"The Incapacitation Effect of Incarceration: Evidence from Several Italian Collective Pardons,"
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Online appendix

A1. Historical remarks on Italian Pardons

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.

A2. Overcrowding

The left panel of 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 and obsolete ones were dismissed during the same period (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 if aggregated at the national level) for the first time. If necessary the prison administration can add new beds to existing cells, up to what is defined as "tolerable" capacity. 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.

A3. 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.

A4. Monthly time-series evidence

Based on monthly time-series crime data and the exact date the pardon gets passed leads to an estimated elasticity of crime with respect to prison population of respectively 15 percent. The identification of the total elasticity (deterrence + incapacitation) with the monthly time series estimates requires few assumptions, since it is based on discontinuous changes in crime rates following pardons measured at a high frequency. However the elasticity is only approximate since we do not have monthly data on prison population.

As for how pardons affect crime, ideally one would compare monthly crime-level statistics with the monthly number of pardoned criminals. Monthly data on crime are available for the years 1962-1983, but not for prison population. The top left panel of Figure A1 shows the monthly data, while all other panels

simply zoom into a two year window around each pardon. From the figures one can see that crime rates tend to increase right after pardons get passed (the horizontal lines). A simple comparison of pre/post differences, meaning the distance between the horizontal lines, shows that apart from the last panel crime rates tend to be larger immediately after the pardons than immediately before. The estimated differences shown in the title are significantly different from zero. The discontinuity is less clear cut in 1963 and 1982, years where the released fraction of prison population has been relatively small (approximately 10 percent). Later we will show that overall these differences are statistically significant even when first-differencing the data to control for preexisting trends.

For the 2006 pardon we also have data on monthly prison population, which we match with data on a specific crime, bank robberies. The two panels of Figure A2 show 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). The right panel shows the estimated regression discontinuity using the region level monthly data with a cubic term of time. Within a month the number of bank robberies jumped by 0.31 per 100 branches (with a standard error of 0.07) from around 0.5 to 0.8. Given that prison population decreased by 37 percent the estimated elasticity is close -160 percent (0.3/0.5/0.37). The dotted line shows the estimated discontinuity when we use 12 month averages just before and after the pardon. The estimated change is equal to 0.18 (with a standard error of 0.04). The estimated elasticity on a yearly basis is closer to 1.

We should keep in mind that such an elasticity represents the sum of the (negative) incapacitation and (likely positive) deterrence effects. We speculate that the net deterrence effect is positive since immediately after a pardon gets passed criminals do not expect a new pardon to be passed in the near future and inmates that were released because of a pardon would risk to see their old sentence added to the new one if they got rearrested.

Now we are going to show that even first-differencing the data shown in Figure A1 one can estimate the total incapacitation effect. There are different ways to estimate the total elasticity (incapacitation plus deterrence) that lead to similar results. Since we don't have monthly data on prison population we simply regress crime rates on dummy variables indicating whether in that particular month a pardon or an amnesty was passed. Given the clear non-stationarity of crime rates in Table A6 we first-difference the data. In the first three columns we use crime levels, while in the last three we use logs. In columns 3 and 6 we also control for seasonality adding month fixed effects. Consistent with what was shown in Figure A1 for the bank robberies, there is strong evidence that after a month crime rates increase by more than 4 crimes every 100,000 inhabitants (column 3), or 5.6 percent (column 6). Given that the average fraction of released prisoners during this period is 36.8 percent the implied elasticity is 5.6/0.368 or 15.21 percent.

