Math and Language at War:

The effect of the Colombian armed conflict on math and language learning

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Abstract

Armed conflict reduces human capital accumulation due to the economic constraints on families, cuts in education spending, destruction of schools and by possibly causing post traumatic disorders in children. This paper estimates the effect of conflict on math and language learning by using the Colombia Saber (Knowledge) Tests score for 5th, 9th and 11th grades. Regressions are estimated using state fixed effects, year (year of birth or year of the test) fixed effects and state specific trends; school fixed effects are also employed for comparative purposes. Results suggests that the impact is small for the 5th grade and 9th grade samples, at most of 6.5% of the test scores standard deviation; as net enrollment rates fall throughout secondary education, estimates are small or not significant for the 11th grade sample. As robustness check, the number of dropouts into the 9th grade and 11th grade samples, assigning them the mean values of the scores and the controls. The robustness check results sugested that only exposure to conflict during the year of the test has a negative impact for the 9th grade sample, while the problems of small point estimates or sign changes remain for the 11th grade sample. Policy suggestions focus on providing families and children with better support networks, on fighting the increasing extortion crimes in the poor neighborhoods and on special interventions in regions with the highest levels of conflict. (PRELIMINARY, DO NOT QUOTE WITHOUT AUTHORIZATION).

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1 - INTRODUCTION

At least once a year, students are summoned to take tests that are a requisite to apply for college education or that are designed as an assessment of the education they receive. During a day or two, they sit in front of scantron forms to answer questions on math, language and sciences. The scene would be normal if it happened anywhere else, but this scene takes place in a country that has experienced armed conflict throughout most of its republican history. The Colombian armed conflict is far from simple. Rooted in the unequal land distribution and unresolved political and social disputes, the conflict evolved from a war against left-wing guerrillas to one with more engaged armed groups. The control of the drug trafficking and its profits created the incentives for the rising of new armed actors. This is the context where children's learning happens: learning in the midst of conflict. It is this learning, measured as the scores in the Colombian government's standardized Saber Tests (Knowledge Tests), the focus of this paper. The goal of these pages is to estimate the effect of the armed conflict on the Saber test scores at 5th, 9th and 11th grade.

This research can be located in the strand of the economics literature exploring the microeconomic-level effects consequences of civil warfare. Certainly, the availability of household and individual level data (as pointed out by Blattman and Miguel, 2009) has opened the path for better understanding of how individuals and families cope with conflict related consequences. Depending on how vulnerable households are to conflict (direct and indirect exposure to violence) and to poverty, households can see their welfare levels decrease or weather out all the negative externalities (Justino, 2009). During armed conflict, families may withdraw children from school, children may not have access to the nutrition they need to succeed in school or they just cannot get the education due to the destruction of facilities and killings of teachers. This research does not observe what families do during conflict or why children leave school; here, only the test scores of children enrolled in 5th, 9th and 11th grade (from 2000 to 2009) are available and the repercussion of violence is intended to be estimated through them. Nevertheless, it is important to keep in mind that there is a household making decisions on what to do because of and during armed conflict.

Previous research (Chen et. al, 2008) has found that GDP per capita is lower after civil war, while GDP growth is higher due to an increase in the investment rate; the aftermath is also marked by higher inflation since governments needed to emit money to finance their military campaigns. There is evidence that Sub-Saharan countries tended to have a GDP growth 2.2 percentage points higher during the peace years (Collier, 1999). Civil war can even reduce the growth of neighboring countries to those hosting the conflict (Murdoch and Sandler, 2002). Macroeconomic research of the impact of civil war still needs to sort out the existence of a peace dividend or of a war hang over as Collier (1999) pointed out.

Worse health and education indicators are the main outcomes of civil war for households and individuals. In the health case, genocide and crop failure in Rwanda reduced the height per age of children exposed in utero to these shocks (Akresh et. al., 2009). Likewise, children exposed to

civil war in Burundi (Bundervoer et al., 2009) had a lower height for age. In regards to infant mortality, increases in homicides per 100,000 inhabitants translated in higher infant mortality rates in Colombia (Urdinola, 2004). Finally, in utero exposure to maternal stress due to violence is associated to early delivery (Smits et al.,2006), changes in sex ratios (born males to born females) in California (Catalano et all, 2005) and, again in Colombia, to lower weight at birth and higher probability of misscarriage (Camacho, 2007).

