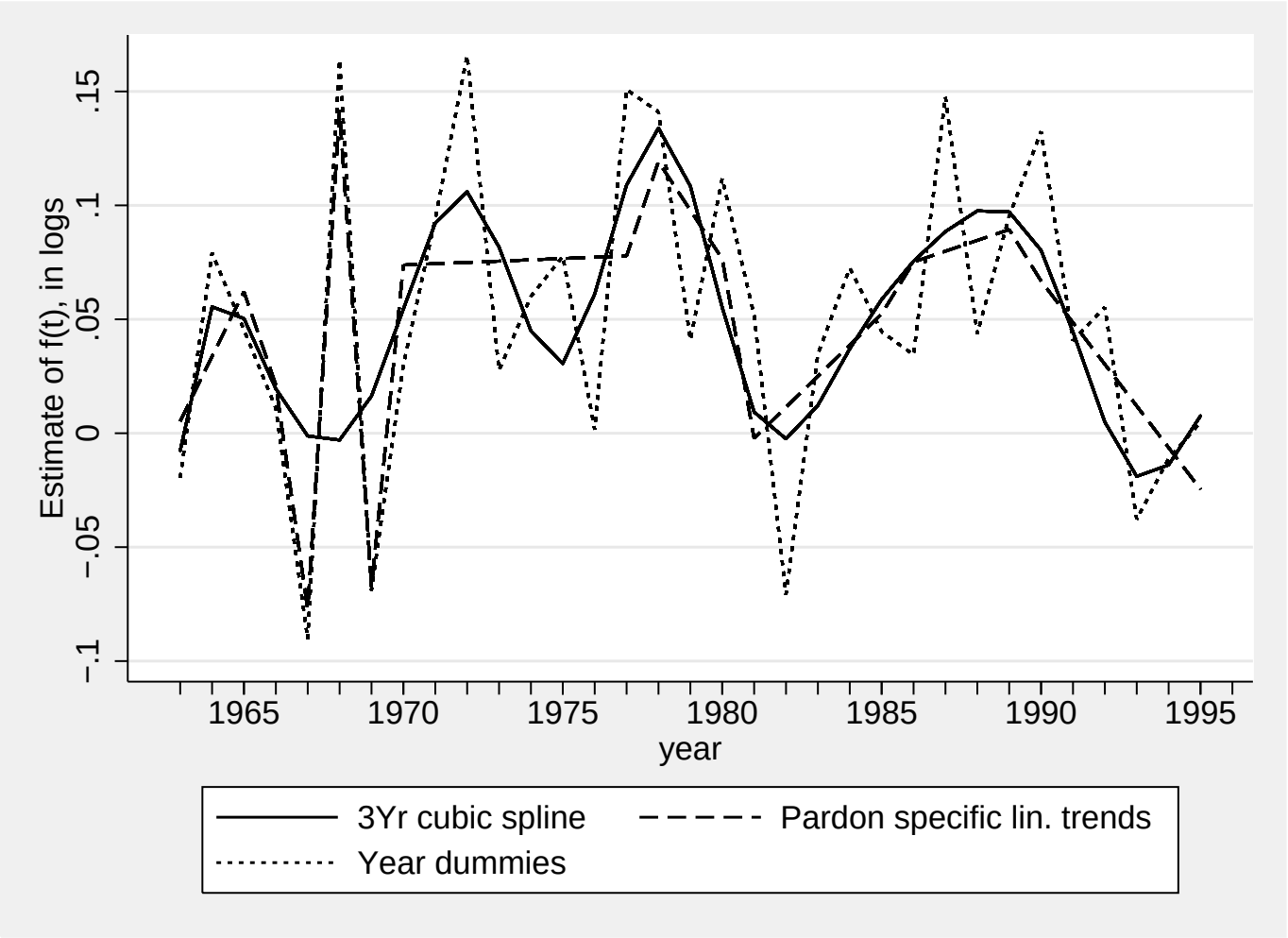

Figure 4: Estimate of $f(t)$, in logs

Full-year Equivalence–Given that some released prisoners get rearrested within a year, we would like to estimate how crime rates vary immediately after a pardon gets enacted. But pardons and amnesties are sometimes passed in the middle of the year, and we have no access to monthly regional data. Fortunately, we can use the date on which the pardon gets passed to adjust the change in the prison population and the number of pardoned prisoners to produce "full-year equivalent" pardoned prisoners—that is, prisoners who can potentially commit crimes for a whole year. Take, for example,

