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The effect of longer school days on crime

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The effect of longer school days on crime: Are kids the victims or perpetrators?

Ana Montes-Viñas

Abstract

In this paper, I study the effect of longer school days on juvenile crime and child work in illegal organizations by exploiting a policy setup in Colombia that aims to increase the length of school hours dedicated to academic activities by 7 hours per day. I exploit the exogenous time and municipality variation introduced by the education reform to identify the effect of additional hours spent in school. This research aims to give light to policy makers about preventive policies to mitigate child recruitment into working for organized criminal gangs. This research investigates the relationship between education and crime while focusing on drug trafficking structures and the role of teens and children within these organizations.

1 Introduction

In Colombia, one of every ten arrests involves the participation of a child or a teenager (DIJIN, 2010). Among the major crimes committed by teenagers, it has been highlighted the trafficking, manufacture or carrying of narcotics, followed by robberies and qualified theft (ICBF, 2015). The data shows a common reality lived by many children and teens from the most marginalized neighborhoods. They are often the target of criminal gangs who seek them to work within their drug trafficking structures. Teenagers and children cannot be easily requisitioned by the authorities, making them perfect to carry and merchandise narcotics. Once they have started to work for these structures, they are intimated and cannot leave the organization, leading them to form a career

within these criminal associations. This phenomenon is replicated by other criminal organizations such as the Maras in El Salvador, where criminal gangs recruit their members when they are between 12 and 21 years old.

In a country such as Colombia, the youth are exposed to the worst forms of child labor such as sexual exploitation and illicit activities in an environment of high criminal activity. For these reasons, it is relevant to study this form of child labor and the preventive policies to mitigate it. Therefore, this research aims at studying the effect of the increase school hours on both juvenile crime and crime committed against children and teens. I exploit the exogenous time and municipality variation induced by a national policy reform in Colombia[1] that increased the number of hours spent in public schools. The gradual implementation of the reform provides a quasi-experiment that allows us to identify the effect of additional schooling on crime.

Through the decrees 1075 of 2015 and 501 of 2016, the Government of Colombia introduced the full-school day or *Jornada Unica* as a nationwide education reform. The reform increased the time spent at schools within the public system to nine hours per day for high-school students, eight hours for primary-school students and 7 hours to kindergarten students [2]. The additional hours are dedicated to academic activities. The implementation is taking place in two phases. During the first stage, all public schools with existing installed capacity migrate to the new *Jornada Unica* system (2015-2017). During the second stage, the remaining schools have implement the policy once they receive the investment necessary for enlarging the infrastructure (2017-2018). In 2017, the decree 2105 changed again the time spend at school, reducing it by one hour. During the first year of implementation, 348 schools have implemented the reform, including schools in 60 additional municipalities between 2015 and 2016. Overall, 502,720 students in 833 public schools were benefiting from the reform in 2016.

What effect does the variation in school hours has on contemporaneous juvenile crime? The relationship between education and crime has been widely discussed[3]. There are several mechanisms in which time spent in school is expected to affect juvenile criminal activity (Hjalmarsson and

[1] In Colombia, education is centralized and regulated at the national level by the Ministry of Education. Local Secretariats implement the policies/reforms designed at the national level.

[2] It should be noted that 45% of the private institutions already offer full-day schooling.

[3] See Rud et al. (2013) for a literature review.

Lochner, 2012). First, and most relevant for this study, attending school may reduce the exposure to environmental risks that leads youth to engage in crime. This incapacitation effect reduces the time students spend outside school where there are more criminal opportunities. Second, more hours of school would increase skills and abilities (human capital), increasing the opportunity cost of future employability or income and reducing incentives to engage in crime while still enrolled in school. Third, social interactions during school time might have mixed results. Spending more time together could either negatively and positively influence juvenile crime behavior. A similar study on the effect of the school reform in Chile, shows that longer school days reduce juvenile crime rates at the municipal level (Berthelon and Kruger, 2011).

