

Punishment, Crime and Schooling Decisions: Evidence for Colombian Youth*

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Abstract

This paper uses a natural policy experiment to estimate how changes in the costs of engaging in criminal activities may influence juvenile crime participation and school attendance. We find that, after an exogenous decrease on the severity of punishment faced by Colombian youths, crime rates in Colombian municipalities increased. This effect appears to be larger in municipalities with a higher proportion of adolescents between 14 and 15 years of age. We provide suggestive evidence that one of the channels through which this might have taken place is through a decrease in the effort of the police force in capturing youth suspects. Moreover, we find that the probability of attending school fell after the change in the juvenile judicial system. This effect is stronger for children belonging to households whose heads have less years of education.

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Introduction

According to the Youth World Report (2003, 2007), juvenile crime increased in almost all parts of the world during the 1990s. In Western Europe, the number of youths convicted or cautioned by the police almost doubled between 1980s and the late 1990s. In Latin America, it is estimated that in countries such as Colombia, Brazil, El Salvador and Venezuela the major cause of deaths of youths aged 15-24 is homicide. Similarly, in the USA the rate of homicide arrest for juveniles aged 10-17 had more than doubled by the early 1990s. Moreover, it is estimated that in many countries juvenile crime has increased at a faster rate than adult crime and in many cases they are becoming more violent each time.¹ Understanding these trends and the best alternatives to reverse them is crucial for several motives. First, it has been found that criminal careers begin early in life (Greenwood, 1995) peaking during the middle teen years and decreasing thereafter. Furthermore, almost all of the most violent adult criminals started their “careers” during their adolescent years. Finally, even for those youths who seek to return to legal activities, they are often faced with limited legal market opportunities (Grogger, 1995).

Some of the deterrent mechanisms that are discussed in criminology, economics and public policy are the tools given by the juvenile judicial system. However, the world is far from reaching any consensus on the subject and hence different theories of justice are currently applied for the youth population. The first line of thought is a protectionist view in which youths are thought of minors who are not legally responsible for their acts due to their lack of ethical and judicial maturity. They are thought as victims of poverty, lack of supervision and appropriate upbringing and hence the State seeks to protect them. Countries such as Germany, Spain and France apply this view in their judicial system. On the other extreme, is the penal view in which youths are considered responsible for their acts and are treated accordingly in juvenile courts. Countries such as USA, China, Netherlands, Canada and Chile follow such a system. Recently, countries such as England, Australia, New Zealand, Belgium and Colombia are moving towards a restorative justice system which can be thought of as the middle ground. Under this system, two objectives are pursued. The first one is that the victims are effectively repaired from their

¹ A recent example for Colombia is the case of “Piloto” a minor who was in charge of placing the bomb that seek to assassinate the ex-Minister Fernando Londono in May 2012 in Bogota.

harm. Secondly, the system seeks to ensure the youth will receive an appropriate rehabilitation process (Oportunidades Estratégicas, 2012).

There is little rigorous empirical evidence on how youths may respond to the tools given by the judicial systems. Thus, we do not know the benefits or negative effects from each theory of justice. Economists are not even certain if indeed the different judicial approaches influence youth's criminal behavior. In principle, based on Becker's (1968) seminal paper, youths who engage in criminal activities should ponder the costs and benefits of doing so. Theoretically, all else equal, harsher juvenile laws that increase the sentences faced by them should deter crime through an increase in its costs. Empirically the relationship is not evident. While the criminology literature has studied this issue and found that harsher punishments tend to increase recidivism rates, as Fagan et al. (2008) points out, most of the studies suffer from selection biases problems. In the economics literature, the few serious empirical studies that do exist on the subject have conflicting results. Levitt (1998), Hjalmarsson (2009) and Entorff (2011) find that when youths are faced with harsher sentences their involvement in criminal activities is significantly reduced. On the contrary, Lee and McCray (2009) find that the elasticity of juvenile crime towards the harshness of the judicial system is positive, but very small.

Regarding the costs of crime, it has been found that participation in youth crime reduces school attainment and future labor opportunities. The negative impacts of crime on education act through two channels. First, the immediate and high returns of criminal activities push some adolescents to drop out of school, or reduce time dedicated to school activities (Freeman et al., 1996). Second, interactions with the police or the justice system affect schooling decisions through several mechanisms: (i) poor schooling quality while being incarcerated reduces the chances of returning or completing school; (ii) interruption of education when incarceration overlaps with the school period; (iii) legal punishment may stigmatize adolescents, pushing youth to persist on a path of deviant behavior; and (iv) incarceration may relate adolescents to conflictive peers (Hjalmarsson, 2008; Gunnar and Kron, 2003; Matsueda, 1992).

Empirical evidence on the negative impact of crime on education is scarce. Since unobservable characteristics that influence crime participation might also be related to low school attainment, most studies fail to establish a causal link. Criminology studies find that juvenile official interventions (i.e. police or judicial) are positively correlated to lower educational attainment,

and less job opportunities, which in turn pushes further youth to deviant behaviors (Gunnar and Krohn, 2003; Bernburg and Krohn, 2003; Matsueda, 1992). Two recent studies identify a causal relation between crime participation and reduced educational attainment. Using a bivariate probit to account for common unobservables, Hjalmasson (2008) finds that the likelihood of high school completion is lower for youths that were arrested or incarcerated. Merlo and Wopin (2009) estimate a structural model and show that youth that commit a crime at 13 years of age have lower chances of graduating from high school.

This paper contributes to the existing debate by answering two different but related questions. First we provide new evidence on the effect of changes in the judicial system, which change the costs of committing crimes, on youth criminal involvement. Moreover, we provide evidence of some possible channels through which this effect may occur. Second, we investigate how changes in the judicial system can also affect schooling decisions of children and adolescents. We estimate whether the effect is heterogeneous according to the household head's education levels.

To answer these two questions, we use a natural policy experiment that exogenously decreased the costs of crime faced by Colombian youths through the enactment of Law 1098 in 2006. In particular, we use the introduction of the new Criminal Responsibility System for Adolescents (SRPA- for its acronym in Spanish) which aligned the Colombian legislation with international treaties and agreements in order to implement a restorative justice view for juvenile crime. Compared to the previous system, instead of sending juvenile offenders to correctional facilities as its main tool, the SRPA aims to use other strategies such as abiding to rules of conduct, community work or partial confinement as its main rehabilitation tools. In doing so, the new penal system increases the age of imprisonment from twelve to fourteen years old and reduces the harshness of punishments received by all youths under eighteen. Moreover, after the implementation of Law 1098, youths aged fourteen to sixteen can only be sent to jail when involved in crimes such as homicide, kidnaps and extortion.

The gradual and exogenous implementation of the SRPA across the country allows us to empirically estimate its effects on juvenile involvement in crimes and schooling decisions through a difference in difference (DID) approach. Using a rich municipal panel data set of crime rates and other municipal characteristics for the years 2003 until 2010, we first show that the

needed assumptions of exogeneity of the implementation of the new system are valid. Through a duration model, we are able to establish that the introduction of the SRPA across the country was exogenous to time varying municipality characteristics and hence not related with crime rates themselves or characteristics that may help explain them.

Secondly, we present evidence that participation of adolescents in criminal activities did in fact increase after the implementation of the SRPA for all Colombian municipalities. Furthermore, we show that such increase was larger for municipalities with a higher proportion of juveniles. In particular we find that the elasticity of theft to commerce, vehicles and residences towards the proportion of the population under 14 years of age is positive and significant for all Colombian cities. On the contrary, the elasticity of homicides to this same proportion is negative and significant. These results go in hand with what the theory suggests as the SRPA reduced the costs of thefts for these youngsters but not for homicides.

We present suggestive evidence that the incentives of the police force on capturing juveniles changed after the SRPA was implemented and interpret this result as a possible channel through which the involvement of youths in crime may have increased. It is found that capture rates of youths for most types of crimes decreased after the new juvenile penal system started to be applied. The magnitude of this effect varies between 0.05 and 6.3 percentage points. The fact that the capture rates for other age groups increased and that the homicide capture rate for all age groups, including youths, remained the same suggests that there was indeed a change in incentives of the police force towards capturing juveniles and not a mere decrease in police efficiency. This implies that not only the SRPA decreased the costs of crime by lessening the harshness of penalties, but also by decreasing the probability of juvenile imprisonment.

Finally, we present evidence on how this exogenous change in legislation and crime rates may have affected schooling decisions of youths. Using a pooled cross-section of household surveys, we find evidence that after the implementation of the SRPA the probability of school attendance of children less than 14 years of age decreased in nearly 1%. We argue this is an important impact since our estimate shows the average impact of the implementation of the SRPA on all Colombian students, who of course are not all subject to fall into criminal activities. Specifically,

we find this effect is taking place only for youths belonging to households whose heads have the lower levels of education.

The remainder of the paper is organized as follows. Section two presents a literature review on deterrence juvenile mechanisms and their effects on juvenile crime rates and schooling decisions, while section three describes the implementation of the new SRPA in Colombia. Section four explains the empirical strategy implemented in the study and section five the data available to do so. Finally, section six presents the main results and section seven concludes.

II. Literature Review

i) Deterrence Measures and Juvenile Crime

Since Becker's 1968 seminal paper on crime and punishment, the economic literature on the subject has continuously examined both the causes and consequences of crime.² Regarding the former, Becker's basic idea states that individuals decide whether or not to participate in criminal activities based on a cost-benefit analysis. Costs from criminal activities will depend on institutional rules such as law enforcement and the level of punishment that criminals would face if being caught. The model shows that the levels of crime in a society depend negatively on the probability of a criminal being caught and convicted, and on the magnitude of such punishment.

In the theoretical line, numerous papers have extended the initial model reaching similar but more detailed conclusions. For example, Fender (1998) extends Becker's seminal model and concludes that such a negative relationship between magnitude and probability of punishment and criminal activity exists. Further extensions to Becker's model reach similar conclusions. Ehrlich (1996) incorporates the idea of a market-for-offenses, where the equilibrium of crime is jointly determined by the supply of crime, and the demand for offenses, implicitly defined by the demand for public and private protection. Andvig and Moene (1990), Sah (1991), Schrag and Scotchmer (1993) and Freeman et al. (1996) examine conflict on a dynamic framework.