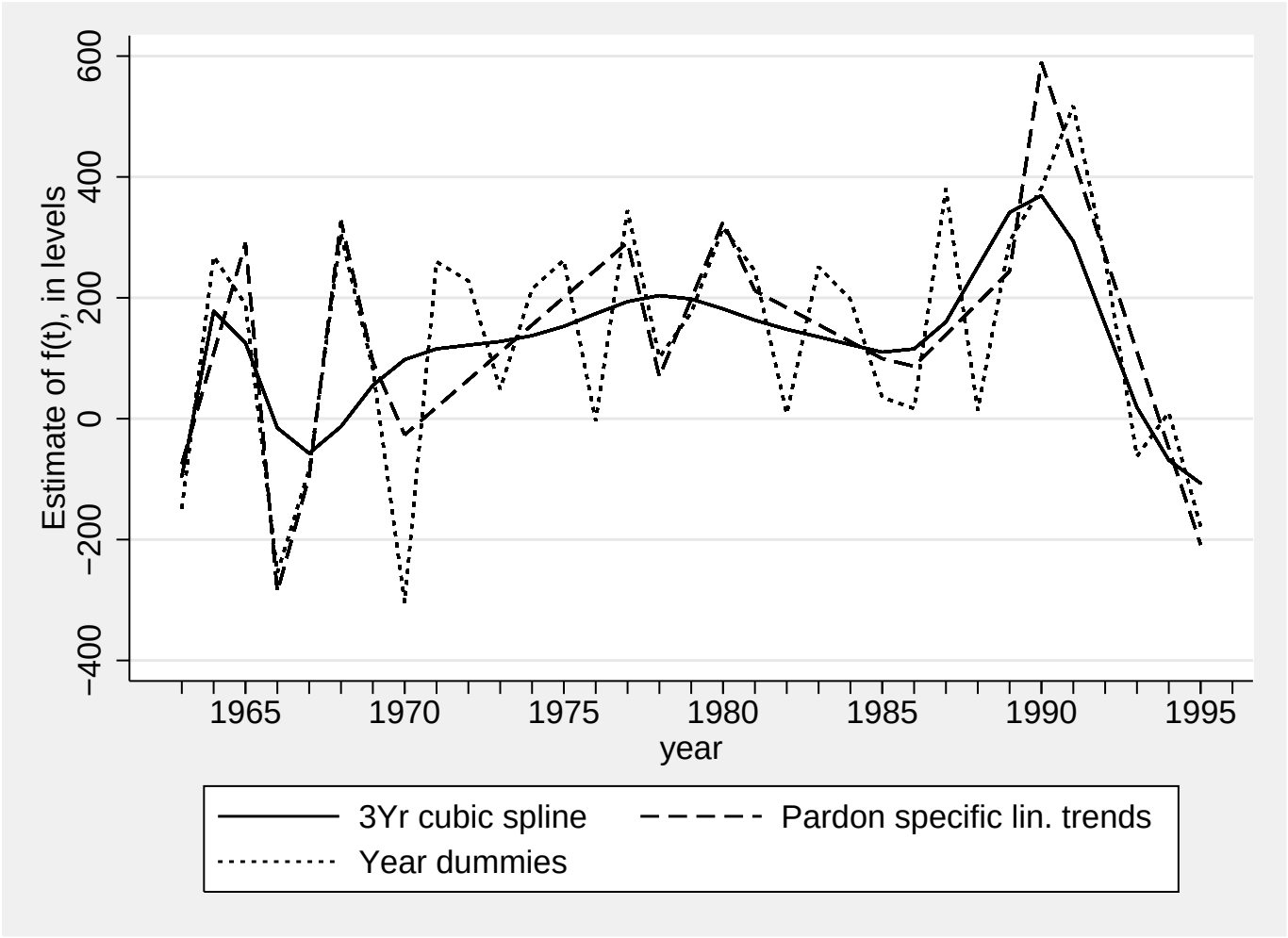

Figure 5: Estimate of $f(t)$, in levels

the 1978 pardon. The law was issued on August 5. Assuming that after the pardon criminal activity was uniformly distributed over time, recidivist prisoners would have been able to commit crimes for five months in 1978. One way to take this timing into account and produce "full-year equivalent" prisoners is to reduce the number of pardoned prisoners by 7/12 in the year of the pardon and add these prisoners to the year after the pardon, year in which they can potentially commit crimes for the whole year.[22]

More generally, based on the day of the year, d, on which the pardon becomes active, full-year equivalent pardoned prisoners are

$$PARDONED^{*}_{t,r} = \frac{365 - d}{365} PARDONED_{t,r}$$

[22]In 1990, the amnesty occurred in April, while the pardon occurred in December. As a result, the weight is going to be the average of the two periods weighted by the fraction of released prisoners who got released because of the pardon (80 percent) and because of the amnesty (20 percent) (Censis, 2006).

in the year of the pardon,

$$PARDONED^*_{t,r} = \frac{d}{365} PARDONED_{t,r-1} + PARDONED_{t,r}$$

in the year after the pardon, and

$$PARDONED^*_{t,r} = PARDONED_{t,r}$$

in all other years. We also adjust the prison population accordingly.

4.2 Results

In this section we report the empirical results of our analysis.

Results for Total Crime–Panel A of Table 7 shows the results of a first-stage regression of the change in prison population on the number of pardoned prisoners. In column 1, where $f(t)$ is estimated using a three-year cubic spline, the first-stage regression shows that by the end of the year, each pardoned prisoner reduces the prison population by 0.46. Once we control for year fixed effects (column 3), the coefficient is four times smaller in absolute value, demonstrating that the instrument becomes weaker once we absorb the nationwide variation in the number of pardoned prisoners.

Panel B shows the results of the first stage regression when log-changes are used instead of changes in levels. In Panel C the dependent variable is changes in crime and in panel D it is log-changes in crime. Let us immediately say that because of the simultaneity between crime and prison population Ordinary Least Squares (OLS) estimates are biased toward zero. In the years after pardons get passed, high incarceration rates match high crime rates, generating a positive correlation. The IV estimates tell us that for each pardoned prisoner, the estimated number of crimes increases by between 30.94, if we use cubic splines to approximate $f(t)$, and 43.42 if we use pardon-specific linear time trends to approximate $f(t)$. The reduced-form coefficients instead are 14.34 and 17.80. Notice that both estimates are highly significant. The model in logs shows elasticities of 17 percent for the model with splines and 20 percent for the model with pardon-specific linear time trends. It is encouraging that the IV estimates that include year fixed effects are, although not precisely estimated, similar

(both in levels and in logs) to the IV estimates that use pardon-specific linear time trends.[23]

Results for Total Crime Conditional on Other Covariates–In Table 8, we additionally control for variables that might affect pardons and crime rates. From now on, we control for the most conservative specification—the one that uses three-year cubic splines. Since some of the additional controls are available only for the years 1985-1995, the sample size drops from 594 to 198. Changes in the probability that the perpetrator of the crime has been identified by the police represents one way to measure the productivity of the judicial system. Pardons might reduce the judicial systems' backlog of cases and influence its productivity. An increase in this probability increases the expected sentence length and, therefore, might influence crime. Controlling for sentence length and for changes in the probability that the perpetrator is known leaves the reduced form elasticity unchanged at 29 percent (column 2) and increases the IV elasticity from 27 percent to 28 percent (column 7). Changes in GDP are supposed to proxy for legal opportunities of criminals, while changes in consumption are supposed to capture illegal opportunities. Controlling for these opportunities changes the reduced form elasticity (Table 8) from 29 percent to 28 percent, while the IV elasticity drops by 3 percentage points (25 percent versus 28 percent). Despite the smaller sample size the estimates are precisely measured and are larger than the elasticities estimated before, indicating that the incapacitation has increased over time.

Police enforcement might respond strategically to the legislatures's pardons. Depending on their objective function, police officers might either increase or decrease their efforts to apprehend criminals. On the one hand, the supply shock of criminals after a pardon is likely to increase the probability of apprehension (p) and also police activity (A) if police officers' goal is to equate expected marginal benefits $pB(A)$ to marginal costs $C(A)$ and if $B_{AA} < 0$, $C_{AA} > 0$. On the other hand, pardons are likely to weaken the police officers motivations and, therefore, productivity. Pardons do more than nullify part of the officers' past efforts. Criminals who commit a crime before the pardon, but get arrested only after the pardon, can also benefit from the pardon. Thus, even post-pardon arrests might end up with an early release. For these reasons, in columns 4 and 9 of Table 8 we control for

[23]A special event took place in Italy in July 1990: the World Cup soccer tournament. In the 12 regions that hosted at least a game, log-changes in crime were, compared with the remaining regions, 12 percentage points larger in 1990 than in either 1989 or 1991 (p-value of 8 percent). Prisoner flows, however, did not seem to differ significantly because of the World Cup. To control for changes in crime that are due to the World Cup, all regressions control for whether in 1990 the region hosted at least one World Cup game.

changes in the number of police officers and for changes in the number of controlled people. Both, the reduced-form estimates and the IV estimates are robust to this inclusion, indicating, at least, that police activity does not change as abruptly as the inmate population.