As for to the education consequences, Lai and Thyne (2007) found that states in civil war reduces educational expenditure even after the war is over, although the negative effect dissipates over time, and that there is a reduction in the balance of enrolled male to enrolled females. Exploring the interprovince variation in conflict intensity during the Rwandan Genocide, Akresh and de Walque (2008) argued that school age children exposed to genocide had lower years of completed schooling. Two studies on the impacts of civil war in two Latin American countries studies on are very relevant for the present paper. Guatemala and Peru had internal conflicts that are similar to Colombian conflicts with respect to the length of the Conflict (as in the case of Guatemala) and the evolution of the conflict (as in the case of Peru). With the 2002 Guatemalan Population census and the human right violations information, Chamarbagwala and Moran (2011) concluded that rural Mayan males and females, born during the years the most violent years, had a lower probability of completing primary grades. In the case of Peru, using census data and the human rights violations information collected by the Commision for Truth and Reconciliation, Leon (2010) suggested that the that the younger children are exposed to violence, the higher are the reductions in schooling attainment.

Psychology and Psychiatry researchers have also explored how exposure to violence or war can affect the learning process. Osofsky (1999) describes the symptoms of children exposed to violence at home or in the community according to their age: children and toddlers present irritability, sleep problems, emotional distress, fear of being alone and regression in toileting and language; school age children suffer from concentration issues (because of intrusive thoughts) and feelings of regret (as they can understand more about violence); finally, adolescents show higher level of aggression, anxiety, behavioral and school problems and truancy. His paper also suggest that good parenting or the support of a significant adult are the best strategies to foster the children's learning in a violent environment. Parenting, and specially mothering, has been stressed after an intervention on children and mothers exposed to the Bosnia and Herzegovina war (Dybdahl, 2001), where mothers receiving counseling reported that their children had improved the cognitive performance. Nevertheless, as it has been studied in Northern Ireland (Curran and Miller, 2001), parents with symptoms of post traumatic disorder may be unable to offer support to their children. Deprivation feelings (food, water or shelter deprivation) and the loss of the family were related to the development of those post traumatic symptoms for children (Husain et al, 1998).

The microeconomic exploration of the effects of civil war or intra-state armed conflict deals with the effects on the schooling attained (measured by completed years of education). A critique

to this variable is that it is an input and not an outcome variable of education. The present research aims at filling a gap in the literature by measuring the human capital effects of civil war using an outcome variable of the education process: cognitive achievement represented by scores in Colombian standardized tests at three different school grades (5th grade, 9th grade and 11th grade). This research can be related to the work by Sharkey (2010), who estimates how homicides in the student's neighborhood relate to his performance in vocabulary and reading tests, using neighborhood fixed effects regressions on data from Chicago. He argues that violence modifies the tests performance through emotional and physiological responses to stress. Youth exposed to violence shows symptoms of posttraumatic stress disorders, impairing their abilities to do well on cognitive assessments. More generally, he reports that experimental studies show that high levels of stress hormones difficult cognitive performance and activities related to the declarative memory. His findings indicate that a homicide in the student's block within a week of the tests reduces the scores by 1,52 points, but the effects is not significant for homicides happening more than a week before. Homicides taking place 4 days before the test in the student's census track or neighborhood cluster also reduce (to a smaller extent than the census tract) the score. He calls for a broader recognition of how violence can be an obstacle for human capital accumulation, whether or not students were directly exposed. The existence of neighborhood effects is put into question and there is a lot of discussion on their validity, as documented by Burdwick-Will et. al (2010). If those effects exists, if violence in the community is a negative contributor in cognitive development, better and increased policing, as well as the provision of safe community environments may result in cognitive development short term gains .