² For an excellent review on the criminology evidence on the subject please refer to Fagan et al. (2008)

Empirically, economists have found causal evidence that indeed the probability of apprehension and the severity of the punishment deter adult crime by increasing the costs criminals face.³ Regarding the probability of apprehension Levitt (1997), Di Tella and Schargrotsky (2004) and Drako et al. (2011) causally link the increase in police force in a city with a decrease in its crime rates. Regarding the severity of punishment, based on natural policy experiments of collective pardons, Maurin and Ouss (2009) and Drago et al. (2007) both find that longer prison sentences reduce the recidivism probability of ex-convicts. Similarly, Helland and Tabarrok (2007) find that California's three-strike legislation significantly reduces felony arrest rates among the class of criminals with two strikes by around 19%. Iyengar (2008) find similar effects, but also establishes an increase in more violent crimes and some displacement to neighboring states. The evidence on prison conditions is mixed. Katz et al. (2003) find that harsher prison conditions have a deterrence effect due to its negative correlation with crime rates. On the other hand, Drago et al. (2009) and Chen and Shapiro (2007) find that harsher prison conditions increase adult recidivism. For Latin America, Di Tella and Schargrotsky (2009) find that individuals under electronic monitoring have lower recidivism rates than individuals sent to prison.

The economic literature that studies the causes and consequence of juvenile crime is scarcer. The initial studies on the subject analyzed the correlations between the socioeconomic characteristics of the youths and their probability to engage in crime. Bjerk (2004), using information from the NLSY97, finds a strong negative correlation between the probability of youths to incur in serious criminal activities and their household wealth. According to the author, youths from less wealthy households received lower levels of investment in their upbringing, have worst expectations for their future and live in places where they are exposed to higher criminal rates. Similarly, Mocan and Rees (1999) using a national representative sample of high school children for the USA, find that family poverty as well as neighborhood unemployment increase the probability of youths to commit crime.

Regarding efficient mechanisms through which juvenile crime may be deterred few studies provide causal links on the effectiveness of the judicial system. A notable exception is Levitt (1998) who uses state level panel data for the years 1978 to 1993 and finds that harsher punishments for juveniles, proxied by the fraction of juveniles in custody, decrease the number

³ For a recent survey on the subject please refer to Entorf (2012).

of juvenile offenses. Moreover, he provides evidence that this reduction is driven by a deterrence effect of the judicial system. To do so, he examines changes in the number of crimes committed by juveniles around the age when they are considered adults by the judicial system. The author finds that in states in which adults are punished relatively harder than youths, the violent and property crimes committed the year after attainment of the age of majority decreases by 20 and 10% respectively.

The evidence on the effect of the harshness of punishment on juvenile recidivism is mixed. Entorff (2011) corroborates the hypothesis that harsher criminal laws decrease the probability of expected recidivism of adolescents. In his research, he uses the fact that turning 18 does not necessarily imply the application of adult criminal law in Germany. In this country, individuals between 18 and 21 may be treated under the juvenile penal system. Based on a survey conducted to 159 juveniles, and taking into account possible endogeneity problems of the sanction finally imposed by the judge, he finds that young inmates convicted under the adult penal system have a lower probability of expected re-offense. Similarly, Hjalmarsson (2009) finds that juveniles in the state of Washington sentenced to state incarceration have a 37% lower daily hazard rate of recidivism compared to youths sentenced to a local sanction. In order to deal with probable endogeneity problems, she uses an RD design that takes advantage of the pseudo random variation present in that Washington State's juvenile judicial system. Contrary to these two studies, Lee and McCray (2009), using longitudinal administrative data for Florida, find a low elasticity of juvenile crime with respect to sentence lengths. In particular, using the discontinuity on the probability of receiving harsher punitive sentences at the age of 18 the authors find that the decrease in criminal activity is merely two percent compared to the increase in the harshness of sanction in 230%.

Two recent papers provide some evidence of the channels through which harsher and more efficient judicial systems may deter juvenile crime. Visser et al. (2006) design an experiment with high school and college students where the rewards and penalties of petty larceny were exogenously modified. They find evidence that youths criminal decisions are in fact responsive to the tradeoffs first expressed by Becker (1968). Similarly, Hjalmarsson (1997) uses data from the NLSY97 to assess whether youths update the cost of crime according to changes dictated by the judicial system. Using longitudinal data, he finds that indeed the expected probability youths

have of going to jail increase by 4-6% when they reach the adult age according to their respective judicial system and hence can be trialed in the penal system.

For Latin America there is little evidence on juvenile crime, its causes and its consequences. A notable exception is Romero (2012) who analyzes how prison sentences for Colombian youths affects their recidivism probability. Using data collected after the implementation of the SRPA, the author finds that youths sent to serve their punishment in prison have a recidivism rates that are 11-17% higher than the rate of similar juveniles sentenced to non-prison punishments.

ii) *Crime and Schooling Decisions*

Schooling decisions and crime have a negative and simultaneous relationship. Higher investments in human capital reduce the likelihood of youth and adults engaging in criminal activities (Hjalmarsson and Lochner, 2011; Berthelon and Kruger, 2011; Merlo and Wolpin, 2009; Fella and Gallipoli, 2006; Lochner and Moretti, 2004; Cullen et al, 2003)⁴. On the other hand, participation in criminal activities affects schooling decisions and future participation in legal labor markets (Hjalmarsson, 2008; Bernburg and Krohn, 2003; Gunnar and Kron, 2003; Western and Beckett, 1999; Freeman et al., 1996; Matsueda, 1992). Most theoretical and empirical studies concentrate on the impacts of education on crime, while fewer studies assess how crime affects education.

Education reduces criminal participation through several channels. Education discourages participation in crime by increasing the returns to legitimate work in the future and raising the opportunity costs of criminal behavior (Lochner and Moretti, 2004). Education alters preferences by increasing risk aversion or making individuals more patient; thus, reducing the financial or psychic returns from participating in criminal activities (Hjalmarsson and Lochner, 2011; Lochner and Moretti, 2004). Because school interactions favor relations with more educated people who are less likely to commit crimes, attending school decreases the likelihood of engaging in crime (Hjalmarsson and Lochner, 2011).

⁴ Hjalmarsson and Lochner (2011) provide a detailed literature review on the impacts of education on crime.

Several empirical findings confirm the negative relation between education and crime. Establishing causality is difficult because the unobservable characteristics that determine schooling decisions may also influence the decisions to engage in crime. Most studies exploit exogenous changes in schooling regulations to identify the impact of education on crime. For example, Lochner and Moretti (2004) use the exogenous change in state compulsory attendance laws to instrument for school attendance. They find that increased schooling reduces incarceration rates, in particular for vulnerable populations (i.e. black students), and arrests for violent and property crime. The effects are sizeable: one additional year of average education levels contributes to reduce state level arrests by 11 percent. Using data from the NLSY, they find that the effect is mostly driven by increasing opportunity costs of participating in legitimate labor markets.

Extending school hours also contributes to reduce juvenile crime rates. Berthelon and Kruger (2011) study whether a school reform that extended the length of stay in Chile affect juvenile crime rates. Finding shows that longer school days reduce juvenile crime rates at the municipal level such that an increase in coverage of 20% of full day school in the municipality reduces juvenile crime between 11 and 24%.

Besides school attendance and longer school days, school quality may reduce youth crime. Cullen et al (2003) examine the effect of school quality on crime using random assignments through lotteries to high quality schools in Chicago. Results show that attending high quality schools do not improve traditional achievement outcomes, yet incidence of disciplinary events and arrests rates for adolescents assigned to these schools are lower.

Few studies examine the contemporaneous decision of schooling and crime participation. Merlo and Wolpin (2009) develop a structural model to explain the relationships between schooling, youth employment and youth crime. They estimate the model for black males using data from the NLSY1997. Results show that attending school at 16 years of age reduces involvement in crimes between 19 and 22 years: crimes and arrest rates decline by 12.2 and 15.5 percent respectively. Initial conditions play an important role determining larger participation in criminal activities and lower graduation rates. However, youth that engage in crime at 14 years of age due

to a transitory shock are also more inclined to commit crime in their adult life (between 19 and 22 years of age).

Youths engaging in criminal activities may reduce human capital investments. Reductions arise from two channels. First, these children may drop out of school, or reduce time dedicated to school activities, since they may be attracted by the higher returns of criminal activities (Freeman et al., 1996). Second, arrest or incarceration of criminal youths potentially affects school attendance through several mechanisms. If the quality of schooling while incarcerated is poor, returning and completing school is less likely (Hjalmasson, 2008). Incarceration may overlap with the school period, causing a disruption on school attendance (Hjalmasson, 2008). The stigma caused by legal punishment may push youth to persist on a pattern of criminal behavior (Hjalmasson, 2008; Gunnar and Kron, 2003). Since jails are schools of crime and human capital accumulation decreases while incarcerated, the opportunity costs of criminal activities is further increased.

Few economic studies assess the impact of crime on schooling decisions. Hjalmasson (2008) examine the negative effect of youth interactions with the justice criminal system on schooling decisions. Using the NLSY1997, she finds that arrested and incarcerated youths are 11 and 11.2 percent less likely less likely to complete high school studies. After accounting for unobservables that affect schooling and crime participation decisions, the negative impact of incarceration persists. The study finds some weak evidence on the potential channels that cause school drop-out. Effects of incarceration are higher when it overlaps with the school year and in states in which the judicial system is obliged to inform the school about the incarceration (i.e. stigma effect). Similarly, Merlo and Wolpin (2009) find that youth that commit a crime at 13 years of age have a lower chance of graduating from high school.

Other criminology studies show similar findings. Albeit, these studies fail to account for unobservables that determine the decision to attend school and participate in criminal activities. Gunnar and Krohn (2003) use panel data that follow males from 13 to 22 years of age. Results show that juvenile intervention is positively correlated to unemployment spells in adulthood, which is mediated mostly through educational attainment. Bernburg and Krohn (2003) find similar results: police and justice interventions on adolescents reduce educational attainment and

job opportunities, which in turn increase the chances of engaging in crime. These negative effects of official interventions may act through promoting deviant behavior or relating individuals to conflictive peers (Matsueda, 1992).

III. Law 1098 of 2006: Criminal Responsibility System for Adolescents in Colombia

In November of 2006, the Colombian Congress approved the Code for Childhood and Adolescence. Among the several objectives of the Code, one purpose was to align the Colombian legislation with international treaties and agreements. In particular, as stated by Benavides (2012), Colombia pursued to incorporate the declaration of the International Convention on the Rights of the Child of 1989 into its national judicial system. Hence, the Code prompted the implementation of a restorative justice system for juvenile crime named the Criminal Responsibility System for Adolescent (SRPA for its Spanish Acronym), with the aim to reestablish the rights of outlaw children but also recognize their responsibilities (Benavides, 2012).