In this paper, I exploit the exogenous time and municipality variation introduced by the education reform to identify the effect of additional hours spent in school. Municipalities gradually implemented the reform by extending school hours for a complete level of education (either elementary, middle or high school). The paper estimates the effect of the reform on arrest rates for adolescents between 15 and 18 years old and children below the age of 15. It also studies the crime rates when an underage minor was the victim. The Criminal Investigation Office of the National Police Department and Colombia's Family Welfare Institute (ICBF, the Spanish acronym) provide the crime data for this analysis at the municipal level for the period 2012-2018. I include as control variables the lagged total crime rates, and a set of other socioeconomic characteristics. Moreover, it includes time and municipality fixed effects to control for time-invariant unobservable characteristics of the municipality. This paper also explore different type of crimes separately to identify if criminal gangs activities are more or less affected by the reform when compared to other crimes.

I expect a negative effect of higher shares of students attending all-day schools on juvenile crime rates at the municipal level due to an incapacitation effect. Policymakers in other developing countries could make use of these results as an example to support the extension of school hours as an alternative way to keep children out of the streets and far from criminal activities. This type of education reform is costly and has long-term expected benefits on education improvement. This policy evaluation could provide a measure of the short-term effects of the education reform and could be helpful to complement the implementation of the next phases.

One limitation of this evaluation is that it cannot distinguish between the pure incapacitation effect from the additional skills built during this time. To be able to assess such an effect another treatment is needed, in which the additional hours in school are dedicated to other activities different than math, languages and science. Another limitation relates to the fact that we only focus on public education (73 percent of all schools). The types of crimes, the motivations and other mechanisms can differ between public and private schools.

The paper proceeds as follows. Section II reviews the literature on the relationship between education and crime. Section III presents an overview of the Colombian context and the *Jornada Unica* policy. Section IV describes the identification and the empirical framework. Section V presents the empirical results. Section VI concludes.

2 Literature Review

Any type of work performed by under-aged[4] that harms them physically, physiologically or emotionally or that affects their schooling can be considered as child labor. Most common forms of child labor are related to agricultural activities, mining, construction work, street sells, begging, car washing, among others. Children in Colombia are exposed to some of worst forms of child labor as described by Article 3 of ILO Convention No. 182 such sexual exploitation for commercial use, the production and trafficking of drugs, and forced recruitment by illegal armed groups (ILAB, 2021). Improving education is among the strongest tools to prevent child labor (Guarcello et al., 2008) along with the involvement of children in criminal activities.

In the long-run, more education can improve the returns in the labor market. If the returns to education in the labor market are high, then education could increase the opportunity cost of engaging in criminal activities such as robbery, larceny, assault, drug related crimes, or any other type of crimes that does not depend on intellectual skills (Lochner, 2004). For white collar crimes, education can in fact increase the returns to crime. Moreover, education increases the opportunity cost of incarceration as well as it can affect preferences for risk (more risk aversion) or attitudes such

[4]Under the minimum working age of each respective country

as patience (Lochner and Moretti, 2004). Individuals with high risk aversion are less likely to engage in criminal activity. A large body of literature have empirically estimated the casual relationship of education on crime by exploiting policy changes in the age of compulsory schooling (Lochner and Moretti, 2004; Buonanno and Leonida, 2006; Sabates and Feinstein, 2007; Machin et al., 2011; Meghir et al., 2012; Anderson, 2014; Hjalmarsson et al., 2015; Merlo and Wolpin, 2015). Studies have found that an increase in average education levels as well as higher high-school graduates rates reduces arrest rates for both property and violent crime (Lochner and Moretti, 2004; Buonanno and Leonida, 2006; Sabates and Feinstein, 2007; Merlo and Wolpin, 2015). Moreover, increasing schooling age (and as a result more years of education) decreases conviction rates (Machin et al., 2011; Meghir et al., 2012; Hjalmarsson et al., 2015) and incarceration rates (Meghir et al., 2012; Hjalmarsson et al., 2015).