This paper is similar to the work by Sharkey (2010), in the sense that also uses standardized test scores for students that are exogenously exposed to conflict; different from his work, the timing of violent events is unknown and the focus is on the level variations. Methodologically speaking, this research tries to follow closely the works by Leon (2010), with the use of long run and short run effects, and Chamarbagwala and Moran (2011), with the use of several specifications of conflict. In this paper, the long run effect is going to be explored through the estimation of the impact of exposure to conflict at birth, while the short run effect through estimating the impact of exposure to conflict during the year of the test. Contrary to Leon, a linear state-specific trend is preferred over the cubic specific trend to avoid a drastic reduction in the data variability. Unlike Chamarbagwala and Moran no initial-level control variable is employed here since the effect of such a trended variable is expected to be absorbed by the linear state specific trend. Another difference with these two works and the works previously done for Colombia (Urdinola, 2004; Camacho, 2007) is the the use of 5 armed conflict indicators. Leon and Chamarbagwala and Moran used the number of human rights violations a variable that is mostly collected through reports to the authorities (or truth and reconciliation commisions). It can be that citizens fear to report or that those who report are different in unobservables to those who do not report; in a extreme case, it can be that the event goes unreported because the victims are dead. Urdinola uses the number of

homicides per 100,000 inhabitants at the municipal level. That variable mey not be representative because it contains homicides not related to the armed conflict and because it does not account for the number of combatants killed as a result of attacks to the armed forces; critically for this research, as the students are observed when they are 11 years, 15 years or 17 years old, there could be inter-municipality migration that can bias the estimates on the effects of exposure at birth and exposure during the year of the test. Finally, Camacho uses the land mine explosions. Even though the mine explosions are random, their location is not and terrorist groups choose the location depending on features of the populations they want to target; moreover, land mine explosions are a relatively rare event and may target more members of the armed forces than civilian population.

This research will use the number of extortions, terrorist attacks, kidnappings, mass murder victims and attacks against the police as the indicators of the armed conflict. The variables will be adjusted per 100,000 inhabitants to account for the heterogeneous population distribution in the country. Although more about the variables is going to be said later, it suffices to say at this point that these variables represent an improvement. The number of battle deads is traditionally used as the variable measuring the intensity of a civil war. While this variable can be only one indicator of the intensity of the civil war or the armed conflict, it is important to notice that open battles or battle engagements are a rare and not frequent event in a guerrilla type of war, where terrorist attacks and ambushes, kidnappings and extortions tend to be more frequent. Also, it is not known, at least theoretically, which variable households use to make decisions to cope with the negative externalities of civil war or armed conflict: it can be extortion if the household fears that its income is going to be taxed by the armed groups; it can also be kidnapping when the household fears that a member is going to be taken as a hostage and a ransom will be charged. Equally possible, it could be terrorist attacks if the household lives in a region where valuable infrastructure is located or it can be mass murder victims (victims in a massacre) if the armed groups are engaged for the territorial control. For all these reasons, several armed conflict indicator offer more representative results when considering that, in the midst of conflict, households and individual are making decisions.

The main contribution of this paper is the use of an outcome of the education, represented by the test scores, as the measure of the human capital accumulation. Most of the referenced papers used the completed school years as their measure of human capital; however, school years is an input in the process of getting knowledge and skills and, therefore, it is not the correct approach to the incidence of conflict on human capital. It has to be admitted that getting access to test scores for countries that have undergone civil wars is not easy either because they may be developing or poor countries (where no tests are applied) or because those tests are not systematically applied. Colombia, despite being a developing country and being in one of the longest civil conflicts, has constantly applied these tests and it is a rare and fortunate exception for research. With the use of the scores, the very measure of learning outcomes and cognitive achievement, hopefully, something

can be said about the real effect on the acquisition of skills and knowledge and less about the effects on the process of education..