Since 1989, Colombia has a separate judicial system for adult and juvenile crime. Before the enactment of Law 1098, the juvenile justice system, which applied for adolescents between 12 and 18 years age, had special judges, and juvenile punishments were more lenient compared to adult punishment. Juveniles were sent to correctional facilities or other facilities. Besides punishment, these facilities sought to rehabilitate juvenile offenders and provide formal education. When adolescents above 16 years of age committed a serious offence, the case was directed to an adult court. Children below 12 years of age were not held legally responsible for crimes. These children were handled by social workers who were responsible for providing support and for investigating the social conditions of the children's households. At the age of majority (18), individuals were subject to the adult court⁵.

Law 1098 of 2006 is similar in many aspects to the legislation described above. For the purpose of this paper, two differences are important to discuss. First, Law 1098 aims to put in place a restorative juvenile justice system such that less emphasis is placed on punitive strategies, in particular confinement in special facilities. The new system seeks to restore victims, and

⁵ See Decree 2737 de 1989.

rehabilitate and reintegrate offenders. Instead of sending juvenile offenders to correctional facilities, the systems aims to use other strategies such as abiding to rules of conduct, community work or partial confinement. For homicides, these provisions do not apply as juveniles should be sent to correctional facilities. Second, the new code increases the age for entering the juvenile justice system. After 2006, children under 14 years of age are not held legally responsible for crimes, except for the case of murder, kidnap or extortion. When children of these ages are seized committing crimes, they should be put under special care of *Instituto Colombiano de Bienestar Familiar* (ICBF)⁶ in order to implement protection measures and ensure school enrollment. These children cannot be confined or punished.

The new system was implemented gradually to ensure an adequate preparation of the judicial districts. The central government created six groups of Judicial Districts⁷ such that the adoption would start in March of 2007 and end in December 2009. Local governments did not participate in this decision process and the exact date of implementations was changed at least three times through decrees of the national government. Hence, in principle we argue such implementation was exogenous. Preliminary evidence of this is presented in Figure 1 which shows the average trend of homicides and thefts for the six groups. As can be observed, even though the average rates are different for each judicial district there is no apparent trend in the order of implementation. For example, the average homicide rate is similar for the first and fourth groups of implementation. In the case of thefts all judicial districts, except for the first group, follow similar patterns but none related with their order of implementation.

[Figure 1 goes about here]

Compared with the previous Code, Law 1098 of 2006 reduces the costs of crime, increasing the incentives for children to participate in minor crimes. Because punishments to children under 14

⁶ Government institution responsible for children's programs.

⁷ The six groups were the following: (i) Stage I: Bogotá and Cali; (ii) Stage II: Armenia, Manizales, Pereira, Buga and Medellín; (iii) Stage III: Tunja, Santa Rosa de Viterbo and Popayán; (iv) Stage IV: Cucutá, Pamplona, Bucaramanga and San Gil; (v) State IV: Antioquia, Cundinamarca, Ibagué, Neiva, Barranquilla, Santa Marta, Cartagena, Riohacha, Sincelejo, Mntería and Valledupar; and (vi) Stage VI: San Andrés, Villavicencio, Pasto, Quibdó, Yopal, Florencia and Arauca

years of age were eliminated by the Code, criminal organizations have recruited them to perform illegal activities⁸.

During the period ranging from 2007 to 2010, the SRPA reports 57.000 cases of juvenile crime. Around 28.1 percent of adolescents entering into the SRPA were found guilty. Despite explicitly favoring restoration measures, punishments concentrated on partial or total seclusion. Harshness of punishment varies greatly along the judicial districts. The crimes on which these children have been engaged are mainly thefts, drug trafficking or illegal possession of firearms. Overall recidivism rates for the SRPA are 19 percent. Recidivism is higher for juveniles that are confined to correctional facilities (30%) or participated in theft crimes (27%). School attainment for these adolescents in the SRPA is low. For children 14 years of age, 81 percent were below their grade, and for those 17 years of age this figure is 95 percent (Oportunidad Estratégica, 2012).

Adoption of the SRPA has been slow and has several weaknesses. First, implementation of the system is heterogeneous across the judicial districts. Second, judges and social workers responsible for the system have little knowledge on restorative judicial systems, favoring traditional approaches and seclusion of adolescents. Third, correctional facilities are overcrowded and do not offer school education as mandated by Law 1098. Fourth, children under 14 years of age that commit crimes are not participating in preventive programs. Usually, these children are immediately released (Oportunidad Estratégica, 2012).

Public perceptions that criminal activities amongst children less than 14 years have increased sharply since the law came into force have prompted efforts to reform the law. Law 1098 has apparently set the ground for children engaging earlier in crime. In fact, large criminal groups are modifying their strategies and recruiting children⁹. Therefore, the risk for children to fall in illegal activities has presumably increased after the law.

⁸ “They (children under 14) are being used by adults”, declared the Colombian Institute on Children Welfare director, Elvira Forero. *No es un juego de niños*, in El Espectador.

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IV. Empirical Strategy

The purpose of our paper is to identify whether adolescents respond to reductions in the costs of engaging in criminal activities in their crime and schooling decisions. As in the classic Becker model we argue that lower costs of crime, which include more lenient punishments, will increase juvenile crime participation and decrease their involvement in legal activities which in their case corresponds to attend school. To identify this effect, we use the exogenous variation through time and regions created in the implementation of Law 1098 in Colombia. We argue that the new SRPA may have changed the incentives to participate in criminal activities and attend school through three channels. First, more lenient criminal laws reduce the costs of engaging in criminal activities. The law eliminates (for children under 14 years of age) or reduces punishment (for adolescents between 14 and 16) for particular crimes. Second, the probability of a criminal being caught and convicted after committing a crime decreases after the enactment of Law 1098. Because children under 14 years of age cannot be convicted, police forces have lower incentives to seize them. This further reduces the costs of engaging in criminal activities. Third, criminal networks recruit younger children to their activities. Criminal networks, aware of the new legislation, may seek young adults to commit crimes. This is particularly important for crimes based on strong and dense networks such as drug trade.

As in many empirical evaluations, when estimating the average effect that the SRPA had on crime rates by Colombian youths we suffer from a missing data problem. To illustrate, we follow the common notation in the literature and let D be a zero-one indicator variable that equals to one if municipality i introduced the new SRPA, $Y_{i,t,0}$ the dependent variable of interest (which may be crime or school attendance rate) if municipality i applies the previous criminal youth code in period t and $Y_{i,t,1}$ the variable of interest in municipality i if it implements the SRPA in period t . Then, the outcome observed for municipality i in period t will be given by $Y_{i,t} = DY_{i,t,1} + (1-D)Y_{i,t,0}$ and the average change in crime rates from the enactment of Law 1098 of 2006 that have characteristics $X_{i,t}$ will be given by:

$$E(Y_{i,t,1} - Y_{i,t,0} \mid D = 1, X_{i,t}) = E(\Delta \mid D = 1, X) \quad (1)$$

Given that $Y_{i,t,0}$ is not observed for municipalities that introduced the SRPA, we use an appropriate methodology to estimate its effects. In this paper, we implement a difference in difference approach. Specifically, we take advantage of the fact that the introduction of the SRPA was done gradually across the country providing variation both across space and time in order to estimate its effects.

Under such strategy, it is important to confirm that indeed the gradual application of the SRPA across the country was exogenous and hence provides an adequate scenario in order to estimate the impacts of the law on youth criminal activity and school attendance. As explained in the previous section, at the national level the introduction of the new Code for Childhood and Adolescence followed international trends on the matter and was established so that the country did in fact abide to the Convention on the Rights of the Child from 1989. Hence, its introduction is not related with any particular crime or school attendance trend in the country. Within its borders, the gradual timing of its implementation was also exogenous to regional trends in crime, school attendance or other time varying characteristics. In fact, the central government, and not the regional offices, decided and designed the six phases of implementation. Moreover, as previously explained the exact dates were changed at least three times through exogenous decrees from the central government. Nonetheless, we follow Galiani et al. (2005) and analyze the determinants of the gradual implementation of the SRPA in the country. Thus, we estimate a duration model in which the probability that a given region implemented the SRPA is a function of both constant and time varying characteristics. As the aforementioned authors, we pay particular attention to the effect that time varying observables, which may be related to crime or school attendance rates, have on such probability.

If indeed there is an exogenous implementation of Law 1098 across the Colombian municipalities a difference in difference strategy to estimate its effects can indeed be used. In particular, under such scenario, in order to estimate the impact of the SRPA on crime rates actually perpetrated by youths we use the total crime rate directly as our dependent variable of interest. We estimate two different reduced form equations. The first one is given by equation (2)

$$\text{Log}(\text{Crime Rate}_{i,t}^s) = \delta_0 \text{SRPA}_{i,t} + \beta \text{Log}(X_{i,t}) + \alpha_t + \mu_i + \varepsilon_{i,t} \quad (2)$$

where the dependent variable, $\text{Log}(\text{Crime Rate}_{i,t}^s)$, is the natural logarithm of crime rate of type s in the municipality i , at time t . The crimes were data is available are homicides, theft to people, commercial establishments, residences, and vehicles. We let $\text{SRPA}_{i,t}$ be a dummy variable that takes the value of 1 after the enactment of the Law 1098 in municipality i and time t , and 0 otherwise. Given the gradual exogenous implementation of the SRPA, this dummy has variation both across time and space allowing us to causally estimate its effect on our variables of interest. The specification also includes a vector of controls $X_{i,t}$. In particular, we include controls for economic performance (trade and industry tax revenues as a proxy for municipal GDP), supply of educational services (investment in education per capita), institutional conditions (land inequality and fiscal performance), and conflict dynamics (number of forcefully displaced). The estimations include year*month (α_t), and municipality (μ_i) fixed effects in order to control for national trends in crime rates and unobservable municipality characteristics that are time invariant respectively. Finally, even though controls include the presence and magnitude of conflict attacks, in order to take into account possible confounding effects between conflict and crime, we estimate specification (2) for four different groups of municipalities: state capitals and the 13 largest cities where the conflict should not be significant, all other municipalities and finally the whole country.