In the short-run, increasing schooling could keep kids out of the street and occupied in other activities different than criminal endeavors. This incapacitation effect of school has also important negative effects on youth's criminal behavior. Nonetheless, more schooling might also have a positive effect on youth's criminal behavior's considering that longer time at school increments the interaction with peers, enabling the coordination among the youth to commit crimes. Moreover, the concentration of juveniles within the school could increase the crimes committed to each other. For the case drug related crimes, schooling offers the opportunity to engage in drug dealing to their peers. The empirical evidence estimating the causal effect of contemporaneous schooling on juveniles crime is scarce. Anderson (2014) exploits the increase to school compulsory age at the county level in the US. The author's results show that more schooling has a negative effect of both violence and property crimes among teens between 16 to 18 years old. Using teach-in-service days and teacher's strikes as sources of variation in school attendance, Jacob and Lefgren (2003) and Luallen (2006) estimated the school's incapacitation effect on juvenile crime. Both studies show that this incapacitation effect of being at school can significantly decrease crimes against properties such us petty theft, robberies, vandalism, and loitering, while increasing violent crimes. With respect to drug related crimes, the empirical results are inconclusive. On the one hand, Jacob and Lefgren (2003) finds that on teacher in-service days, the incidence of drug related crimes among

teens reduces by 10 percent. On the other hand, Luallen (2006) results show that for urban areas, the incidence of drug related crimes increases during on teacher's strikes while for rural and sub-urban areas drug related crimes decreases during teachers strikes. Notwithstanding, for both research studies, Jacob and Lefgren (2003) and Luallen (2006), coefficient of attendance to school on drug related crimes by juveniles is not significant. One limitation of using teach-in-service days and teacher's strikes as sources of variation in schooling is related to the fact that parents can occupy their children with other activities at home while schools are closed, limiting the interpretation of the unsupervised time away from school. In contrast, using extensions of time at the school as source of exogenous variation ensures adult supervision while discouraging the criminal behavior. The research study by Berthelon and Kruger (2011) follows this empirical strategy by exploring the effect of the gradual implementation of a school reform that extends time at school in Chile. The authors show that a longer time at school reduces juvenile crime rates in Chile for both violent and property crime.

Unlike previous literature, this paper studies the relationship between longer schooling days and crime from a different perspective. It seeks to answer whether teenagers and children (under the age of 14) are the victims or the perpetrators of crime. This research contribute to the literature by analyzing not only crime rates in which children and teens are involved as authors of the crime, but also crimes committed against children and teenagers. The incapacitating effect of school could have a different impact on crime. On the one hand, it can restrain children and teens from committing crimes as previously highlighted. On the other hand, schooling could keep children safe from being victims of criminal activities perpetuated by adults either at home or on the streets. This paper evaluates the effect of schooling on crimes rates by or against teens and children separately. Moreover, this paper evaluates the effect of a schooling reform on different types of crime, while focusing on the drug trafficking but also conducting the analysis on other crimes such as robbery, property crime, among others. Most of the empirical research has studied contexts in which the return to education are high and outweighs the returns of criminal activities. This paper contributes to the literature of crime and education by studying the Colombian context in which returns to

education in the labor market are rather low and youth unemployment is importantly high[5].

3 The Colombian context

3.1 The *Jornada Unica* policy

The length of the school day in Colombia continous to be a topic of debate among scholars and policy makers. Before 1965, schools in Colombia had a single full school day (7-hours). In that year, the national government implemented the establishment of two sessions per school for public high-schools in the five main cities[6]. This means that one high-school was capable of enrolling a set of students to attend school in the morning from 6:30 until 12:30, and a different set of students from 12:45 until 18:45 (Bocanegra and Huertas, 2018). Later that year, the night school session was regulated allowing a school to have different students (mostly adults) attending school during the night[7]. These reforms allowed to increase school coverage in the country using the same infrastructure, but reducing the school sessions to 6 hours per day for each student. One year later, this policy reform was extended to all public schools in the country and all grades levels[8].