A problem to this approach is that the test scores may not be fully representative due to sample attrition. If all the children that are supposed to be enrolled at any chosen school grade take the test, the scores will give the complete picture of the cognitive achievement; nevertheless, when children may drop out of school, the scores only give the information of those that could stay in school and the information is biased. Things can get more complicated if conflict is the leading reason to drop out of school. To address this issue, scores from 3 grades with different net enrollment rates (5th grade, 9th grade and 11th grade) are part of the estimation samples. The enrollment for 5th grade is around 90%, while for 9th grade it goes down around 70% and, finally, around 50% for 11th grade. The effect of this attrition issue is better seen as the estimates for conflict switch sign in the forthcoming regressions. An specific problem with the used datasets is that they do not report the birth date for the 5th and 9th grade students, as well as they do not report the state of birth for any grade; in the first case, it was assumed that all the students in 5th and 9th grades are of the expected age at those grades (11 and 15 years old, respectively), and that all students reside in the same state of birth. Validity of these assumptions are discussed at length.

This introduction leads to a section offering some background about the dynamics and evolution of the Colombian conflict; also, next section contains some generalities about the Colombian educational system and the Saber Test. These tests are going to provide the scores for the estimations. Coming afterwards, the section about the data explain why Extortion, Kidnapping, Terrorist Attacks, Mass Murder Victims and Terrorist Attacks against the Police are selected to measure the conflict levels; also, the processing and cleaning of the test scores samples are discussed. The empirical method section introduces the foundational theoretical model and describes the identification strategy; basically, the conflict indicator level is assigned according to the state of residence, the year of birth and the year of the test. The empirical method section also goes on possible weaknesses and strengths of this identification strategy. After discussing the results, the last section concludes and presents some policy recommendations.

Seemingly, the effects of conflict on learning are smaller: higher levels of conflict at birth may be more harmful for the learning achievement of the 5th grade students; due to sample attrition or the reduction of the net enrollment rate throughout secondary education, the armed conflict seems to have a negative impact up until 9th grade. The effect for the 11th grade scores was very small or even positive. Adding up the exposure to conflict at birth and the exposure to conflict during the year of the test, higher levels of conflict lead to a reduction of language scores (5% of the standard deviation for 5th grade and 3% of the standard deviation for 9th grade) and of math scores (6.5% of the standard deviation for the 5th grade and 6% of the standard deviation for the 9th grade). Performance on the math tests seems to suffer more from higher levels of conflict. A Robustness check, including artificially created dropouts in the 9th grade and 11th grade sample, holds the

negative impact on the 9th grade scores and the very reduced impact on the 11th grade scores; however, the inclusion of the dropouts eliminates any effect of the exposure to conflict at birth. The results draw attention for policies aimed at policies promoting the completion of all primary and secondary years (like conditional cash transfer programs), as well as policies helping mothers and communities to support children to cope with the stress and trauma caused by violence.

2 - COLOMBIAN BACKGROUND

a) The Colombian conflict[2]

To understand the roots and evolution of this conflict, Nahzri (1997) points at the concentration of land as the main reason for all the armed conflicts in Colombia since the independence from the Spain in the 19th century. He proposes that the war has became permanent because of a war system based on three conditions: the failure of institutions to solve the conflicts among different groups; the ability of the armed groups to adapt to changes and to find ways to create a positive-sum out of conflict for all of them; and finally, that no armed group could get the upper hand over the others. it is easy to see this war system in Colombia in two phases (see **Figure 1**): the low intensity war, up until 1982, and then how the the war system breaks due to the money of drug dealing afterwards.

Changes to the equilibrium of the war system after 1982 come from what Nahzri (1997) explains as the involvement of the guerrilla groups with the drug dealing and the creation of right wing paramilitary forces. While the guerrillas were fighting the state, drug traffickers could undertake their business relatively undeterred; when the business grew, the guerrilla began charging a tax of 10% of the market value per kilo of coca or poppy. The effect of the tax was multiple: firstly, the guerrilla assured the coca growers protection and that the traffickers always paid the fair value; secondly, some drug traffickers created paramilitary organizations to fight and resist the