Finally, we control for changes in the fraction of inmates staying in dormitories and for the change in the rate of overcrowding (inmates divided by available beds). The reason is that changes in prison quality might have a deterrence effect (Katz et al., 2003). Although the change in the rate of overcrowding captures part of the variability that is due to the pardons, there are again no significant changes in either the marginal effects or the elasticities of interest, which suggests that pardons can be credibly treated as exogenous and that there is no need to control for other variables.

Results for Different Crime Categories–Typically, not all criminals are pardoned; usually some restrictions apply. A number of crimes are generally excluded from pardons (see Table 1). Table 9 shows that between 1984 and 1995, the types of crime that were explicitly excluded from pardons, like kidnappings, do not show any significant increase related to pardons.[24] Sexual assault were also always excluded from pardons but their coefficient is equal to -0.22, though not significant due to a large standard error. It is somehow puzzling that the effects of pardons on larcenies and burglaries were not significantly different from zero, though these crimes might have been subject to serious measurement error in the police data. This measurement error is likely to inflate the standard errors of the estimated elasticities. We will see that the results for these kind of crimes look different when judiciary data are used to mitigate the measurement issue. Motor vehicle theft, which are known to be measured with high precision (the rates of reporting are close to 1 due to the car insurance), had an elasticity of 18 percent. Bank robberies showed an elasticity of 48 percent, and drug-related crimes had an elasticity of 60 percent, even though some drug-related crimes were excluded from the 1990 pardon (but not from the 1990 amnesty).

As an additional robustness check, Table 10 shows that using judicial crime data instead of police data only strengthens the incapacitation effect (30 percent versus 22 percent). Given that "judges for the initial investigation" (*giudice delle indagini preliminari*) are supposed to dismiss all irrelevant cases before reporting a crime, this result might be due to increased precision in the measurement of

[24]Mafia-related homicides, always excluded from pardons, also did not respond to pardons. Since many regions had no Mafia-related homicides, we analyzed changes in levels. Results are available upon request.

crime. Consistent with this possibility, the elasticity for thefts, which include larceny and burglary, is equal to 43 percent and highly significant. Frauds show the highest elasticity (49 percent), and even the coefficient for homicides (murder and attempted murder) is significantly different from zero (36 percent). Remember that extortions and kidnappings are usually excluded from pardons. The judiciary data has robberies, extortions and kidnappings all under one category. Given that extortions and kidnappings are typically not pardoned the effect is driven by robberies and is relatively small.

Robustness Checks–In Section 4.1 we mentioned that regions whose prisoners serve on average shorter terms release on average more prisoners when pardons get enacted. If these released prisoners tend to commit crimes more frequently than average, it is important to control for the average sentence length to rule out a spurious relationship between pardoned prisoners and crime. In Table 11 we rerun the same specification as in Table 10 with in addition the demeaned average log sentence length in the particular crime categories and its interaction with changes in prison population instrumented with its interaction with the fraction of pardoned prisoners. The coefficient on the interaction is never significant and the incapacitation effects are very close to the ones estimated without controlling for sentence length, which indicates that selection is not a concern and that most of the variability in the fraction of released pardons is due to the variability in the date of arrest or in the date of conviction, depending on whether the judge decides to keep the criminal in jail during his trial. The final robustness check is to make sure that the elasticity is not driven by a single region or a single pardon. When we estimate the elasticity of incapacitation excluding any single region or any single pardon the results are always statistically significant and of similar magnitude.[25]

5 Policy Implications

When attempting to solve the problem of prison overcrowding, the important question to ask is whether a forward-looking society would benefit from building new prisons or expanding alternative measures to imprisonment, instead of constantly relying on pardons. Collective pardons and collective amnesties have been shown to increase the total number of crimes. What is still to be determined is whether the marginal social cost of these crimes, when compared with the marginal

[25]The results are available upon request.

cost of incarceration, is large enough to make pardons an inefficient policy.

The Marginal Cost of Incarceration – Let us start with the cost of incarceration. Regressing the total budgetary cost of the penitentiary administration (in 2004 euros) on prison population over the past 17 years, we obtain a marginal cost per prisoner of 42,449 euros (95 percent confidence interval [11,066-73,832]) when we use OLS and of 57,830 euros (95 percent confidence interval [44,092-71,568]) when we use a median regression. Dividing the budget by the prison population instead, we get an average cost of 46,452 euros, with a range that varies between 35,496 euros (97 euros per day) and 70,974 (194 euros per day).[26] Notice that these costs do not include tax distortions (it costs more than 1 euro to collect 1 euro in taxes), changes in criminal capital, inmates' wasted human capital, their post release decline in wages, and the pain and suffering of inmates and of their families (including that due to overcrowding).

The Marginal Cost of Crime – Calculating the marginal cost of crime is more difficult and requires the use of different sources and several assumptions. Table 12 reports the estimated elasticity (ϵ), the probability of reporting (p), the marginal effect of incarceration ($\beta = \frac{\epsilon}{p} \times \frac{\overline{crimes}}{\overline{prison-pop}}$), the cost per crime ($c$), and the social cost ($s = \beta \times c$).[27] The marginal effects are based on the average crime rates in 2004, which is the last year for which the published crime statistics are available. Notice that these social costs are based on the incapacitation effect only and might be larger if deterrence were taken into account. All but two cost-per-crime estimates and the probabilities of reporting a crime come from ISTAT's 2002 victimization study (Muratore et al., 2004). Italy's Value of a Statistical Life (VSL), used to value a lost life due to intentional homicide, has been estimated in a study commissioned by the European Commission (Albertini and Scarpa, 2004), and its results are comparable with those from several other studies done in the United States.[28] The social cost of frauds comes from a study by the Italian association of retailers (Confesercenti, 2006).[29] [30] For

[26]These costs tend to be much larger than in the United States (Levitt, 1996), probably because the inmate-to-staff ratio is two to six times larger in Italy than it is in the United States. At the beginning of 2007, the Italian prison system employed more than 45,000 people, with an inmate-to-staff ratio close to 1 (www.polizia-penitenziaria.it). In 2001 the inmate-to-staff ratio, ranged between 1.7 in Maine (with an average cost of 122 dollars per day) and 6.8 in Alabama (with an average cost of 22 dollars per day, www.ojp.usdoj.gov).