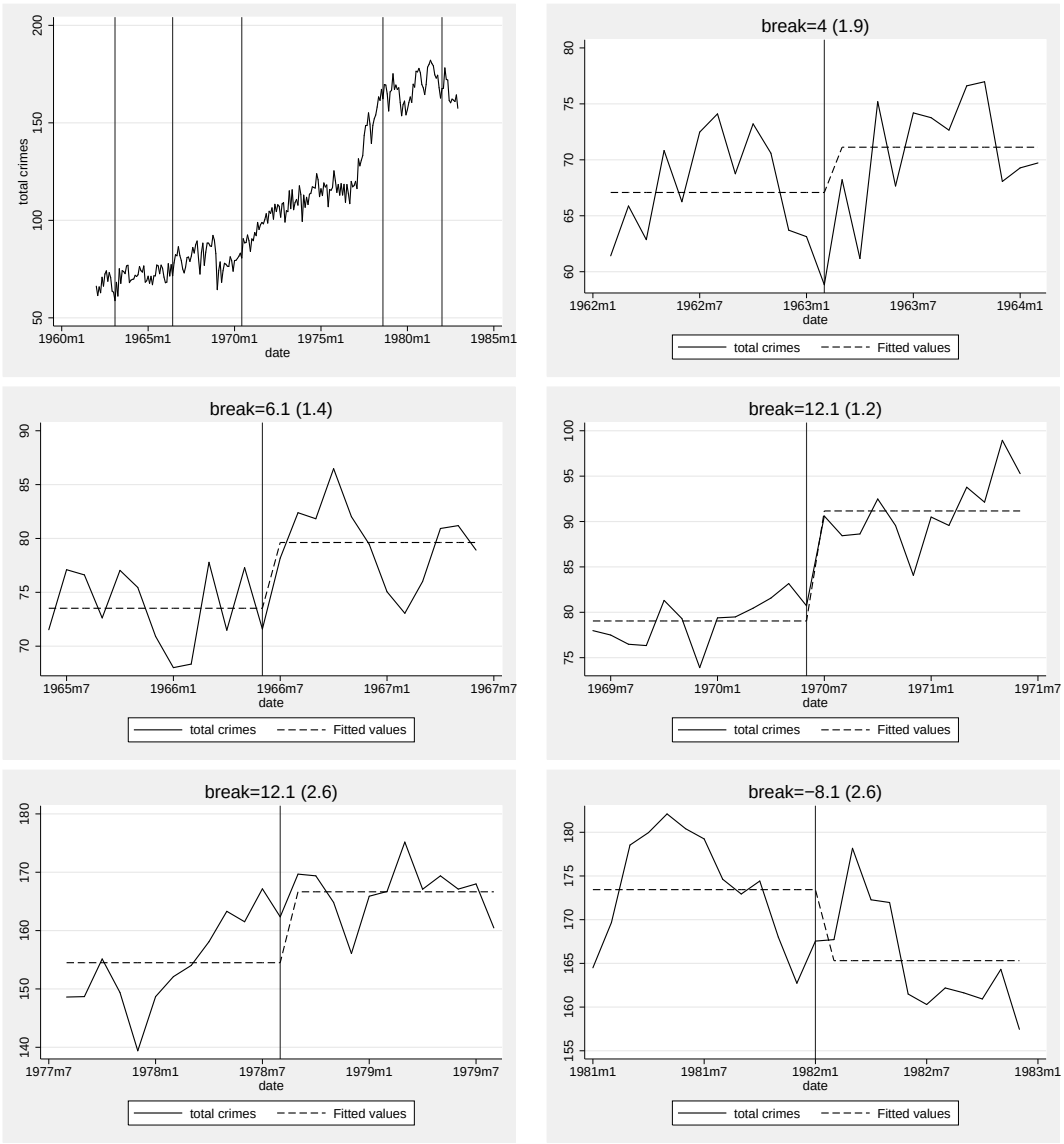


Figure A1. : Monthly crime rates per 100,000 residents, and structural breaks)

Notes: The break is estimated using a two year window centered at each pardon. The standard errors are in parentheses. Vertical lines represent months in which pardons or amnesties have been passed.