[2] There has been a lot of controversy on how to classify the Colombian conflict. The Colombian Government has avoided to call it a civil war because it does not want the terrorist groups to claim the belligerent status. What happens in Colombia is, indeed, the fight between the State's armed forces against armed groups, in a type of guerrilla war (like the ones experienced in most Latin America after the 60's) and where the armed groups (right wing and left wing) use terrorist strategies. The issue of naming the Colombian conflict was solved in the first semester of 2011. In the process of passing a victims compensation law through congress, the government classified the conflict as an internal armed conflict (Law 1448 of 2011). According to the Human Rights Education Association (2010) an internal armed conflict is the conflict between two factions within one state. In international law, the 1977 Protocol II of the Geneva Convention defines this type of war as conflict of non international nature and aims at protecting the victims, while respecting the sovereign rights of national governments and delaying international intervention. When conflict or war are mentioned in this paper, it is meant the internal armed conflict and not civil war, according to the Protocol II of Geneva Convention and the Colombian laws

guerrilla intervention (and that also involved in the drug trafficking business); thirdly, with the money collected from taxing the drug trafficking, the armed actors gained in sophistication and action capabilities. For instance, FARC (the main left wing terrorist group) achieved a level of military operation and funding that was unparalleled by any of the other guerrilla groups in the continent: at its peak, the FARC had approximately 25,000 combatants and, as reported by Ortiz (2002),incomes in 1998 equivalent to $285 millions (almost 50% coming from the tax on drugs and trafficking related activities). The striking fact is that the operational cost of FARC were only around 15% of its income.

The peak of violence coincides with another breaking point of the Colombian war system. Promising peace talks if elected, Andres Pastrana was elected for the period of 1998-2002 and offered the FARC a large demilitarized zone for peace talks. As there was not cease fire or non hostilities condition for the peace talks, the FARC accepted. Negotiations went on fruitless and FARC kept committing crimes all around the country. When the peace talks collapsed, The Colombian government asked for help to the US in order to take on the military challenge of the FARC and other terrorist groups. The help was materialized in the US funded Plan Colombia. The main goals of the plan were to promote peace, increase security and to end drug trafficking (Veillette, 2005). With the support of the US, Colombia could increase and modernized the armed forces. When in 2002, Alvaro Uribe was elected president, the Plan Patriota (Patriot Plan)or the state's military offensive took place. The results can be seen in **Figure** 2, exhibiting the most relevant conflict data during the Plan Colombia and the Uribe's government. The government increased the size of the military and the police forces, neutralized (killed or capture) more members of the terrorist groups and reduced the number of displaced people. In order to win over minds and hearts, the Uribe government also pursued a more active social policy, increasing the expenditure in areas like health and education (see **Figure** 3), and extending the coverage of conditional cash transfer programs. With the government military success, the right wing guerrillas (paramilitaries) surrender and demobilized, while the military capabilities of FARC were drastically reduced both logistically and in number of combatants.

Not everything has gone well in this last phase of the conflict for the Colombian government. Since 2002, many allegations have been made about human right violations and the increased danger for some social groups. One of these groups is the public school teachers. As Noticolombia (2010) indicates, 927 teachers have been killed in Colombia (264 since 2002), more than 4,000 teachers have been threatened, 1,092 were forced to relocate, 70 looked for refuge in other countries and 60 disappeared. Another source of concern is that the paramilitary structures were replaced by other criminal structures that are battling to control the profitable drug trafficking. Finally, after suffering many desertions, and the killings or captures of the main leaders, FARC still poses a risk for the population and the state in certain regions of the country. The conflict seems to be mutating instead of reaching an end; now, the main priority for the government is to fight against the augmented and more powerful organized urban criminality.

b) Education system and the Saber Tests

Formal education in Colombia is divided in 3 levels (Ministerio de Educacion, 2011). The first level is a year of pre-school education; the second level, or the basic education level, is composed by 5 years of primary education and 4 years of secondary education; the third level, the middle education level, is made of 2 years. After completing the pre-school education and the 11 years of primary, secondary and middle education, students can opt to apply for higher education, whether the 5 years of college level education or the usually 2-3 years of vocational education (technical and technological education). In the period of analysis, 2000-2010, the best way to understand the Colombian education system is under the Educational Revolution (Revolucion Educativa), or the program of higher enrollment rates, quality improving, increasing accountability and public education expenditure.