In 1994, the national government published a general education law, in which the scholar day was regulated as one single full school day (Law 115 of 1994)[9]. The discretion to implement these plans was given to the educational institutions under the supervision of the secretary of education for each district. In practice, some schools transitioned but not all the schools did. An important percentage of the public schools continued to offer two sessions per day (equivalent to 6 hours of schooling per student) due to the lack physical capacity and staff, in addition to the increasing demand for public education (Hincapie, 2016). In contrast, the private schools usually offer one session equivalent of 8 hours (on average) per day.

[5]According to the Colombian national statistics department, between 2018 and 2021, the unemployment rate among young adults rages from 18% to 23%

[6]Decree 455 of 1964

[7]Decree 455 of 1965

[8]Decree 280 of 1965

[9]The decree 1860 of 1994, regulated the minimum effective study time during the week. For grades 1 to 5, the minimum number of hours was 25 per week. For high and middle school, it corresponded to 30 hours per week. This is equivalent to 5 or 6 hours of study at the school per day depending on the grade level

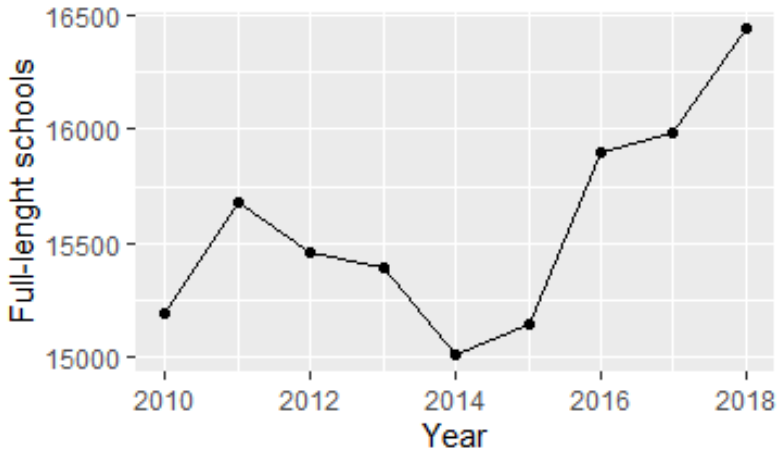
In order to accomplish the goals established in 1994, a new regulation was set in place in 2015. The decrees 1075 of 2015 and 501 of 2016, re-introduced the full-school day or *Jornada Unica* as a nationwide education reform. The reform increased the time spent at schools within the public system to nine hours per day for high-school students, eight hours for primary-school students and seven hours to kindergarten students. During that time, the school had to designate one hour for a break and lunch. From the 40 weekly hours dedicated to academic activities, a minimum of 32 hours were designated to core subjects, and the remaining 8 hours to specific subjects for technical or academic secondary education. In 2017, the decree 2105 changed again the time at school after many discussions with teacher's unions and the schools administrators. The change reduced by one hour the time dedicated to academic activities for each day, and leaving to the discretion of the school principal the time for breaks and lunch. The final allocation of time for academic activities introduced by the two policy reforms is summarized in Table 1

Table 1: Time dedicated to academic activities under the Jornada Única reform

	Decree 501 0f 2016	**Decree 2105 of 2017**
Kindergarden	6 per day or 30 per week	5 per day or 25 per week
1st to 5th grade	7 per day or 35 per week	6 per day or 30 per week
6th to 9th grade	8 per day or 40 per week	7 per day or 35 per week
10th and 11th grade	8 per day or 40 per week	7 per day or 35 per week

The implementation of this reform was planned in two phases. During the first stage, all public schools with existing installed capacity migrated to the new *Jornada Unica* system (2015-2017). A second stage was planned for the remaining schools. These schools were expected to transition to a single full school day once they receive the necessary investment for enlarging the infrastructure (2017-2018). Nevertheless some errors occurred along the way, that led to change the implementation plans. During the first year, 2015, the secretaries of education had the mandate of selecting the schools that were going to transition to a *Jornada Unica*. Many schools were not prepared to implement the policy given the lack of infrastructure and teachers. In 2015, only 348 schools implemented the reform. As a result, in 2017, the decision to implement the strategy was left to

Figure 1: The number of schools with a full-school day



Source: own calculations based on C-600 DANE School Census.

the school principal. If the school fulfills the criteria specified in the Decree 2105 od 2017, then the school principal can apply to certify the school under the *Jornada Unica* system [10]. Figure 1 shows the number of schools that offers a full-day between 2010 and 2018. I have excluded the schools dedicated to adult education. The figure shows a small increase at the end of 2015, and an important increase in 2016. By 2018, a total of 5,934 school had adhered to the program, representing nearly 30% of the schools in the country.