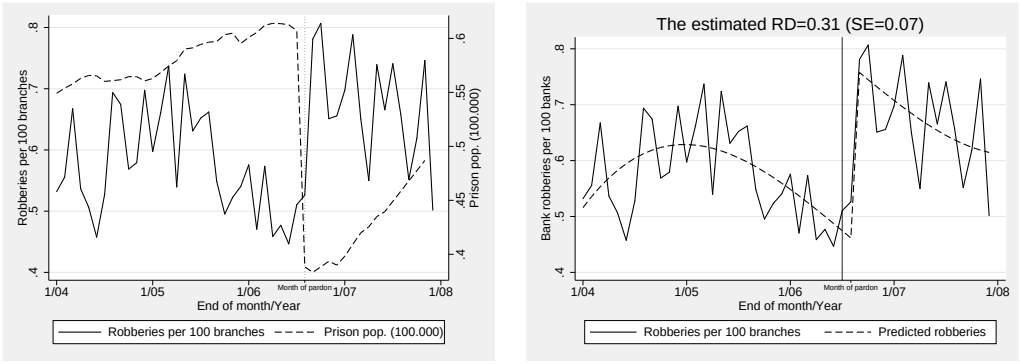


Figure A2. : Monthly bank robberies per 100 branches

A5. Additional Tables and Graphs

Table A1—: History of collective pardons from 1963 to 2006.

LAW EFFECTIVE	TYPE	N. OF YEARS PARDONED	INCLUDED CRIMES AND CRIMES W/O SENTENCING LIMITS	EXCLUDED CRIMES	EXCLUDED CRIMINALS
Jan 24, 1963 (Dec 8, 1962)	Amnesty	3 years (4 years if the inmate's age is below 18).	W/O: Thefts of plants, crimes related to art. 82 of the criminal law (c.l.).	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).	W/O: 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 c.l.; 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.	W/O: 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 c.l., 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 AND CRIMES W/O SENTENCING LIMITS	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	5 years.	Crimes committed during student demonstrations related to art. 302, 303, 338, 419, 423 of the c.l., 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 c.l..	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 criminal law (m.c.l.) 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.

LAW EFFECTIVE	TYPE	N. OF YEARS PARDONED	INCLUDED CRIMES AND CRIMES W/O SENTENCING LIMITS	EXCLUDED CRIMES	EXCLUDED CRIMINALS
	Pardon	1 year for crimes related to art. 441, 442, 519, 521, 624 of the c.l.; 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.	
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 c.l.; 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.

LAW EFFECTIVE	TYPE	N. OF YEARS PARDONED	INCLUDED CRIMES AND CRIMES W/O SENTENCING LIMITS	EXCLUDED CRIMES	EXCLUDED 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 c.l.; 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 AND CRIMES W/O SENTENCING LIMITS	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

LAW EFFECTIVE	TYPE	N. OF YEARS PARDONED	INCLUDED CRIMES AND CRIMES W/O SENTENCING LIMITS	EXCLUDED CRIMES	EXCLUDED CRIMINALS

Notes:
I - Crime against (C.a.) 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 - C.a. the State's social activity. Article numbers reported within brackets in the column of excluded crimes are articles of the criminal law (c.l.), unless something different is explicitly indicated. Sometimes several laws (s.l.) are involved. Date: Publication date is presented above the effectiveness date (in brackets). The Amnesty/Pardon is valid for crimes committed before the effectiveness date.

Table A2—: 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 A3—: Weights

Weight:	Population	Jail/Population	Jail	V(Δ crime)	V(crime)	V(Δ jail)	V(jail)
Abruzzo & Molise	0.03	0.05	0.03	0.02	0.02	0.09	0.11
Basilicata	0.01	0.06	0.01	0.01	0.01	0.10	0.07
Calabria	0.04	0.07	0.04	0.02	0.02	0.07	0.09
Campania	0.10	0.08	0.13	0.06	0.06	0.09	0.09
Emilia Romagna	0.07	0.04	0.05	0.03	0.04	0.03	0.06
Friuli-Venezia Giulia	0.02	0.05	0.02	0.05	0.05	0.05	0.03
Lazio	0.09	0.07	0.11	0.10	0.16	0.05	0.08
Liguria	0.03	0.07	0.04	0.15	0.14	0.06	0.04
Lombardia	0.16	0.05	0.12	0.05	0.07	0.02	0.04
Marche	0.03	0.03	0.01	0.02	0.02	0.03	0.03
Piemonte & Valle d'Aosta	0.08	0.06	0.08	0.07	0.08	0.04	0.11
Puglia	0.07	0.06	0.07	0.04	0.06	0.05	0.04
Sardegna	0.03	0.07	0.03	0.09	0.09	0.07	0.05
Sicilia	0.09	0.08	0.13	0.07	0.06	0.11	0.07
Toscana	0.06	0.05	0.05	0.05	0.04	0.04	0.05
Trentino-Alto Adige	0.02	0.04	0.01	0.11	0.04	0.03	0.02
Umbria	0.01	0.04	0.01	0.03	0.01	0.06	0.03
Veneto	0.08	0.03	0.04	0.03	0.03	0.01	0.01

Notes: Weights used in Table 7. The weights sum up to one. "V" stands for the within-region variance.