Government increased the education expenditure since 2002 (**Figure** 3). The government also changed the mechanisms to hire and to evaluate the public school teachers in order to avoid political corruption or interference; information systems to collect data on resources, inputs and outcomes of the educational system were implemented and made publicly available. Standardized tests, designed by the Ministry of Education, were applied on a regular basis to measure learning achievements in all education levels. Supporting the coverage expansion, the government implemented conditional cash transfer programs for families to keep their children in school. For higher education, the government offered study credits and enhanced the technical and vocational education offer..

The policies still seem to be insufficient. Figures from the 2005 Colombian Census (the latest census available) reveal that enrollment seems to decrease with age and with the level of income. Around 90% of children at age 10 are enrolled in any educational center, but the enrollment percentage drops to 56% when they are 17 years old (**Table 1**). The national aggregate figures hide variations across states because some the enrollment rates at age 15 can drop to around 30% in some of the poorest states. It is important to highlight, at this point, that the conflict in Colombia has spread throughout the territory: coffee producing states, oil and gas producing states, rich agricultural states and industrial centers and poor states in the tropical forest and the east plains, all of them have experienced conflict. Crossing the information on how household income meets the expenses (more than enough, enough or not enough) with the enrollment status, it is found that the percentage of not enrolled children in households with insufficient income keeps increasing the older the children are (**Table 2**). Those who are not enrolled are mostly men regardless the age (**Table 3**).

During the period of analysis, 2000-2009, the net enrollment rate in primary education has been around 90%; there were not substantial increases during the decade and it seems that more policy interventions may be needed to achieve full coverage. The country did experience gains of 10 percentage points in net enrollment for secondary education and for middle education (**Figure 3**). 9 in 10 children in primary education age are enrolled, and those are ones taking the Saber

tests in 5th grade; initially, this figure does not indicate a problem of sample attrition for the estimations for this level. Sample attrition becomes a serious issue for the estimations using the 9th grade sample (only 7 out of 10 children are still in school) and 11th grade (only 4 out of 10 are completing all their primary and secondary education). Figures reported by the Ministry of Education (2011) indicate a slight increment in the total enrollment for the three levels of education in public institutions (from around 80% to 85%) and a slight contraction in the figure for private institutions (from 20% to 15%).

The Ministry of education has an office responsible for designing and applying the standardized tests at the different levels of education. Those tests take place during 5th grade, 9th grade, 11th grade and at the end of college. The name of the tests is Saber (knowledge) and the objective of tests depends on the level of education they are applied. The goal of the Saber tests for 5th and 9th grades is to assess the quality of the education through the evaluation of the cognitive achievement of the students. By law, these tests are mandatory for the all the students enrolled in 5th and 9th grade and the government has to apply them every 3 years (Ministerio de Educacion - ICFES, 2011); until now, the government has applied the tests in 2002-2003, 2005-2006 and 2009. Things are slightly different for the 11th grade Saber tests. Their main purpose is to be a requisite in the application and admission for higher education; however, every college can have its own admission requirements and can give a different weight to the scores on the Saber 11 tests (Ministerio de Educacion - ICFES, 2008).

The structure and application procedures of the tests are also different.. For the 5th and 9th grades tests, students take them in the schools where they are enrolled; usually, the teachers, already employed in the schools, proctor the tests during the day the application lasts. The students answer to multiple choice questions on language, math and sciences; these three fields are mandatory for all the students. The whole process for the 11th grade tests is more cumbersome. First, students have to fill out a form with some demographics, some household features and questions about future plans; second, students are assigned a place (different from the school they attend) to take the tests within the same municipality; third, the tests are taken during the weekend (2 four hour sessions on Saturday and 1 four hour session on Sunday). The 11th grade tests evaluate more subjects: the core section (mandatory for all the students) contains questions on math, language, sciences, social sciences (history and geography) and a foreign language (chosen by the student); a student chosen specialization field (either math, language or social sciences); and there is also a student chosen interdisciplinary field that evaluates a topics on environmental sciences or conflict and society.