Under specification (2) the coefficient of interest is δ , which will estimate the average impact that the gradual implementation of the SRPA had on the municipalities' crime rates. In order to understand if these effects vary according to the structure of the population in a given region we estimate the following reduced form equation:

$$\begin{aligned} \text{Log}(\text{CrimeRate}_{i,t}^s) = \\ \delta_0 \text{SRPA}_{i,t} + \sum_{c=1}^3 \delta_c \text{Log}(\text{PropCohort}_{c,i,t}) \text{SRPA}_{i,t} + \beta \text{Log}(X_{i,t}) + \alpha_t + \mu_i + \varepsilon_{i,t} \end{aligned} \quad (3)$$

As can be observed, the main difference with specification (2) is the interaction of $\text{SRPA}_{i,t}$ with $\text{Log}(\text{PropCohort}_{c,i,t})$ which represents the logarithm of the proportion of certain cohorts c of youth residing in each municipality i at time t . The specific groups c of cohorts chosen are based on the new SRPA. As previously explained, the enactment of Law 1098 changed the criminal

incentives of youths in different magnitude according to their ages. Thus, we use such changes in incentives to create three excluding cohorts of interest: under 14 years of age, between 14 and below 18, and between 18 and under 25 years of age.

Under such strategy, δ_c will estimate the elasticity of crime to Law 1098 on municipality i at time t according to the proportion of the population from a specific age cohort. If our hypothesis is true, it is expected that these coefficients will be positive and significant implying that crime rates increased by a higher proportion in municipalities where a larger fraction of its population belongs to such age groups.

It is difficult to provide evidence on the possible channels that may drive any results on the estimations above described. Some of these may be a change in the youth's perception on the costs of crime. As explained in the literature review, recent studies show that indeed youths do update their beliefs on the costs that involvement in crime may bring. Unfortunately, for Colombia there is no data set that can allow us to test this channel. However, this is not the only one that may explain the impact of the change in the SRPA on crime rates. Anecdotal evidence suggests that the change in the legislation caused a decrease in the effort that the police force invested in the arrests of young suspects. The police force knows that such arrests, given the application of Law 1098, will probably end with no punitive measure and hence they simply have reduced their effort to apprehend them. Figure 2 shows this trend clearly for the capture rates of four different crimes one year prior and one year after the implementation of the SRPA in the first two phases of the SRPA. Two facts are important to mention from these figures. First, as previously established in the criminology literature, criminal careers start early in life and reach its peak at the age of 16 and 17. Thereafter, there is a sharp reduction on the arrest rate of juveniles probably due to the deterrence effect that reaching adulthood and being subject to adult penal law may have on criminal behavior. Second, this preliminary evidence suggests that just one year after the implementation of Law 1098 the capture rates of adolescents younger than 18 years of age decrease sharply. On the contrary, if anything, the capture rate of older individuals appears to increase during the same period of time.

[Figure 2 goes about here]

In order to formally assess such effect on the incentives of the police force after the implementation of the SRPA, we estimate a reduced form equation in which the dependent variable is the rate of arrest for different age groups in each municipality and time. Specifically, we estimate the following regression:

$$ArrestRate_{i,t}^c = \delta SRPA_{i,t} + \gamma Crime Rate_{i,t} + \beta X_{i,t} + \alpha_t + \mu_i + \varepsilon_{i,t} \quad (4)$$

where the dependent variable, $ArrestRate_{i,t}^c$ is the capture rate per 100.000 inhabitants of cohort c in the municipality i , at time t for crimes such as homicides, theft to people, commercial establishments, residences, vehicles, motorcycles, illegal possession of firearms and drug trafficking. The specific groups of cohorts chosen are the same ones as those used in specification (3). The difference however is that, given that information of arrest rates is available according to age, no interaction with the SRPA dummy is needed. What is done in this case is that separate regressions are estimated for each cohort.

As in the previous specifications, $D_{i,t}$ is a dummy variable that takes the value of 1 on the precise month and year in which the new SRPA started to be applied in municipality i and zero otherwise. We further include the crime rate in the municipality i at time t ($Crime Rate_{i,t}$) in order to control for possible trends of crime in the municipality that may explain arrest rates, as well as a vector $X_{i,t}$ of time varying municipality's characteristics as in specification (1) and (2).

Under this specification the coefficient of interest is of course δ which if significant will imply that the implementation of Law 1098 may have changed the incentives of the police force to capture at a different rate each of these age cohorts.¹⁰

In order to assess the impact of the SRPA on schooling decisions, we take a very similar approach. Specifically, we estimate a linear probability model of school attendance of child a , residing in municipality i in year t . We follow the economics of education literature and control for child, family and municipality characteristics in matrix Z . We further include a dummy for

¹⁰ The significance of the coefficient could also imply a change in youth's behavior in which they may become more able in committing crimes or become harder to arrest. Although we are not able to test which of these two possibilities is actually occurring, the anecdotal evidence suggest it is the change in police incentives the one at play.

whether the SRPA was implemented in their municipality of residence ($SRPA_{i,t}$) and its interaction with a dummy of the students' own age cohort ($Cohort_{a,i,t}$) which is different from the one in specification (3). The main specification is as follows:

$$SchoolAtt_{a,i,t} = \delta_0 SRPA_{i,t} + \sum_{c=1}^3 \delta_c Cohort_{a,i,t} SRPA_{i,t} + \beta Z_{a,i,t} + \alpha_t + \mu_i + \varepsilon_{a,i,t} \quad (5)$$

Where $SchoolAtt_{a,i,t}$ is a dummy variable equal to one if child a , residing in municipality i in year t is attending school and zero otherwise. As in the previous regressions, our coefficients of interest are δ_0 and all δ_c which estimate the impact that the implementation of the SRPA had on school attendance in general and for particular students depending on their own age. If these coefficients are negative and significant, it will imply that, after the implementation of the SRPA in Colombia, school attendance has decreased. As reviewed in the literature there are two main channels through which the SRPA may have influenced schooling decisions of youngsters. First, youths may view that a criminal career is now more beneficial given the exogenous reductions in crime costs and opt to quit their legal activity (school) and dedicate to the illegal one. Second, youths may try to pursue both activities but when apprehended and sent to prison they are forced to quit school and abandon their studies. Finally, if indeed police force incentives changed after the implementation of the SRPA, it could be the case that this last channel may not be occurring. If so, youths may be committing more crime without leaving school. Hence, the final impact of the new legislation is ambiguous and can only be resolved empirically.

V. Data

In this paper we use four sources of data. The first is data on incidence of crimes rates from the Ministry of Defense. This data provides information on each crime incident that occurred for the period ranging from 2003 to 2010. For each crime incident, the data provides information on type of crime (homicides, theft to people, commercial establishments, residences, and vehicles), the date in which the incident took place (month and year) and the municipality.

The second is data on arrests from the Ministry of Defense for the period ranging from 2003 to 2010. Police record detailed information for each arrest: type of crime committed, age of the

offender, date (month and year), and municipality. This information covers a broad range of crimes such as homicides, theft to people, commercial establishments, residences, vehicles, motorcycles, illegal possession of firearms and drug trafficking. Before 2006, the police did not always classify theft information by each type. Unclassified thefts were labeled as other theft. After 2006, theft types are correctly classified and this category disappears.

The third data source comes from a pooled cross-section of the *Encuesta de Calidad de Vida* (ECV) for the years 2003, 2008 and 2010. This is a national representative survey that follows the same methodology implemented in the World Bank's LSMS survey. Conducted by the Colombian Bureau of Statistics (Departamento Administrativo Nacional de Estadística, DANE), the survey's objective is to measure Colombian socioeconomic conditions, levels of poverty, and access to social programs. The three cross-sections allow us to have information before the SRPA was implemented (2003), in the period during its gradual implementation (2008) and after it was in place in all the country (2010). In order to evaluate the effect of the SRPA on schooling decisions, we use information for individuals between six and 18 years of age who, under the structure of the Colombian educational system, should be enrolled in school.

Finally the fourth source of data is the CEDE panel. This panel collects yearly information on a wide range of municipal characteristics since the 1980s onwards. We use trade and industry revenues, investment in education per capita, land gini, an index for fiscal performance, number of forcefully displaced persons, and number of hectares under aerial fumigation.

Table 1 presents descriptive statistics for municipal monthly crime rates. The mean monthly homicide rate per 100.000 inhabitants is 1.2 for all the municipalities. Even though state capitals and the 13 largest cities have higher homicide rates, divergences with the other municipalities are not large. On the other hand, thefts are indeed much higher in state capitals and the 13 largest cities. For example, thefts of people in the 13 largest cities are 8.9 times higher than for the other municipalities.

[Table 1 goes about here]

Trends of crime incidence differ for homicides and thefts. Figures 3 and 4 illustrate yearly homicide and theft rates between 2003 and 2010. Since 2003, Colombia has experienced a

significant overall reduction in homicide rates. Although reductions are widespread, homicide rates are still high compared to international standards. On the contrary, theft rates have experienced a slight increase since 2003. Differently than homicide rates, theft rates are concentrated in state capitals and the 13 largest Colombian cities. This is intuitive as these are more urban areas.

[Figure 3 goes about here]

[Figure 4 goes about here]

Yearly total arrests by crime type are reported in Table 2. In 2003, a little more than 163,149 persons were apprehended in Colombia of which 18.9 percent were juvenile offenders (less than 18 years of age). Participation of juvenile offenders in arrest rates reached its peak, 22 percent, in 2005. By 2011, total arrests fell to 146,073 and the percentage of juvenile offenders also fell to 13.1 percent. Most of the reduction in the percentage of apprehensions for those under 18 years of age arises from lower arrests of children below 14 years of age. In 2003, children below 14 years contributed to 1.1 percent of arrests. This figure fell to 0.1 percent in 2011. The bulk of the fall occurs from 2009 onwards when Law 1098 was fully adopted. Presumably, the provisions of the Law 1098 that prohibited confinement for children below 14 years of age lowered the incentive for police forces to seize these children.

[Table 2 goes about here]

Table 3 shows the main descriptive statistics of the pooled cross-section of ECV and the CEDE panel. In total, we have information for 44,000 students who have an attendance rate of almost 89%, 83% of which attend to public schools. The average education of the head of the household is 6 years and the vast majorities come from a low income household (strata 1 through 3). Nearly 29% belong to single headed households.