Table A4—: Excluding One Region at The Time

	Excluded region	IV estimate	SE	R-squared
(1)	Abruzzo & Molise	-0.178***	(0.030)	0.148
(2)	Basilicata	-0.168***	(0.029)	0.173
(3)	Calabria	-0.172***	(0.030)	0.159
(4)	Campania	-0.173***	(0.030)	0.182
(5)	Emilia Romagna	-0.173***	(0.030)	0.153
(6)	Friuli-Venezia Giulia	-0.180***	(0.030)	0.150
(7)	Lazio	-0.182***	(0.029)	0.158
(8)	Liguria	-0.164***	(0.029)	0.152
(9)	Lombardia	-0.176***	(0.030)	0.154
(10)	Marche	-0.180***	(0.029)	0.164
(11)	Piemonte & Valle d'Aosta	-0.181***	(0.030)	0.155
(12)	Puglia	-0.178***	(0.030)	0.154
(13)	Sardegna	-0.154***	(0.024)	0.176
(14)	Sicilia	-0.172***	(0.030)	0.146
(15)	Toscana	-0.163***	(0.028)	0.148
(16)	Trentino-Alto Adige	-0.174***	(0.032)	0.159
(17)	Umbria	-0.168***	(0.031)	0.158
(18)	Veneto	-0.180***	(0.029)	0.158

Notes: All 2sls regressions include pardon-specific time trends, a 1990 Soccer World Cup dummy equal to one for the regions where at least one game was played, and a year 1991 dummy for the region Umbria due to data inconsistencies. Standard errors clustered by region in parentheses. * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table A5—: Excluding One Decade at The Time

	(1)	(2)	(3)	(4)
Excluded decade	60s	70s	80s	90s
		log Δ in crime		
Δ log prison pop.	-0.186***	-0.216***	-0.185***	-0.158***
	(0.029)	(0.029)	(0.040)	(0.038)
Observations	468	414	414	486
R-squared	0.144	0.199	0.206	0.106

Notes: All 2sls regressions include pardon-specific time trends, a 1990 Soccer World Cup dummy equal to one for the regions where at least one game was played, and a year 1991 dummy for the region Umbria due to data inconsistencies. Standard errors clustered by region in parentheses. * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table A6—: Time-series Evidence of the Relationship Between Crime Rates and Pardons

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
	Total crime rate					
	levels	Δ levels	Δ levels	logs	Δ logs	Δ logs
Total crimes (t-1)	0.826***					
	(0.038)					
Log total crimes (t-1)				0.736***		
				(0.045)		
Pardon month	-2.738	-2.653	-1.501	-0.042*	-0.038	-0.027
	(2.414)	(2.509)	(1.923)	(0.025)	(0.026)	(0.021)
Pardon month (t-1)	5.906**	6.504**	4.310**	0.062**	0.077***	0.056***
	(2.418)	(2.509)	(1.922)	(0.025)	(0.026)	(0.021)
Pardon month (t-2)	1.346	0.866	0.014	-0.002	-0.007	-0.017
	(2.416)	(2.509)	(1.921)	(0.025)	(0.026)	(0.021)
Time	0.259	0.142	0.133	0.007***	0.001	0.001
	(0.192)	(0.198)	(0.148)	(0.002)	(0.002)	(0.002)
Time sq.	0.023**	-0.006	-0.005	0.000*	-0.000	-0.000
	(0.010)	(0.008)	(0.006)	(0.000)	(0.000)	(0.000)
Month dummies	no	yes	no	yes	no	yes
Observations	250	250	250	250	250	250
R-squared	0.979	0.034	0.484	0.973	0.044	0.451

Notes: Monthly time-series ranging from January 1962 to December 1982. Standard errors in parentheses. * significant at 5 percent; ** significant at 1 percent.