[27]As in Levitt (1996) we need to assume that reported and unreported crimes are subject to the same elasticities, an assumption that, since criminals do not know a priori whether a crime gets reported, seems to be reasonable.

[28]Estimates of the VSL for Italy range from 1,448,000 euros to 2,896,000 euros (Albertini and Scarpa, 2004). See Ashenfelter and Greenstone (2004a,b) for an overview of recent estimates of the VSL.

[29]The study uses the following sources for its estimate, fiscal police (*Guardia di Finanza*), customs police (*Agenzia delle Dogane*), survey data, and the anti-fraud phone (*Telefono antiplagio*).

[30]We could not estimate some elasticities, marked with a question mark, while for other elasticities, based on

drug-related crimes, we could not find any cost estimate, while for attempted murder, which also has a positive elasticity, we use a conservative estimate of 0. Notice that when computing the total social cost, question marks are treated as zeros, a conservative approach. For violent crimes, we do not use quality-of-life reductions caused by pain and suffering, because no such estimates are available for Italy. The cost estimates also do not include preventive measures taken by people to fight crime (insurance policies and the like). Apprehensions are also socially costly, because resources must be spent to rearrest pardoned prisoners. But since these costs are difficult quantify they also are excluded.[31]

Policy Implications – Intended to be taken with a grain of salt, given the assumptions, the total social cost amounts to 146,000 euros, a value that is much higher than the marginal cost of prisoners.[32][33] The most socially costly crimes after a pardon are frauds (55,000 euros) and non-mafia-related murders (45,000 euros). Next are motor vehicle thefts (a total of 31,000 euros), other thefts (14,000 euros), and bank robberies (1,000 euros).

While some of these costs are simple transfers to criminals we follow Levitt (1996) and do not take their utility into account.[34] To understand how our policy implication depends on these transfers we can compute the relative value lost needed to keep the marginal cost of pardons equal to the marginal cost of incarceration. Assuming that transfers apply only to property crimes and using a marginal cost of prisoners of 42,449 euros the relative loss has to be lower than 3.4 percent to make pardons efficient. In other words more than 96.6 percent of the value of the stolen property needs to be transferred from victims to criminals to justify pardons.

institutional details of the pardons, we have a conservative guess of zero, marked with a zero and a question mark.

[31]Notice that we are implicitly assuming a linear social function. In case of risk aversion individuals would like to equate their marginal expected (dis)utility from crime with their marginal tax devoted to financing the prison administration. Given that crime involves risk to the public, people should be willing to pay even more than the marginal cost of incarceration to keep criminals in jail.

[32]Even if we exclude the social cost related to frauds, which is the only cost not entirely based on representative victimization surveys or on police reports only, the social cost is still above any measure of marginal cost of prisoners.

[33]We exclude from the cost-benefit analysis pardoned individuals who were subject to alternative measures of detention. The reason for the exclusion is that we do not have region-level data on these measures. We do know, though, that pardons affect the prison population, and the population subject to alternative measures of detention, in the same way. Since the population subject to alternative measures of detention is likely to recidivate less and cost less than the prison population, including them in the cost-benefit analysis is likely to reduce the marginal cost of imprisonment, thereby making the case against pardons and amnesties even stronger.

[34]A justification for doing so might be that only 14 percent of Italians surveyed in 2007 supported the 2006 pardon (EURISPES, 2007), while more than 70 percent of them believed that the pardon had led to an increase in crime.

6 Conclusions

We use an atypical judicial policy—namely, Italy's collective pardons and amnesties—to estimate the causal effect of incapacitation on crime. We show with a simple model that whenever pardons and amnesties are nationwide policies, the incapacitation effect can be identified separately from the deterrence effect. We can also control for the possible endogeneity of the policy that arises whenever criminals expect a sentence-reducing policy before the policy gets enacted. Ignoring this endogeneity could bias our estimates toward zero. Compared with the elasticities found in Levitt (1996), which uses the status of overcrowding litigation in the U.S. states as an instrument and estimates the sum of incapacitation and deterrence, our elasticities of "just" incapacitation are smaller. Nevertheless, our estimated elasticities tend to be larger than previous "non-experimental" estimates. Our OLS estimates are shown to be biased toward zero casting doubt on estimates of the incapacitation effect that do not try to overcome the simultaneity issue.

Collective pardons and amnesties could represent a more cost-efficient imperfect screening device than individual parole boards. This idea was certainly present in the minds of the legislators. "Formalized" habitual criminals were typically excluded from pardons, and elderly prisoners, believed to have lower recidivism rates, sometimes received larger sentence reductions.

This view could potentially lead to the definition of an optimal release policy, which would likely be several times more efficient than the typical Italian pardon. We leave this topic for future research and perform a cost-benefit analysis that compares the efficiency of pardons with the status quo—i.e., keeping prisoners in jail. We find the social cost of pardons to be significantly larger than the cost of incarceration. In the absence of cost-efficient alternatives to incarceration this finding suggests that in Italy pardons should be abandoned or be designed to be more selective. It also suggests that marginal changes in prison population generate more costs than benefits, indicating that prison population might be below its optimal level.

A Definitions of crime, years available, and source

Bank robberies, 1984-95, police records The seizing property from a bank through violence or intimidation.

Burglaries, 1984-95, police records The unlawful entry of a structure to commit a theft.

Drug-related crimes, 1984-95, police records

Frauds, 1970-1995, judicial records The deceiving of someone to damage him usually, to obtain property or services unjustly. Examples are false advertising, identity theft, false billing, forgery of documents or signatures, false insurance claims, investment frauds, etc.

Homicides, 1970-1995, judicial records

Kidnappings, 1984-95, police records

Larcenies, 1984-95, police records The unlawful taking of property from the possession of another

Mafia murders, 1984-95, police records Intentional homicides related to the organized crime

Motor vehicle theft, 1984-95, police records

Sexual assaults, 1984-95, police records The carnal knowledge against someone's will

Theft and aggravated thefts, 1970-1995, judicial records

Robberies, 1970-1995, judicial records The seizing property through violence or intimidation. Includes extortions and kidnappings.

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Table 1: History of collective pardons from 1978 to 2006.