[Table 3 goes about here]

VI. Results

i) The exogenous implementation of Law 1098

As previously explained, the objective of this paper is twofold. First we seek to understand whether the enactment of Law 1098 did in fact change youth's criminal costs and through this channel their involvement in criminal activities. Second, we investigate whether changes in the costs of crime may also affect decisions regarding legal activities of children such as schooling decisions. To do so, we take advantage of the natural policy experiment created by the Colombian central government that gradually implemented the new SRPA across the country. However, the first step in doing so is proving that this implementation was in fact exogenous and hence can be used under a DID approach in order to answer our question of interest.

To do so, we follow Galiani et al. (2005) and estimate a duration model in which the probability of implementing the SRPA in municipality i at time t depends on both time varying shocks as well as constant characteristics that may be related to crime rates. In particular, we include as time varying characteristics those related with each municipality current income levels and investment in areas as education and health. More importantly, we include as controls shocks to different crime rates in the previous month in order to test whether they are in any way related to the phase in which each municipality started to implement Law 1098. We further control for the average values of these same measures and finally for municipalities' characteristics in the year 2003 previous to the enactment of the law. Finally, all models control for duration dependence linearly.

As can be observed in Table 4, results clearly show that indeed the gradual implementation of the SRPA can be treated as an exogenous policy experiment. In particular, it is important to note that none of the shocks, especially those related to the crime rates in each municipality, help explain the timing at which each implementation phase started. The only exception to this rule is previous shocks on the rate of vehicle theft which appears significant at a six percent level and suggests that the implementation was faster in places where a reduction in the rate of this crime occurred. As for the constant control variables, the only significant one suggests that

municipalities with higher mean homicide rates implemented the SRPA earlier. However, given that we control in our specification of interest for constant municipalities' fixed effects, such finding poses no inconvenience for the implementation of the DID strategy.

[Table 4 goes about here]

ii) **The SRPA and crime rates**

Tables 5 and 6 present the general effect that the implementation of the SRPA had on crime rates in the country. Specifically, we present the results for five different crimes: theft to people, commercial establishments, residences, vehicles and homicides. For each of them, the specification is done for the 13 largest Colombian cities, all states' capitals, other municipalities and the country as a whole with month-year and municipalities fixed effects. It should be noted that, in order to separate crime from the conflict Colombia is suffering we use only information on urban crimes. Although not shown, all regression include controls for industry and trade revenue per capita, investment in education, Gini coefficient, number of coca hectares grown in the municipality, forcefully displaced population and unemployment rate for the 13 largest cities. Each table has two distinct panels which correspond to different specifications. In the first panel the results from specification (2) are presented, while the other panel presents the results from specification (3). As can be observed, the coefficient associated with the implementation of the SRPA in each municipality is positive and significant for most thefts, implying that they in fact increased in each municipality after the change in the judicial system for adolescents. This however is not true for homicides where the coefficient associated with SRPA is zero. These results are expected given that, as previously explained, the SRPA decreased the costs of committing crimes such as thefts for juveniles but did not change the costs for crimes such as homicides, kidnaps or extortions.

[Table 5 goes about here]

[Table 6 goes about here]

The second panel presents the results of estimating specification (2) with the interactions of the proportion of the population between 8 and 14, 15 and 17, and 18 and 25 for each of the different

types of crimes and in the four groups of municipalities. As can be observed, all results appear to be driven by the largest municipalities, in the first two groups that include the 13 largest cities and all states' capitals. For state capitals, all the effect is more pronounced the higher the proportion of youths under 14 years of age, except for the case of theft to commerce and homicides. The elasticity for the variable of interest ranges from 1.3 to 15 where the smallest effect is for thefts of vehicles in non-capitals and the largest is for thefts to people in Capital cities. It is interesting to note that there appears to be a substitution effect between youths under and above 14 years of age after the implementation of the SRPA. For almost all thefts, except for thefts to commerce, the coefficient associated with the proportion of youths between 14 and 17 years old is negative and significant. As for the proportion of adults between 18 and 25 the coefficient for all crimes is positive and significant suggesting that in the case of Colombia this group of age is particularly prone to commit criminal acts. In the case of homicides, neither the dummy variable nor its interaction are significant for the largest cities suggesting that once we control for the structure of the population the effect of the implementation of the SRPA is zero. For smaller municipalities the elasticity is actually negative and significant. Again, we expected this result as Law 1098 mandates that homicides and other serious crimes are punished equally than in adult courts. Thus, the implementation of the SRPA increased crime overall and recomposed crime participation among age groups, prompting children below 14 to engage more in criminal activities.

iii) A change in police incentives?

As previously mentioned, it is interesting to understand the channels through which the implementation of Law 1098 may have increased youth participation in criminal activities in Colombia. In this paper, we present evidence of one of the possible mechanisms that may be taking place: a change in police incentives. The results in Tables 7 through 9 confirm what was evident in Figure 2. The implementation of Law 1098 might have changed police incentives and a general decrease in youth's arrests rates did in fact occur for most of the crimes. The table shows the coefficient of interest, δ , obtained from regressing each capture rate per 100.000 inhabitants for each crime and cohort as explained in section IV. Moreover, for each type of

crime the table shows the results of the estimation using only states' capitals, non-capitals and all municipalities the country respectively.

Two important results must be highlighted from these tables. The first one is the fact that in the case of thefts to people, drug trafficking and illegal weapon carrying the capture rate of youths under 14 years of age and between 14 and under 18 decreased after the implementation of the SRPA. The economic magnitudes of these effects are important for the group of youngsters below 14, and between 14 and 18, but not so much for those above this age. For example, in the case of theft to people, after the implementation of the SRPA the reduction in arrest rates for children below 14 years of age was approximately of 0.08 and 0.05 percentage points for the 13 biggest cities and for the whole country respectively. It is interesting to also note that for those cohorts eighteen or older the capture rate per 100.000 inhabitants actually increased. The magnitude of this change is close to 0.6 and 0.1 percentage points respectively in the case of thefts to people. These differences suggest that it is not the case that the efficiency of the police force decreased after the implementation of the SRPA. What this differences tells us is that indeed there was a change in police incentives after the SRPA. The second important fact that must be noted is that for homicide arrest rates the coefficient of interest is never significant at any standard confidence level. This suggests that the gradual implementation of the SRPA did not change any incentives of the police force that might have affected the rate of homicide captures associated to any cohort in particular. This result is expected given that as explained, when comparing the new and old juvenile codes. The judicial consequences with respect to homicide rates for all children above fourteen remain the same.

Taken together, the evidence presented in Tables 5 through 8 suggests that the introduction of the SRPA decreased the cost of crime of juveniles through two different channels. First and foremost, it significantly reduced the harshness of the penalties youths receive after committing a crime, except in the case of homicide, kidnaps and extortion. Secondly, it also reduced the cost criminals face by decreasing the probability of apprehension.

[Table 7 goes about here]

[Table 8 goes about here]

[Table 9 goes about here]

iv) SRPA and schooling decisions

Table 10 shows the effect of the implementation of the SRPA on schooling attendance decisions. As can be observed, the Table is divided into two distinct panels. Panel A shows the general effect of the law on school attendance for the complete sample and for youths divided according to the years of education of the head of household in order to investigate whether heterogeneous impacts are present. The more interesting results are presented in Panel B. This panel shows the coefficients obtained from estimating specification (5) where the interaction of each student's own age and the SRPA are included. Specifically, we include the interaction of a dummy for youths under 14 years of age and between 14 and 16 which correspond to the ages that, according to the Colombian education system, youths should be in school. As can be observed, the SRPA only affected youths under fourteen years of age. This result goes in line with the fact that the biggest reductions in the cost of crime after the implementation of the SRPA occurred precisely for this age group. Specifically, it is estimated that, after the new law passed, school attendance for this group of children reduced in 1.2 percentage points. This is a big effect given that what we present is the average impact of the law on all children in the country, which of course should not be all affected by it.

The last five columns of Table 10 present the results when we divide the sample according to the education of the head of household. As can be observed, the effect of the SRPA is only present for children belonging to households whose heads have less years of education. This is in fact expected given that it is precisely these children who are the most vulnerable to fall into criminal activities.¹¹ More importantly, the effect for children belonging to households whose heads have between zero and two years of education increases to more than 3 percentage points. For children belonging to households whose heads have between three and four years of education the effect increases to 2.7 percentage points. No effect for the other children is found.

[Table 10 goes about here]

¹¹ As discussed in the literature, studies such as Mocan and Rees (1999) and Bjerck (2004) show that indeed this population is more vulnerable. For Colombia, data from the SRPA show that for those youths incarcerated 80% belong to the lowest two income strata (Romero, 2012).

VII. Conclusions

The exogenous implementation of the change in the youth criminal system in Colombia allows us to estimate the effect it had in the criminal participation of youths in the country. Following international movements in the theories of justice for adolescents, the SRPA reduced the harshness of punitive measures faced by them and had two important effects. The first result is its effects on crime rates. The results show that for the case of thefts, after the implementation of the SRPA the urban rates increased. This effect is higher in municipalities with a higher proportion of youths. No effect however is found for homicide rates and the SRPA. The second result one is a reduction in the arrest rates of youngsters in Colombia. We interpret this as one of the possible channels that could explain the increase in the proportion of crime rates. All these results are probably non-expected effect of the new judicial system that further reduced the costs of engaging in criminal activities for this population.

This increasing trend of youth crime seems to create incentives for children to drop out of school. School attendance decreases for children under 14 years of age after the SRPA enters into force. Lower school attendance is concentrated on children from poorer households. The results of this paper contribute to emerging evidence on the impacts of crime on schooling attainment.

The results go in line with the previous literature which shows that the mechanisms present in the judicial system influences the incentives of youths to participate or not in illegal activities. More importantly, the results also show that policy makers must be prepared to counteract the negative side effects changes in legislation, such as the one implemented in Colombia, may have.