Other tests have been applied to samples of Colombian students to measure their cognitive achievements and skills in language, math and sciences. These tests, like the UNESCO PERCE-SERCE tests and the OECD PISA, allow for country level comparisons as they are of international nature and. For instance, Colombia has participated in the 2006 and 2009 OECD-PISA (Programme for International Student Assessment), that evaluates the learning in math, language

and sciences. **Table 4** presents the mean scores for the OECD countries and the Latin American participating countries. On average, Colombia only outperforms Brazil and Peru in both math and reading, but lags behind the other Latin American countries. More importantly is the improvement in the country's means between 2006 and 2009. In the analysis of the 2006 tests, the Ibero American PISA Group states the following conclusions about Colombian students: more than 50 % of students are below the basic level of scientific literacy; 72% of students cannot use basic formulae and procedures, and are not capable of direct reasoning and making literal interpretations of the results; finally, more than 50% of students cannot identify the main idea in a text (OECD-PISA, GIP 2010).

3 - DATA SOURCES

a) Armed Conflict Indicators

Extortion, Terrorist Attacks, Kidnapping, Mass Murder Victims and Terrorist Attacks against the police were selected as the most representative measures of the Colombian armed conflict. Values were taken at yearly basis and at the state level from the special issue of the Revista Criminalidad (Criminality Journal), the research Journal published by the criminality research brand of the Colombian National Police (Revista Criminalidad, 2008). State level figures are preferred over municipality level issues because of the more frequent within state relocation. The Colombian police records the number of events for each of these variables at the level of its regional commands or special jurisdictions. Most of the jurisdictions coincide with the states; however, some jurisdiction can be specific for the major cities or for regions with special public safety concerns. For this paper, the figures of the major cities are going to be added to the states were they are located; for the public safety special regions, an educated guess was made with the information provided by army and police officers: for instance, if 10 extortion cases are reported for one of those regions and that region is formed by territory of 2 states (state X and state Y, for the purpose of illustration), following the army and police officers advise, it can be said that 80% of the cases correspond to state X and the remaining 20% to state Y. Legal definitions of each of the selected variables are taken from the on-line glossary on the Colombian National Police website (2011) and can be found in **Table 5**.

Extortion suffers from underreporting because people being extorted may fear that reporting to the police can bring negative outcomes or increase what they have to pay to criminals. Even though it can be more related to the common criminality, it is a perfect expression of the linkages between criminal activities under the internal armed conflict: common criminals may increase their own activities as the armed forces and the police fight the terrorist groups and the drug dealers; in so, they feel that the deterrence on them is reduced and take advantage. Mass Murders, also known as massacres, were very common during the most violent years. Usually, Mass Murders happen as a retaliation strategy of the drug-dealing gangs, but also as a part of the war between the right wing and the left wing narco-terrorists in order to bring terror to the population in conflict zones. Most civilians were kidnapped for the captors to get a ransom, while politicians and members of

the armed forces were kidnapped as a way to push the society to demand more peace talks.

Some variables, that at first can be relevant in the Colombian case, but that pose serious identification risks, are not going to be used in the empirical exercises for this paper. The total number of homicides is a very appealing measure; however, this variable includes killings that happen due to factors not related to internal armed conflict (family issues, robberies). The second variable not chosen here is the amount of cocaine seized by the armed and police forces; this may draw some criticism because of the role drug trafficking has played in the Colombian conflict. The problem is that most of the seizing takes places in drug production or shipping areas, which are only a part of all the drug production, distribution and commercialization chain; furthermore, the real impact of drug trafficking on conflict has been through the money it has brought to the armed groups and through the territory-control conflicts in most Colombian regions.

Table 6 and **Table 7** contain the average values of the conflict indicators for the sample of the students taking the tests. For the 5th grade and 9th grade students taking the test in 2002-2003, 2005-2006, the average values are reported at the birth year (an assumed two years state average is taken as it is going to be explained) and at the test year (for the 2002-2003 and 2005-2006 a state two years average was taken since no specific date of the test is provided). For the 11th grade students taking the tests from 2000 to 2007, the figures are also reported at the birth year and at the year of the test.