LAW EFFECTIVE	TYPE	N. OF YEARS PARDONED	INCLUDED CRIMES	EXCLUDED CRIMES	EXCLUDED CRIMINALS
Jan 24, 1963 (Dec 8, 1962)	Amnesty	3 years (4 years if the inmate's age is below 18).	Thefts of plants, crimes related to art. 82 of the penal codex (p.c.).	I(371); III(444); IV(516); V(528, 530).	Criminals who at the amnesty have been sentenced to more than 1 year for intentional crimes.
	Pardon	1 year (2 years if the inmate's age is below 18 or above 70).		I(314, 315, 317); III(439, 440, 441); V(519, 520); VIII(628).	Criminals who at the amnesty have been sentenced to more than 1 year for intentional crimes.
June 4, 1966 (Jan 31, 1966)	Amnesty	3 years (4 years if the inmate's age is below 18 or above 70).	Tax crimes, thefts of plants, wood and fish, crimes related to art. 57, 82, 330, 337, 340, 341, 414, 415, 507, 508, 610, 635 of the p.c.; crimes related to the Resistance Movement if committed between July 25, 1943 and June 2, 1946.	I(316, 318-322, 371); III(443-447); V(528, 530).	Criminals who at the amnesty have been sentenced to more than 2 years for intentional crimes.
	Pardon	2 years.	Tax crimes, crimes concerning the law of customs and monopoly.		Professional or recurrent criminals.
Oct 25, 1968 (June 27, 1968)	Amnesty	5 years.	Crimes committed because of, and during political demonstrations related to art. 338, 419, 423 of the p.c., crimes related to Vajont disaster.		Criminals who at the amnesty have been sentenced to more than 3 years for intentional crimes.

LAW EFFECTIVE	TYPE	N. OF YEARS PARDONED	INCLUDED CRIMES	EXCLUDED CRIMES	EXCLUDED CRIMINALS
	Pardon	2 years.	Same as above, and crimes related to Vajont disaster.		Professional or recurrent criminals.
May 22, 1970 (April 6, 1970)	Amnesty (particular)	5 years.	Crimes related to art. 302, 303, 338, 419, 423 of the p.c., illegal detention of arms, crimes concerning the law of customs, crimes related with tobacco monopoly.		
	Amnesty	3 years (4 years if the inmate's age is below 18 or above 70).	Non-financial crimes, thefts and crimes related to art. 314 of the penal codex (p. c.).	I(371, 372, 388); III(443, 444, 446, 447); V(528, 530).	Professional or recurrent criminals, criminals who at the amnesty have been sentenced to more than 3 years for intentional crimes.
	Pardon	2 years.	Crimes covered by the military penal codex (m.p.c.) if committed because of conscientious objection.		Professional or recurrent criminals, criminals who at the amnesty have been sentenced to more than 3 years for intentional crimes.
Aug 5, 1978 (March 15, 1978)	Amnesty	3 years (4 years if the inmate's age is below 18 or above 70).	Non-financial crimes with few exceptions, crimes related to art. 57 and 334 of the p. c., and WWII desertions.	I (316, 318-321, 355, 371, 372, 385, 391); III (443-445); IV (501, 501-bis); VII (590); VIII (644). Art. 218 of the m. p. c.. Crimes associated with construction (several laws (s. l.)), environment (s. l.), illegion detention of arms(s. l.), and currency(s. l.).	Professional or recurrent criminals, criminals who within 5 years preceding the amnesty have been sentenced to more than 2 years for intentional crimes, criminals who have been sentenced to more than 10 years for intentional crimes.
	Pardon	1 year for crimes related to art. 441, 442, 519, 521, 624 of the p.c.; otherwise 2 years.		I (253, 276, 283-286, 306, 314, 315, 317, 319, 385); III (422, 428 - 434, 438 - 440); VII (575); VIII (628 - 630). Crimes associated with reorganization of fascism (law), drugs (law), currency (s. l.), production and trade of arms (s. l.), and financial crimes.	

LAW EFFECTIVE	TYPE	N. OF YEARS PARDONED	INCLUDED CRIMES	EXCLUDED CRIMES	EXCLUDED CRIMINALS
Dec 19, 1981 (Aug 31, 1981)	Amnesty	3 years (4 years if the inmate's age is below 18 or above 70).	Non-financial crimes with few exceptions, crimes related to art. 57, 334, 476, 491, 482 and 610 of the p. c.	I (316, 318-321, 355, 371, 372, 385, 391); III (443-445); IV (501, 501-bis); VII (590); VIII (644). Art. 218 of the m. p. c.. Crimes associated with construction (s. l.), environment (s.l.), illegal detention of arms (s.l.), currency (s.l.) and terrorism.	Professional or recurrent criminals, criminals who within 5 years preceding the amnesty have been sentenced to more than 2 years for intentional crimes, criminals who have been sentenced to more than 10 years for intentional crimes.
	Pardon	1 year for crimes related to art. 441, 442, 519, 521, 624 of the p.c.; otherwise 2 years.		I (253, 270, 270-bis, 276, 280, 283-286, 289-bis, 306, 314, 315, 317, 319, 385); II (420); III (422, 428 - 434, 438 - 440); VII (575); VIII (628 - 630, 648 - bis). Crimes associated with reorganization of fascism (s. l.), drugs (law), currency (s. l.), production and trade of arms (s. l.), terrorism, and financial crimes.	Professional or recurrent criminals.
Dec 16, 1986 (June 8, 1986)	Amnesty	3 years (4 years if the inmate's age is below 18 or above 65).	Non-financial crimes with few exceptions, crimes related to art. 57, 476, 491, 482, 337 and 610 of the p. c., illegal detention of small weapons (s.l.), crimes committed by criminals under age 18	I (316, 318-321, 355, 371, 372, 385, 391); III (443-445); IV (501, 501-bis); VII (590); VIII (644). Crimes associated with construction (s. l.), environment (s. l.), modification of weapons (law) and currency (s. l.). protection of Venice (s. l.), ecological crimes (s. l.)	Professional or recurrent criminals, criminals who within 10 years preceding the amnesty have been sentenced to more than 3 years for intentional crimes.
	Pardon	1 year for crimes related to art. 441, 442, 519, 521, 624 of the p.c.; 3 years if the inmte's age is above 65; otherwise 2 years.		I (253, 270, 270-bis, 276, 280, 283-286, 289, 289-bis, 306, 314, 315, 317, 319, 385); II (416 - bis, 420); III (422, 428 - 434, 438 - 442); V (519, 521); VII (575); VIII (628 - 630, 648 - bis). Art. 167, 186, 195, 215, 216, 217 of the m. p. c.. Crimes associated with the reorganization of fascism (s. l.), drugs (s. l.), currency (s. l.), secret organizations (s. l.), illegal detention of arms (law), and financial crimes.	Professional or recurrent criminals.