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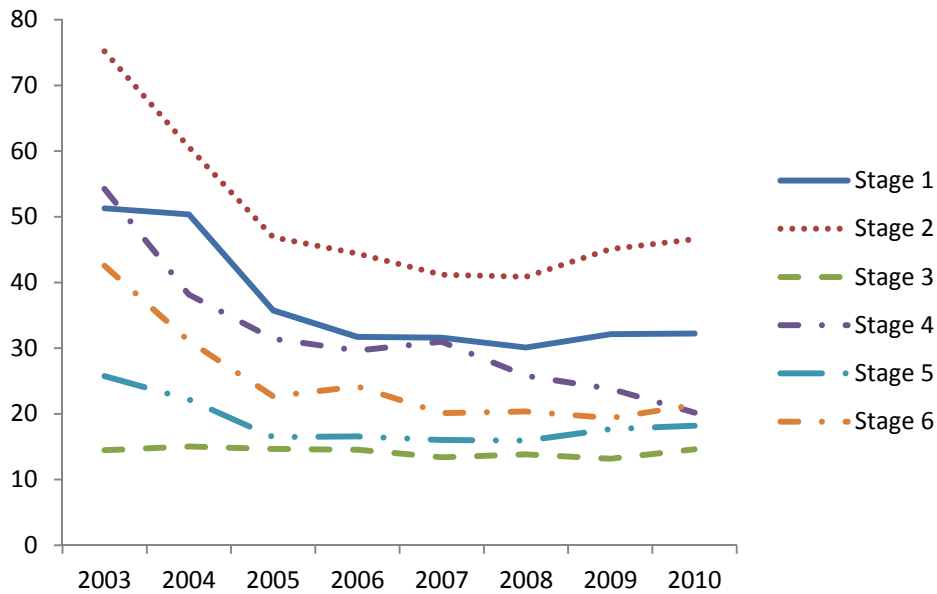
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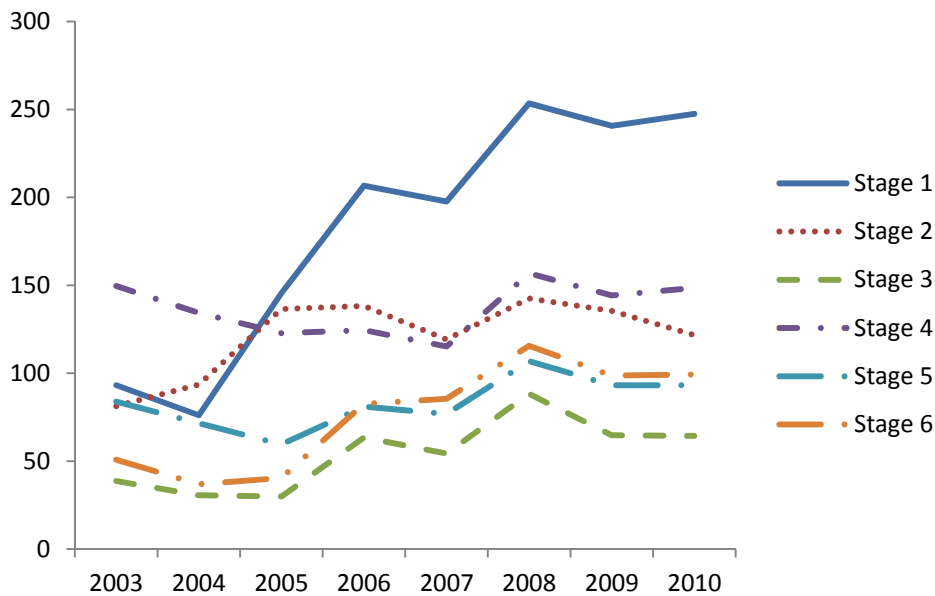
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Figure 1. Homicide rates by judicial district – 2003 and 2010



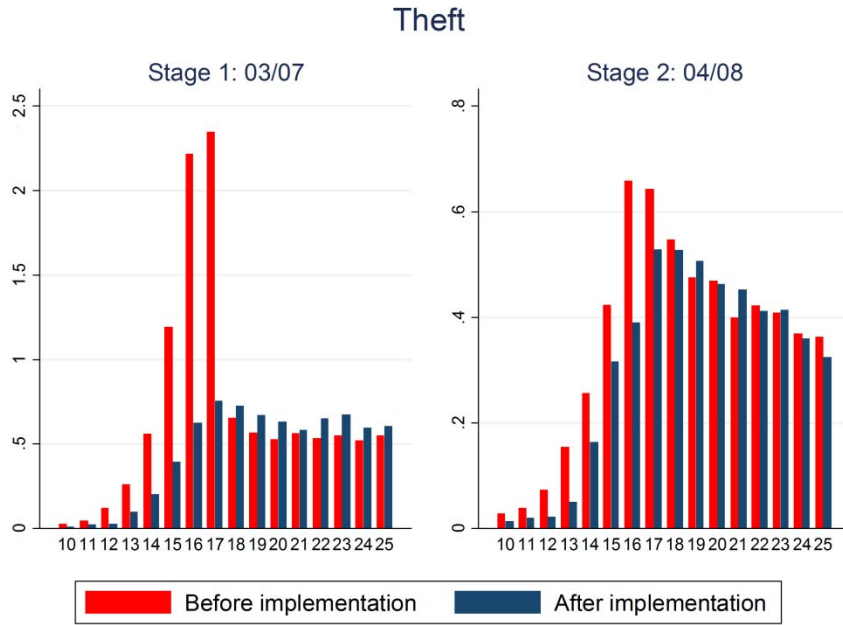
Source: Authors' calculations based on Ministry of Defense

Theft rates by judicial district – 2003 and 2010

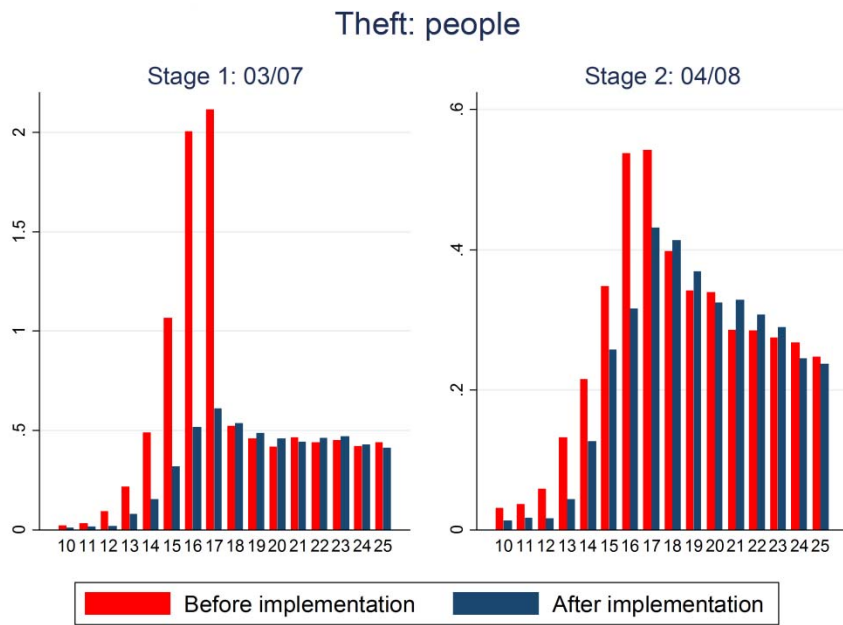


Source: Authors' calculations based on Ministry of Defense

Figure 2. Arrest rates by age and crime type – one year prior and before the adoption of SRPA

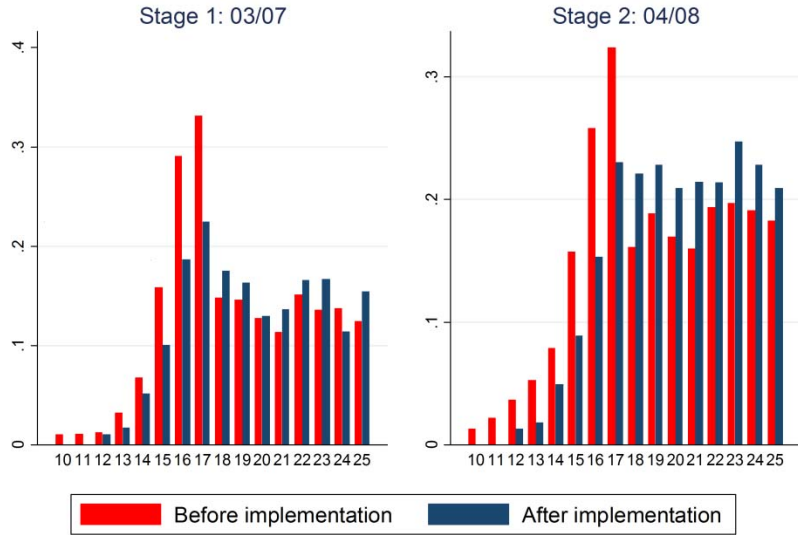


Source: Authors' calculations based on Ministry of Defense



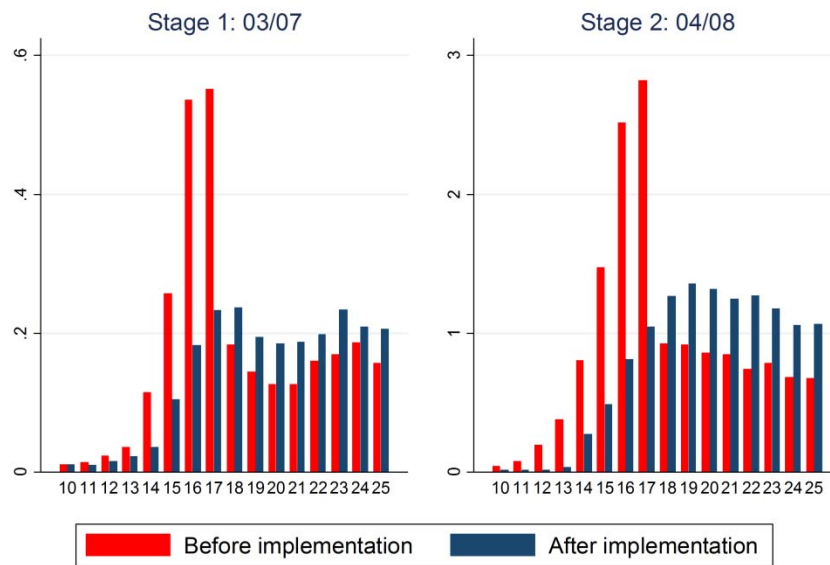
Source: Authors' calculations based on Ministry of Defense