The objectives of this reform were not limited to increase the time spend on academic activities within the school, but also to increase the quality of education in the public system, reduce the existing gaps between public and private school, and to reduce the exposure of the students to risk environments during their free time.

[10]The criteria are the following: 1.Educational infrastructure available and in good condition. 2. A meal plan for the lunch, 3. Sufficient teachers, 4. Regular and sufficient functioning of the public services such as water, electricity, internet access, etc.

3.2 Childrens and teens: victims and victimizers

According to the Colombian police department statements, children and adolescents enjoy special protection in the constitutional system in the face of any crime, either as a victim or as an aggressor. On the one had, as victims, crimes committed to children are penalized with higher sentences. children and adolescents in Colombia are victims of crimes such as homicide, personal injury, abuse sexual and domestic violence. The last two are the crimes that affect the most to this population. For example, sexual abuse concentrates around between 70% of the total crimes committed against children, concentrating the most in children from 0 to 12 years old.

On the other hand, as aggressors, penalties and sentences are often reduced. The previous situation has been capitalized by criminal organizations. These organizations make use children and adolescents in the commission of crimes to avoid the severity of the criminal process. As, perpetrators, childrens and adolescents have been apprehended mainly for the crimes sucks drug trafficking, manufacturing or carrying drugs, theft, and manufacturing, trafficking and carrying firearms or ammunition.Boys and young men are at a higher risk of committing these crimes, with nearly 90% of the children and adolescents apprehended belong to the male gender.

4 Identification and empirical strategy

To understand the effect of additional hours spent in school as a mechanism to reduce exposure the to risky environments, I exploit the exogenous time and municipality variation introduced by the education reform. Municipalities have gradually implement the reform by extending school hours for a complete level of education (either elementary, middle or high school). The study benefit from the fact that students do not endogenously sort into the schools. The allocation of a student into a school is a decision of the municipal secretariat based on the preferences stated by the parents and availability of spots in the schools. Notwithstanding, assignment can differ from parent's preferences if there are not spots in those schools (Hincapie, 2016). Note that given the lack of school spots within the public system, switching schools is a lengthy process.

I use as dependent variables: 1) Arrest rates of under-aged, and 2) arrest rates when an underage minor was the victim. Among the juvenile crimes most commonly perpetrated are drug trafficking, gun possession, and property crime. The Criminal Investigation Office of the National Police Department and the ICBF provide the crime data for this analysis at the municipal level for the period 2012-2018. The main explanatory variable is the share of schools in a full-day school in each municipality per year. This information is collected by the National Department of Statistics that annually conducts a census to both public and private schools. I control for total crime with a lagged variable to account for the fact that organized crime in the municipality may influence juvenile crime, and for a set of other socioeconomic characteristics (such poverty or median income level, youth-adults unemployment, average education level among adults, and dummy variable that is equal to 1 if the municipality is a urban area, and zero otherwise). Moreover, by using fixed effects, I control for time-invariant unobservable characteristics of the municipality.

$$Crime_{jt} = \alpha_0 + \alpha_1 StudentsJD_{jt} + \sum_{n=1}^{J} \theta_j X_{jt} + \mu_r + \mu_i + \epsilon_{it}$$

Where $Crime_{it}$ is the number of crimes committed against children or teens, or the number juvenile arrest in time t and municipality i in years. Moreover, it explores the different type of crimes separately to identify if criminal gangs activities are more or less affected than other crimes. The variable $StudentsJD_{it}$ is the proportion of students attending a full-length school day. X_{ijt} refers to a set of other control variables for the municipality i at time t, u_i corresponds to municipality fixed effects and u_r corresponds to region fixed effects.