LAW EFFECTIVE	TYPE	N. OF YEARS PARDONED	INCLUDED CRIMES	EXCLUDED CRIMES	EXCLUDED CRIMINALS
April 12, 1990 (Oct 24, 1989)	Amnesty	4 years.	Non-financial crimes with few exceptions, crimes related to art. 57, 336, 337, 588, 614, 640, of the p. c., illegal detention of arms (s. l.), crimes related to strikes (s. l.), crimes committed by criminals under age 18 (s.l.), crimes related to tobacco monopoly, crimes related to taxes on consumption of gas and electricity (s.l.), small crimes related to taxes committed by non-commercial entities.	I (316, 318-321, 353-355, 371, 372, 378, 385, 391); II(420); III (443-445, 452, 471, 478); IV (501, 501-bis); V(521); VII (590, 595, 610); VIII (644); IX (733, 734). Crimes associated with construction (s. l.), environment (s. l.), control of arms (law), mafia (law), protection of Venice (s. l.), risks of big accidents associated with certain industrial activities (law), ecological crimes (s.l.) and modification of artworks (law).	NO
Dec 24, 1990 (Oct 24, 1989)	Pardon	2 years.			NO
July 31, 2006 (May 2, 2006)	Pardon	3 years.		I (270, 270-bis, 270-quater, 270-quinquies, 280, 280-bis, 285, 289-bis, 306); II (416); III (422); VII (600, 600-bis, 600-ter, 600-quater, 600-quinquies, 601, 602, 609-bis, 609-quater, 609-quinquies, 609-octies); VIII (630, 644, 648-bis). Crimes associated with drugs.	NO

Notes:

I - Crime against the State/PA/Judiciary System; II - C.a. public order; III - Fraud; IV - C.a Economic System; V - C. a. morality; VI - C. a. family; VII - C. a. person (inc. violent crimes); VIII - C. a. wealth (thefts etc); IX - Crimes against the State's social activity. Article numbers reported within brackets in the column of excluded crimes are articles of the penal codex, unless something different is explicitly indicated. Date: Publication date is presented above the effectiveness date (in brackets). The Amnesty/Pardon is valid for crimes committed before the effectiveness date.

Table 2: Fraction of the prison population that is pardoned.

	1963	1966	1968	1970	1978	1981	1986	1990
Abruzzo & Molise	0.301	0.847	0.007	0.732	0.426	0.184	0.274	0.459
Basilicata	0.285	0.642	0.007	0.445	0.287	0.119	0.153	0.348
Calabria	0.248	0.382	0.02	0.378	0.313	0.154	0.137	0.337
Campania	0.175	0.464	0.008	0.698	0.377	0.179	0.211	0.358
Emilia Romagna	0.218	0.619	0.003	0.675	0.318	0.231	0.2	0.433
Friuli-Venezia Giulia	0.276	0.62	0.003	0.709	0.429	0.289	0.333	0.514
Lazio	0.204	0.427	0.036	0.319	0.307	0.212	0.144	0.276
Liguria	0.192	0.579	0.007	0.715	0.392	0.234	0.236	0.372
Lombardia	0.223	0.556	0.028	0.617	0.339	0.214	0.161	0.366
Marche	0.199	0.747	0.025	0.695	0.418	0.152	0.119	0.341
Piemonte & Valle d'Aosta	0.23	0.55	0.014	0.676	0.272	0.15	0.171	0.428
Puglia	0.216	0.512	0.005	0.508	0.397	0.246	0.277	0.401
Sardegna	0.132	0.387	0.004	0.389	0.266	0.202	0.205	0.243
Sicilia	0.192	0.447	0.007	0.497	0.369	0.199	0.103	0.419
Toscana	0.224	0.69	0.012	0.579	0.357	0.239	0.256	0.281
Trentino-Alto Adige	0.247	0.591	0.091	0.772	0.638	0.32	0.415	0.504
Umbria	0.172	0.385	0	0.573	0.425	0.205	0.47	0.316
Veneto	0.251	0.62	0.011	0.549	0.366	0.193	0.287	0.462

Table 3: Pardoned inmates per 100,000 residents.

	1963	1966	1968	1970	1978	1981	1986	1990
Abruzzo & Molise	5.4	16.3	0.2	24.1	14.2	7.9	12.5	19.0
Basilicata	10.7	24.5	0.3	17.2	14.9	5.7	8.2	13.1
Calabria	12.1	15.8	0.9	14.9	13.9	7.4	8.3	12.4
Campania	11.4	28.4	0.4	35.3	18.7	6.6	14.5	15.8
Emilia Romagna	6.0	16.0	0.1	14.4	9.1	6.7	6.5	13.8
Friuli-Venezia Giulia	10.1	18.9	0.1	18.9	14.8	9.2	11.3	13.7
Lazio	8.8	19.1	1.4	11.9	15.3	13.3	9.3	12.0
Liguria	10.2	29.8	0.3	29.0	18.8	11.1	12.4	13.4
Lombardia	8.0	17.4	0.7	14.6	9.1	5.9	6.1	12.2
Marche	2.8	13.8	0.4	13.7	5.0	2.8	4.0	6.9
Piemonte & Valle d'Aosta	9.6	19.8	0.5	19.6	10.4	6.3	9.1	18.8
Puglia	10.1	20.2	0.2	18.6	18.2	12.7	12.9	14.1
Sardegna	7.0	18.7	0.2	15.5	11.8	11.3	10.7	11.5
Sicilia	13.3	29.3	0.4	24.8	22.4	11.7	7.3	19.5
Toscana	7.2	19.0	0.3	14.1	9.9	7.2	9.9	10.3
Trentino-Alto Adige	7.4	17.3	2.1	17.7	13.7	10.1	14.0	15.1
Umbria	5.7	13.0	0.0	22.0	16.6	5.4	7.3	8.5
Veneto	5.8	12.9	0.2	10.6	7.5	4.3	7.3	8.4

Table 4: Distribution of criminal types before and after the July 2006 pardon.