Illegal weapon carrying



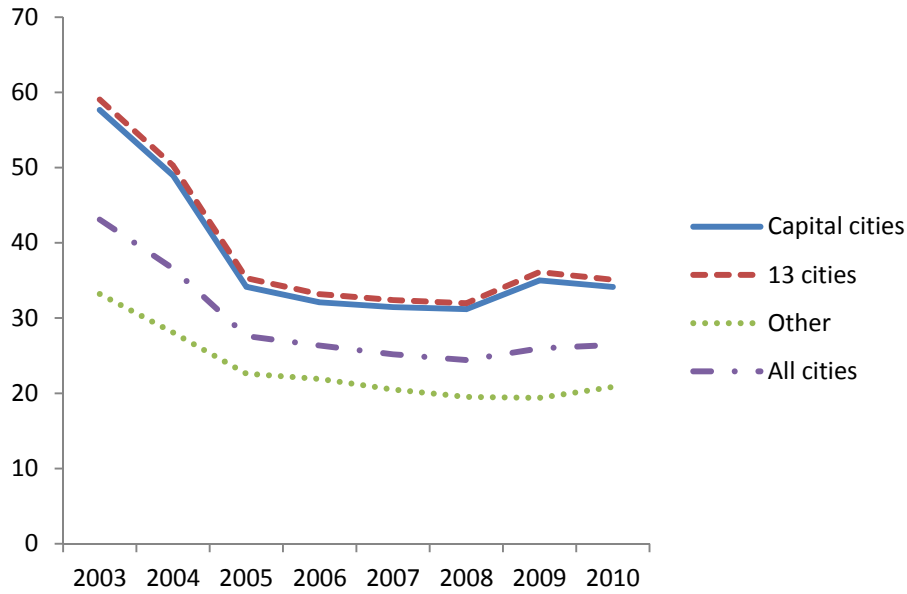
Source: Authors' calculations based on Ministry of Defense

Drug carrying



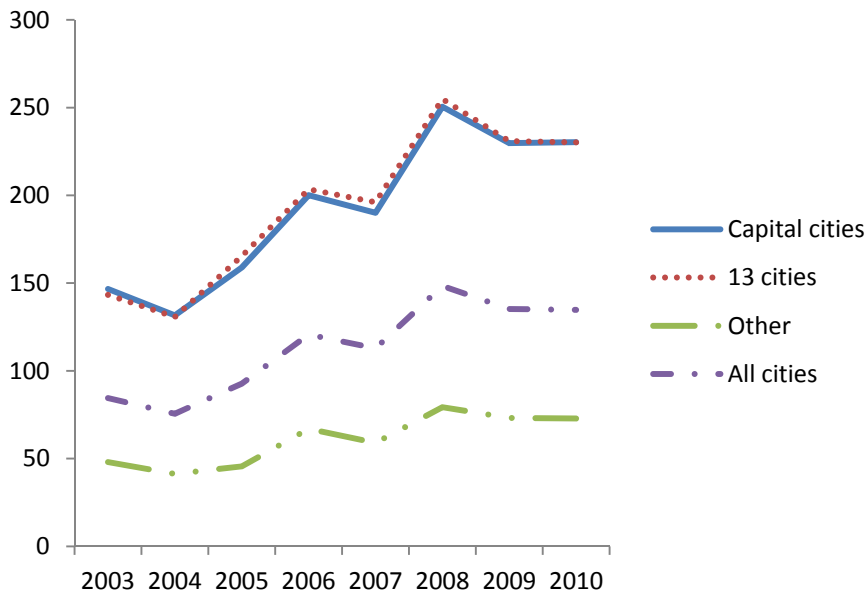
Source: Authors' calculations based on Ministry of Defense

Figure 3. Yearly homicide rates – all municipalities, state capitals, 13 largest cities and other municipalities



Source: Authors' calculations based on Ministry of Defense

Figure 4. Yearly theft rates – all municipalities, state capitals, 13 largest cities and other municipalities



Source: Authors' calculations based on Ministry of Defense

Table 1. Monthly municipal crime rates – all municipalities, state capitals, 13 largest cities and other municipalities

Variable	Capital cities		13 cities		Other		All cities	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Homicides	2.8	2.7	3.5	2.3	1.1	3.8	1.2	3.8
Theft: people	15.3	13.0	19.4	13.9	2.2	6.5	2.4	6.9
Theft: commerce	4.3	3.6	4.9	3.1	0.7	2.9	0.8	2.9
Theft: residence	7.3	7.6	6.0	4.3	1.1	4.1	1.1	4.1
Theft: cars	4.9	4.6	6.8	4.9	0.5	2.2	0.6	2.3
Observations	2,928		1,248		69,300		97,548	

Source: Authors' calculations based on Ministry of Defense

Table 2. Total captures by type of crime

	2003	2004	2005	2006	2007	2008	2009	2010
Homicides	6,794	7,174	7,370	6,505	5,797	4,603	5,055	5,092
Under 14	12	19	11	16	12	4	4	0
Between 14 and 16	68	110	82	69	57	61	68	70
Between 16 and 18	267	321	302	291	204	226	233	232
Weapon carrying	15,011	17,628	17,861	15,700	14,712	14,666	16,414	16,438
Under 14	67	81	92	116	107	75	31	24
Between 14 and 18	1,538	2,088	2,229	2,054	1,803	1,869	1,996	2,135
Drug carrying	45,694	60,363	72,263	53,626	51,940	48,030	54,496	73,206
Under 14	346	388	412	675	852	477	87	71
Between 14 and 18	5,208	7,044	11,552	11,669	11,069	10,510	6,266	7,594
Total theft	85,070	93,466	70,436	53,912	44,073	41,207	42,761	44,359
Under 14	1,201	1,264	1,297	1,275	842	506	177	87
Between 14 and 18	9,423	10,526	15,385	13,466	7,730	7,984	6,832	7,307

Source: Authors' calculations based on Ministry of Defense

Table 3. Descriptive statistics - ECV

Variable	Obs	Mean	Std. Dev.	Min	Max
School attendance	69,188	0.69	0.46	0.00	1.00
Under 14	69,188	0.46	0.50	0.00	1.00
Between 14 and 16	69,188	0.11	0.32	0.00	1.00
Between 16 and 18	69,188	0.11	0.31	0.00	1.00
Gender	69,188	0.50	0.50	0.00	1.00
Socio-economic level (stratum)	65,671	1.94	0.96	0.00	6.00
Years of education	69,111	2.66	5.10	0.00	24.00
Years of education of head of household	69,188	6.52	5.64	0.00	24.00
Years of education of spouse	69,188	4.63	5.54	0.00	24.00
Single-parent household	69,188	0.31	0.46	0.00	1.00
Gender of head	69,186	0.69	0.46	0.00	1.00
Income per capita (\$COP)	69,188	2,658,693	4,813,397	0	281,000,000
Public school	69,188	0.55	0.50	0.00	1.00
Household size	69,188	5.12	2.12	1.00	20.00
Floor material (=1 if polished wood, rug, marble)	69,188	0.44	0.50	0.00	1.00
Rural	69,188	0.19	0.39	0.00	1.00
Municipal theft to people (rate per 100.000 people)	69,188	105.89	107.12	0.00	617.32
Municipal homicide rate (rate per 100.000 people)	69,188	31.00	26.63	0.00	193.61
Municipal theft to commerce (rate per 100.000 people)	69,188	37.36	34.93	0.00	214.11
Municipal theft to vehicles (rate per 100.000 people)	69,188	56.07	59.73	0.00	314.53
Municipal theft to residence (rate per 100.000 people)	69,188	51.06	54.59	0.00	364.72

Source: Authors' calculations based on ECV and CEDE municipal panel

Table 4. Duration model - Probability of implementing the SRPA

VARIABLES	
Duration dependence	0.00103*** (1.88e-05)
Δ investment in education	1.44e-11 (1.77e-10)
Δ municipality income	-3.99e-12 (2.65e-11)
Δ municipality royalties	-4.60e-10 (3.34e-10)
Δ theft rate to people	-2.13e-05 (6.22e-05)
Δ homicide rate	4.56e-05 (8.23e-05)
Δ theft rate to commerce	-1.89e-05 (0.000110)
Δ theft rate to residence	-6.92e-05 (8.39e-05)
Δ theft rate to vehicles	-0.000174 (0.000158)
Observations	75,219
R-squared	0.038

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on Ministry of Defense and CEDE municipal panel

Logarithm of Crime Rates in municipality i and time t

Theft to people				Theft to commerce				Theft to residence			
Capital cities	13 cities	Other cities	All cities	Capital cities	13 cities	Other cities	All cities	Capital cities	13 cities	Other cities	All cities
0.180*** [0.0638]	0.192*** [0.0627]	0.0941*** [0.0139]	0.0977*** [0.0137]	0.106* [0.0543]	0.194*** [0.0516]	0.00959 [0.00969]	0.0124 [0.00955]	0.149** [0.0605]	0.347*** [0.0531]	0.0216* [0.0110]	0.0259** [0.0109]
-1.845*** [0.575]	3.334*** [0.904]	0.143* [0.0791]	0.159** [0.0782]	-2.342*** [0.491]	-0.587 [0.760]	-0.207*** [0.0553]	-0.228*** [0.0547]	-1.001* [0.551]	0.840 [0.761]	-0.269*** [0.0630]	-0.284*** [0.0623]
14.15*** [4.431]	2.310 [4.217]	0.723 [0.695]	0.625 [0.683]	-3.387 [3.780]	-5.442 [3.547]	1.419*** [0.486]	1.533*** [0.478]	10.57** [4.241]	0.571 [3.553]	2.135*** [0.553]	2.291*** [0.544]
-33.95*** [7.418]	-79.43*** [11.76]	-6.098*** [1.381]	-6.249*** [1.369]	12.94** [6.329]	9.758 [9.895]	-0.808 [0.965]	-0.480 [0.958]	-25.71*** [7.100]	-28.30*** [9.911]	-2.748** [1.100]	-2.768** [1.091]
24.99*** [4.445]	20.66*** [6.071]	3.110*** [0.514]	3.207*** [0.508]	14.99*** [3.792]	5.347 [5.108]	0.911** [0.359]	0.764** [0.355]	15.98*** [4.255]	12.69** [5.115]	2.162*** [0.409]	2.176*** [0.404]
2,928 0.207 31	1,248 0.306 13	96,300 0.014 1,027	97,548 0.015 1,040	2,928 0.133 31	1,248 0.240 13	96,300 0.007 1,027	97,548 0.008 1,040	2,928 0.116 31	1,248 0.243 13	96,300 0.010 1,027	97,548 0.010 1,040
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