5 Data

For the crime variables, I make use of two main sources: the Criminal Investigation Office of the National Police Department (DIJIN, the Spanish acronym) and Colombia's Family Welfare Institute (ICBF, the Spanish acronym). The first source provided the information of all the crimes reported in

Colombian between 2010 and 2018, while the second source published the information of the arrests for crimes committed by people under the age of 18 years old, which corresponds to the legal age in Colombia. The information provided by the National Police Department details each crime, the date and hour of the event, characteristics of the victim, region, municipality and neighborhood where the crime was committed, type of weapon, rural or urban area, among other information. The ICBF publishes, the information on the Criminal Responsibility System for Adolescents. This institution receives the cases in which a under aged minor is apprehended committing a crime and ensures that the legal rights as under aged are guaranteed and respected. The information is aggregated by year, judicial district, gender, age, and type of crime.

Moreover, I make use of the registration form for educational institutions also called C-600 published very year by the National Statistics Department (DANE, the Spanish acronym). This form is filled by the educational institutions offering preschool, primary, middle and high school education. It contains information about the schools, the school enrollments, the characteristics of teachers, subjects, infrastructure, among other information. To control for the municipality characteristics, I make use of the municipal panel dataset constructed by Universidad de los Andes's Center for Economic Development Studies (CEDE)

6 Results and discussion

6.1 The effect of longer school days on crime

This paper is interested in uncovering the effects of longer time at school on both crimes committed against and by teens. To uncover this relationship, the paper presents the results of the effect of the policy reform on crime by victims and types of crimes in section 6.1.1, and the effect on juvenile crimes in section 6.1.2.

6.1.1 Children and teens as victims

Table 2 displays the results of a Poisson regression for each type of crime and by age group of the victims. I have aggregated the victims below the age of 14 years as children, and as teenagers to all the victims older than 13 years but under the age of 18 years. The regressions includes municipality and region fixed effects as well as a set municipality control variables. The first column presents the coefficient of the proportion of students enrolled in full-length school on violent crimes committed again children, teenagers and the overall population. Similar to Jacob and Lefgren (2003) and Luallen (2006) findings, the results show that a high proportion of students inside the schools is associated to higher violent crimes specially targeted to children. The effect is less important for teenagers. Column (2) shows the results for minor crimes such as injuries and treats. A positive association is also found between the numbers of students attending a full-length school day and this type of crimes. The estimated effect is small in magnitude when compared to violent crimes.

Regarding property crimes, the results shows a negative association between the increase in the number of students enrolled in full-length schools days and this type of crimes against teenagers. While the measure seems to keep the teenagers safe from crimes such as robberies, for the case of children the estimated effect is not significant. For the overall population, the association continues to be positive. Moreover, column (4) displays the results for sexual related crimes individually since these type of criminal acts have a large incidence among children and teenager. The estimated effect is positive and significant meaning that an increase in the proportion of students in school with longer schedules is associated with 2 more sexual assault cases. The results found in this section are in line with empirical evidence in the literature, showing that often times schools do not offer a safe environment to the youngest generation.

Table 2: The effect of full-length school days on crimes municipality fixed effects by victim

	(1) Violent crimes	(2) Minor crimes	(3) Property crimes	(4) Sexual crimes
Children	6.443***	0.666***	-0.104	2.864***
	(0.121)	(0.0607)	(0.256)	(0.0477)
Teenagers	1.896***	0.913***	-0.356***	2.257***
	(0.0589)	(0.0450)	(0.105)	(0.0811)
Total	2.114***	1.513***	0.347***	2.669***
	(0.0154)	(0.0110)	(0.0173)	(0.0345)
Observations	9850	9850	9850	9850

Note: This tables shows coefficient of the effect of the proportion of students enrolled in a full-length day school and it's standard error in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6.1.2 Teens as perpetrators

6.2 Displacement effect on crime of longer school days

6.3 Heterogeneous effects

7 Conclusions

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