	July 2006	rank	September 2006	rank	% Reduction
Crimes against wealth	0.309	1	0.277	1	-0.43
Crimes against persons	0.149	2	0.167	2	-0.29
Drug related crimes	0.146	3	0.166	3	-0.28
Illegal possession of weapons	0.141	4	0.144	4	-0.36
Public trust	0.048	5	0.041	5	-0.46
Crimes against the public administration	0.038	6	0.032	7	-0.47
Crimes against the justice department	0.034	7	0.027	8	-0.50
Third book of administrative sanctions	0.025	8	0.025	9	-0.37
Mafia related crimes	0.025	9	0.033	6	-0.17
Other crimes	0.085	.	0.088	.	-0.35
Total number of prisoners	60,710		38,326		-0.37

Notes: Based on DAP (2006)

Table 5: Laws proposed before the July 2006 pardon.

	Legislature	House of rep.	Senate
July 2006	XV	4	1
June	XV	2	4
May	XV	5	0
April	XV	0	0
TOTAL	XV	**11**	**5**
January-March	XIV	0	0
December 2005	XIV	0	1
November	XIV	1	0
May-October	XIV	0	0
April	XIV	2	3
August 2003-March 2005	XIV	0	0
July 2003	XIV	2	0
February-June	XIV	0	0
January	XIV	1	0
December 2002	XIV	0	0
November	XIV	3	3
October	XIV	1	0
September	XIV	4	0
July-August	XIV	0	0
June	XIV	0	2
March-May	XIV	0	0
February	XIV	1	0
January	XIV	0	1
October-December 2001	XIV	0	0
September	XIV	2	0
August	XIV	0	0
July	XIV	2	0
June	XIV	1	0
TOTAL	XIV	**20**	**10**
May 1996-May 2001	XIII	12	7
March 1994-April 1996	XII	3	2
April 1992-April 1994	XI	3	1

Table 6: Summary statistics (per 100,000 residents when applicable)

Variable	Mean	Std. Dev.	Min.	Max.	N
Prison population	42.471	17.178	7.647	100.995	612
Pardoned prisoners	3.583	6.093	0	35.343	612
GDP per capita (x1000)	13.704	3.526	7.247	21.97	288
Consumption per capita (x1000)	11.219	2.032	7.299	17.728	288
# of police forces	439.404	179.88	112.951	995.681	288
# of police controls	52931.831	28147.419	0	125339.326	255
Average sentence length in years (AVS)	12.016	4.14	5.044	26.781	468
AVS: Thefts	7.286	3.127	2.747	25.313	468
AVS: Homicides	126.966	41.941	0	360	468
AVS: Robberies, extortions and kidnappings	32.244	16.079	0	139.13	468
AVS: Fraud	7.515	2.198	2.667	18.557	468
Fraction of known perpetrators (x100)	23.539	16.925	0	73.915	612
Fraction dormitories (x100)	12.166	5.708	0	36.113	611
# inmates /# of beds	0.798	0.337	0.15	2.046	611
Mafia murders	0.434	1.164	0	7.971	255
Sexual assault	1.364	0.631	0	3.607	255
Kidnappings	1.102	0.538	0	2.578	255
Drug related c.	42.487	30.901	0	159.845	255
Larceny	193.444	188.906	0	1073.249	255
Burglary	253.103	131.561	0	760.621	255
Motor vehicle theft	303.592	268.271	0	1174.157	255
Bank robberies	1.32	2.107	0	12.588	612
Theft and aggravated theft	2073.106	1158.944	240.299	7967.78	468
Attempted and committed intentional homicides	3.609	3.316	0.258	23.575	468
Frauds	43.9	30.424	11.609	294.63	468
Total # crimes (Police)	1983.252	1293.943	538.976	7696.002	612
Total # crimes (Judicial)	3283.724	1547.89	794.03	11464.021	468

Table 7: (Log-) changes in crime on (log-) changes in prison population, 1963-1995.

		(1)	(2)	(3)	(4)	(5)	(6)
Dep. var.		Panel A: Δ prison pop.			Panel B: Δ log prison pop.		
FIRST	Pardoned	-0.46	-0.41	-0.11	-1.18	-1.12	-0.28
STAGE	prisoners	(0.06)**	(0.08)**	(0.08)	(0.13)**	(0.14)**	(0.12)*
	R-squared	0.36	0.33	0.49	0.44	0.47	0.67
Dep. var.		Panel C: Δ crime			Panel D: Δ log crime		
REDUCED	Pardoned	14.34	17.80	4.46	0.21	0.23	0.07
FORM	prisoners	(2.29)**	(3.97)**	(6.13)	(0.03)**	(0.05)**	(0.09)
	R-squared	0.37	0.32	0.43	0.29	0.28	0.32
IV	Change	-30.94	-43.42	-39.71	-0.17	-0.20	-0.24
	in prison pop.	(5.40)**	(10.79)**	(58.01)	(0.02)**	(0.03)**	(0.28)
OLS	Change	-4.90	-8.14	-0.36	-0.08	-0.11	0.00
	in prison pop.	(1.87)*	(2.16)**	(2.17)	(0.02)**	(0.02)**	(0.03)
	R-squared	0.33	0.30	0.43	0.27	0.28	0.32
Region FE		YES	YES	YES	YES	YES	YES
Year controls		spline	time trends	dummies	spline	time trends	dummies
Observations		594	594	594	594	594	594

Notes: All regressions include region fixed effects. Standard errors clustered by region in parentheses. * significant at 5 percent; ** significant at 1 percent.

Table 8: The incapacitation elasticity after controlling for additional factors.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Log-change in crime, reduced form					Log-change in crime, instrumental variable				
Fraction of pardoned prisoners (adj.)	0.29 (0.09)**	0.29 (0.09)**	0.28 (0.09)**	0.27 (0.09)**	0.28 (0.09)**					
Log change in prison pop. (adj.)						-0.27 (0.05)**	-0.28 (0.05)**	-0.25 (0.05)**	-0.25 (0.05)**	-0.22 (0.05)**
Log sentence length		0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)		0.03 (0.02)	0.03 (0.02)	0.03 (0.02)	0.02 (0.02)
Log change in probability perpetrator is known		-0.02 (0.04)	-0.02 (0.04)	-0.01 (0.04)	-0.01 (0.04)		0.01 (0.03)	-0.01 (0.03)	-0.01 (0.04)	-0.02 (0.04)
Log change in GDP			-0.26 (0.39)	-0.20 (0.38)	-0.20 (0.40)			-0.06 (0.37)	-0.07 (0.38)	-0.05 (0.37)
Log change in consumption			0.70 (0.68)	0.26 (0.73)	0.33 (0.75)			1.73 (0.50)**	1.74 (0.57)**	1.28 (0.60)*
Log change in police officers				0.16 (0.08)*	0.16 (0.08)				-0.04 (0.07)	-0.01 (0.06)
Log change in number of people controlled				0.08 (0.06)	0.08 (0.06)				0.02 (0.07)	0.01 (0.06)
Log change in the fraction of inmates staying in dormitories					-0.00 (0.04)					-0.02 (0.03)
Log change in overcrowding					-0.02 (0.02)					0.10 (0.03)**
Observations	198	198	198	198	198	198	198	198	198	198
R-squared	0.50	0.50	0.50	0.51	0.51					

Notes: All regressions include region fixed effects. Standard errors clustered by region in parentheses. * significant at 5 percent; ** significant at 1 percent.