... tax collection, per capita investment in education, fiscal performance, density of population, rural index, displaced population arrival, unemployment (for 13

** p<0.05, * p<0.1.

Ministry of Defense and CEDE municipal panel

Table 6. Dependent Variable: Logarithm of Crime Rates in municipality i and time t

VARIABLES	Theft to vehicles				Homicide			
	Capital cities	13 cities	Other cities	All cities	Capital cities	13 cities	Other cities	All cities
<i>Panel A</i>								
SRPA	0.00382 [0.0499]	-0.0716* [0.0420]	0.00511 [0.00788]	0.000673 [0.00777]	0.0617 [0.0447]	-0.0272 [0.0334]	-0.0158 [0.0115]	-0.0171 [0.0113]
<i>Panel B</i>								
SRPA	-1.189*** [0.455]	-0.549 [0.594]	-0.186*** [0.0450]	-0.234*** [0.0445]	0.0445 [0.401]	1.235** [0.492]	-0.276*** [0.0657]	-0.279*** [0.0649]
SRPA*Log (% of people 8-13)	15.27*** [3.504]	9.455*** [2.772]	1.342*** [0.395]	1.783*** [0.389]	-6.765** [3.092]	-7.936*** [2.296]	0.776 [0.577]	0.750 [0.567]
SRPA*Log (% of people 14-17)	-27.12*** [5.867]	-12.81* [7.733]	-1.724** [0.785]	-1.749** [0.780]	19.72*** [5.176]	9.071 [6.405]	2.053* [1.147]	2.144* [1.136]
SRPA*Log (% of people 18-25)	12.71*** [3.515]	3.488 [3.991]	1.447*** [0.292]	1.354*** [0.289]	-6.127** [3.102]	-8.915*** [3.306]	-0.00456 [0.427]	-0.0208 [0.421]
Observations	2,928	1,248	96,300	97,548	2,928	1,248	96,300	97,548
R-squared	0.112	0.403	0.005	0.005	0.157	0.343	0.008	0.009
Number of municipalities	31	13	1,027	1,040	31	13	1,027	1,040
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month*year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Controls: per capita Industry and Commerce tax collection, per capita investment in education, fiscal performance, density of population, rural index, displaced population arrival, unemployment (for 13 cities)

Standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on Ministry of Defense and CEDE municipal panel

Table 7. Dependent Variable: Arrest Rate for each cohort c and for each crime s in municipality i and time t

VARIABLES	Theft to people				Theft to commerce				Theft to residence			
	Capital cities	13 cities	Other	All cities	Capital cities	13 cities	Other	All cities	Capital cities	13 cities	Other	All cities
SRPA (under 14)	-0.0450 [0.0518]	-0.0845*** [0.0324]	-0.0522*** [0.0110]	-0.0532*** [0.0109]	-0.0135 [0.0468]	-0.0202 [0.0183]	-0.00973 [0.00629]	-0.0103* [0.00619]	-0.0365 [0.0658]	0.0120* [0.00669]	0.00594 [0.00816]	0.00596 [0.00803]
SRPA (14-17)	-1.321*** [0.170]	-1.566*** [0.223]	-0.155*** [0.0286]	-0.185*** [0.0283]	-0.131 [0.0981]	-0.102** [0.0485]	-0.0349** [0.0170]	-0.0370** [0.0167]	-0.174 [0.130]	-0.0577** [0.0248]	-0.00229 [0.0182]	-0.00359 [0.0179]
SRPA (18-25)	0.634*** [0.197]	0.365* [0.218]	0.107*** [0.0389]	0.108*** [0.0384]	0.163 [0.103]	0.188*** [0.0724]	0.0453** [0.0192]	0.0463** [0.0189]	-0.0118 [0.122]	-0.0125 [0.0419]	0.0676*** [0.0208]	0.0656*** [0.0205]
SRPA (over 25)	0.257 [0.238]	-0.215 [0.239]	0.164*** [0.0580]	0.152*** [0.0572]	0.261* [0.141]	0.335** [0.133]	0.0721** [0.0300]	0.0737** [0.0296]	-0.392** [0.187]	0.135** [0.0580]	0.0401 [0.0294]	0.0407 [0.0289]
Observations	1824	780	60756	61536	1824	780	60756	61536	1824	780	60756	61536
Number of municipalities	31	13	1033	1046	31	13	1033	1046	31	13	1033	1046
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month*year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Controls: per capita Industry and Commerce tax collection, per capita investment in education, fiscal performance, density of population, rural index, displaced population arrival, unemployment (for 13 cities)

Standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on Ministry of Defense and CEDE municipal panel

Table 8. Dependent Variable: Arrest Rate for each cohort c and for each crime s in municipality i and time t

VARIABLES	Theft to cars				Theft to motorcycles				Total theft			
	Capital cities	13 cities	Other	All cities	Capital cities	13 cities	Other	All cities	Capital cities	13 cities	Other	All cities
Dummy (under 14)	0.000224 [0.000591]	-0.000420 [0.000276]	0.000452*** [0.000138]	0.000437*** [0.000136]	-0.00259 [0.00220]	-0.00204* [0.00121]	-0.000628 [0.000878]	-0.000644 [0.000864]	-0.0499 [0.0934]	-0.135*** [0.0455]	-0.0264 [0.0195]	-0.0292 [0.0192]
Dummy (14-17)	0.000994 [0.00376]	-0.000122 [0.00600]	0.000919 [0.00217]	0.000891 [0.00214]	0.0107 [0.0328]	-0.00902 [0.0102]	0.00831 [0.00519]	0.00821 [0.00511]	-1.866*** [0.261]	-2.385*** [0.248]	-0.154*** [0.0454]	-0.202*** [0.0448]
Dummy (18-25)	0.00586 [0.0104]	0.0258* [0.0152]	-0.0129*** [0.00493]	-0.0122** [0.00486]	0.109** [0.0540]	0.0123 [0.0238]	0.0289** [0.0120]	0.0290** [0.0118]	0.584 [0.369]	0.303 [0.370]	0.171** [0.0685]	0.144** [0.0677]
Dummy (over 25)	-0.0151 [0.0290]	0.0269 [0.0284]	-0.00532 [0.0101]	-0.00494 [0.00997]	0.0575 [0.0517]	-0.00817 [0.0253]	0.0293*** [0.0100]	0.0290*** [0.00987]	0.0859 [0.446]	0.196 [0.465]	0.121 [0.109]	0.0856 [0.108]
Observations	1824	780	60756	61536	1824	780	60756	61536	2928	1248	96876	98124
Number of municipalities	31	13	1033	1046	31	13	1033	1046	31	13	1033	1046
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month*year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Controls: per capita Industry and Commerce tax collection, per capita investment in education, fiscal performance, density of population, rural index, displaced population arrival, unemployment (for 13 cities)

Standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on Ministry of Defense and CEDE municipal panel

Table 9. Dependent Variable: Arrest Rate for each cohort c and for each crime s in municipality i and time t

VARIABLES	Weapon carrying				Drug carrying				Homicide			
	Capital cities	13 cities	Other	All cities	Capital cities	13 cities	Other	All cities	Capital cities	13 cities	Other	All cities
Dummy (under 14)	-0.0252*** [0.00580]	-0.0334*** [0.00898]	0.00319 [0.00427]	0.00238 [0.00420]	-0.237*** [0.0371]	-0.313*** [0.0497]	-0.0494*** [0.0120]	-0.0527*** [0.0118]	-0.00158 [0.00249]	-0.00304 [0.00415]	0.000316 [0.000894]	0.000271 [0.000881]
Dummy (14-17)	-0.158*** [0.0503]	-0.373*** [0.0512]	-0.0242 [0.0163]	-0.0306* [0.0160]	-4.243*** [0.341]	-6.028*** [0.540]	-0.674*** [0.0635]	-0.743*** [0.0630]	0.00147 [0.0235]	0.00601 [0.0228]	-0.00642 [0.00752]	-0.00638 [0.00740]
Dummy (18-25)	0.238** [0.104]	0.211** [0.0906]	-0.0464 [0.0405]	-0.0422 [0.0398]	1.135** [0.553]	3.857*** [0.585]	0.633*** [0.103]	0.663*** [0.101]	-0.0868 [0.0779]	-0.0625 [0.0494]	0.00939 [0.0222]	0.00801 [0.0219]
Dummy (over 25)	0.388** [0.177]	0.0699 [0.132]	-0.00563 [0.0742]	-0.000398 [0.0730]	3.052*** [0.887]	7.265*** [0.848]	1.845*** [0.184]	1.907*** [0.182]	0.0551 [0.145]	-0.0290 [0.0777]	0.0620 [0.0488]	0.0579 [0.0479]
Observations	2928	1248	96876	98124	2928	1248	96876	98124	2928	1248	96300	97548
Number of municipalities	31	13	1033	1046	31	13	1033	1046	31	13	1027	1040
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month*year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Controls: per capita Industry and Commerce tax collection, per capita investment in education, fiscal performance, density of population, rural index, displaced population arrival, unemployment (for 13 cities)

Source: Authors' calculations based on Ministry of Defense and CEDE municipal panel

Table 10. Dependent Variable: School Assitance for each child a in municipality i and time t

	Whole sample 1	Years of education of head of household				
		0-2	3-4	5-6	7-11	12-21
<i>Panel A</i>						
SRPA	0.969*** (0.0515)	1.030*** (0.124)	0.811*** (0.158)	0.924*** (0.124)	0.971*** (0.0602)	0.958*** (0.0526)
<i>Panel B</i>						
SRPA * Under 14	-0.0116*** (0.00449)	-0.0315** (0.0125)	-0.0273** (0.0131)	-0.0113 (0.00888)	0.00340 (0.00618)	0.00398 (0.00599)
SRPA * Between 14-16	0.00552 (0.00560)	-0.00176 (0.0155)	-0.0175 (0.0164)	0.00914 (0.0110)	0.00546 (0.00773)	0.0154** (0.00743)
Observations	44310	10338	6661	9817	12401	5093
R-squared	0.703	0.649	0.704	0.743	0.780	0.843
Number of municipalities*years	351	340	331	344	336	296
Municipality*year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Contols: gender, years of education, years of education of head of household, single-parent household, gender of head of household, per capita income, size of household, floor quality, rural/urban, stratum, role inside household, homicide rate, theft rates (people, commerce, vehicles, residence)

Standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on Ministry of Defense and CEDE municipal panel