Table 9: The incapacitation effect for different types of crime for the years 1985-1995.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Sex. assault		Kidnapp.		Drug deals		Larceny		Burglary		MV thefts		Bank rob.		Total	
	RF	IV	RF	IV	RF	IV	RF	IV	RF	IV	RF	IV	RF	IV	RF	IV
							Panel B: Log-changes in crime									
Fraction of	0.23		0.06		0.65		-0.12		0.06		0.20		0.52		0.30	
pardoned pris.	(0.30)		(0.31)		(0.07)**		(0.23)		(0.07)		(0.08)*		(0.23)*		(0.09)**	
Log-change in		-0.22		-0.06		-0.60		0.11		-0.05		-0.18		-0.48		-0.28
prison pop.		(0.26)		(0.29)		(0.13)**		(0.20)		(0.06)		(0.05)**		(0.24)		(0.05)**
R-squared	0.07		0.05		0.44		0.07		0.13		0.44		0.14		0.50	
Observations	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216

Notes: All regressions include region fixed effects. RF indicates the reduced form regression, IV the instrumental variable regression.
Standard errors clustered by region in parentheses. * significant at 5 percent; ** significant at 1 percent.

Table 10: The incapacitation effect for different types of crime for the years 1970-1995.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Thefts		Homicides		Robberies, extortions and kidnappings		Frauds		Total crimes (judiciary)		Total crimes (police)	
	RF	IV	RF	IV	RF	IV	RF	IV	RF	IV	RF	IV
Frac. of pardoned inmates	0.46 (0.12)**		0.38 (0.11)**		0.19 (0.10)		0.51 (0.16)**		0.32 (0.07)**		0.23 (0.05)**	
Log-change in prison pop.		-0.43 (0.09)**		-0.36 (0.14)*		-0.18 (0.08)*		-0.49 (0.13)**		-0.30 (0.06)**		-0.22 (0.04)**
R-squared	0.31		0.06		0.21		0.23		0.27		0.30	
Observations	450	450	450	450	450	450	450	450	450	450	450	450

Notes: All regressions include region fixed effects. RF indicates the reduced form regression, IV the instrumental variable regression. Standard errors clustered by region in parentheses. * significant at 5 percent; ** significant at 1 percent.

Table 11: The incapacitation effect for different types of crime for the years 1970-1995. Controlling for selection.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Thefts		Homicides		Robberies, extortions and kidnappings		Frauds		Total crimes	(judiciary)
	RF	IV	RF	IV	RF	IV	RF	IV	RF	IV
Frac. of pardoned inmates	0.44		0.37		0.18		0.56		0.33	
	(0.13)**		(0.10)**		(0.11)		(0.17)**		(0.08)**	
Log-change in prison pop.		-0.42		-0.32		-0.17		-0.49		-0.31
		(0.09)**		(0.10)**		(0.10)		(0.13)**		(0.06)**
Log sentence length	0.01	0.02	0.05	0.11	-0.03	-0.03	-0.01	-0.06	-0.08	-0.05
	(0.04)	(0.04)	(0.12)	(0.09)	(0.03)	(0.04)	(0.07)	(0.06)	(0.04)*	(0.05)
Interaction	-0.14	0.12	0.34	-0.46	0.03	-0.01	-0.43	0.24	0.11	-0.12
	(0.23)	(0.17)	(0.46)	(0.77)	(0.16)	(0.17)	(0.40)	(0.51)	(0.11)	(0.12)
Observations	450	450	440	440	438	438	438	438	438	438
R-squared	0.32		0.07		0.21		0.23		0.28	

Notes: All regressions include region fixed effects. RF indicates the reduced form regression, IV the instrumental variable regression. The sentence lengths are crime specific. The interaction is between the fraction of pardoned prisoners (or its instrument) and the demeaned logarithm of sentence length. The interaction in the IV regression is instrumented using the interaction with the fraction of pardoned inmates. Standard errors clustered by region in parentheses. * significant at 5 percent; ** significant at 1 percent.

Table 12: Social benefit from incarceration

Crime	Total	Elasticity	Reporting prob.	Marginal effect	Cost per crime	Social cost
Against the person						
Massacre	24	0 ?	-	-	-	-
Mafia related murder	299	0,00	1,00	0,00	-	0,00
non-Mafia related murder	1.249	0,36	1,00	0,02	2.000.000	45.411
Attempted murder	1.542	0,36	1,00	0,03	0 ?	-
Infanticide	6	0 ?	-	-	-	-
Voluntary manslaughter	83	?	-	-	-	-
Involuntary manslaughter	8.294	?	-	-	-	-
Sexual assault	4.571	0 ?	-	-	-	-
Other (including assault, battery, pornography)	290.612	?	-	-	-	-
Against the family, the morale, the animals						
	18.180	0 ?	-	-	-	-
Against property						
Motor vehicle theft (motorbikes)	80.494	0,18	0,95	1,55	2.156	3.339
Motor vehicle theft (cars)	182.470	0,18	0,87	3,84	7.145	27.404
Other thefts	1.252.117	0,43	0,54	41,85	326	13.643
Bank robbery	2.683	0,48	1,00	0,05	21.033	1.026
Other robberies	47.046	0,18	0,50	1,72	326	562
Extorsion	8.024	?	-	0,15	-	-
Kidnappings	196	0,00	-	-	-	0,00
Harm to things, animals, property, etc.	300.352	?	-	-	-	-
Fraud	301.428	0,49	1,00	5,48	9.953	54.545
Against the economy and the public trust						
Commercial fraud	8.583	0,49	1,00	0,16	?	-
Drug related crimes	33.417	0,60	1,00	0,61	?	-
Other (forged currency, counterfeit)	193.095	0,49	1,00	3,51	?	-
Against the State and the public order						
	74.610	0 ?	-	-	-	-
Other crimes						
	153.878	0 ?	-	-	-	-
Total	2.963.253				Total social cost	145.775,17

Notes: See Section 5 for the list of sources and assumptions used.