The figures are different from the national figures (which were a national aggregate) and are not the same among the 3 grades to be used in the empirical analysis. The reason for the differences is that the state level composition of the samples changes because the number of students in each grade is different for each state. For instance, if a very violent state has more students taking the 5th grade in 2002-2003 than a more peaceful state, then the mean value is going to be higher than if the students population were homogeneously distributed. The same argument goes for the 9th grade and the 11th grade samples. Note that the 11th grade students taking the test up until 2004, experienced higher conflict during the year of the tests than at birth; however, the students taking the tests after 2005 tend to have lower conflict values during the year of the test than at birth. The closer the students were born to the years the conflict paced up (1994-2002), the higher the level of conflict experienced at birth; that is exactly why the 5th grade students tend to have higher averages of conflict indicators at birth than the 9th grade students (who are 4 years older).

b) Saber Tests Datasets

Datasets containing the individual level scores are available on-line, upon subscription, on the Ministerio de Educacion-ICFES website. The 5th grade and 9th grade datasets are very similar in the way the information is organized and presented; for this reason, the estimation results for the 5th and 9th grade test scores are displayed together. Due to the different application process and higher logististics complexity of the 11th grade Saber Tests, as it was mentioned earlier, the datasets are richer in information about the student, the family background and future plans after graduation from high school. The results for the 11th grade sample are going to

be presented separately. Only the scores for math and language are going to be employed and discussed throughout this paper. Finally, no student can be tracked over time; even though is entirely possible that a student in the 9th grade is also in the 11th grade sample 2 years later, there is no way to track down that student as the identification code changes with each tests.

For 5th and 9th grade, the datasets only contain the location of the school (urban or rural school), whether the school is private or public, the scores of each student, and a full array of the school location variables (state and municipality), as well as the school identification code. The main drawback of these dataset is the lack of information on the student gender and family background related variables. Another drawback is that the year of birth is not reported; this poses a serious problem for the estimation of the effects of conflict at birth. To overcome this issue, it is going to be assumed that all the students in the 5th and 9th grades sample are of the expected ages (11 and 15 years old, respectively). Data from the 3 waves of the tests suggest that more rural schools have been participating in the tests, while the increase is not that significant for private schools; what has been more relevant is that more students at 9th grade have been evaluated (see **Table 8** for details). The increase in number of students taking the test may be correlated with both an increase in enrollment and an increase in the coverage of the tests.

Although more detailed, the datasets for 11th grade Saber tests are also less consistent for some of the variables. As the application form for the tests changes with every wave, some variables are not collected consistently throughout the period of analysis and others are added. No additional assumptions were needed for the 11th grade data since the files recorded the information about the year of birth, level of education of the parents (although the categories change for every wave and are not always recorded), the plans (if any) to go to college and all the detailed scores for the mandatory and the optional fields in the test. As no extra endogeneity is desired, the scores on the field chosen by the students are not considered here.

Samples for the 5th and 9th grades include all but 4 individual records reported, but the story is different for the 11th grade sample. All those graduating before 1990, those with errors in the coding of the age, the birth year and the identifying code of the school were discarded. Although the data is available from 2000 to 2009, the years 2008 and 2009 are discarded are there is not identification for the schools; additionally, the years after 2005 are discarded because they do not keep track of the parental education. After all the cleaning process, it can be seen that more women that men take the test from 2000 to 2007; the percentage of father and mothers of the students with high school or more education also increases; more students take the test as the period goes on (see **Table 9** for details).

The main statistics of the scores on math and language for each of the selected grades are on **Table 10** and **Table 11.** The max mun attainable in each field is not constant as the grading and number of questions may change. Some salient features about the scores should be mentioned now. First, the scores variability (represented by the standard deviation) increases, which may be explained by the higher number of students taking the tests; second, math and language average

scores tend to go down for the 5th and 9th grades sample, these grades may have a higher heterogeneity of students than the 11th grade; third, the average do not change that much for math scores in 11th grade and they actually improve for the language scores. What may be happening with the 11th grade scores? It may be entirely possible that only the relatively better students remain in school: relatively better because their families can cope better with the economic constraints and the negative impacts ofthe internal armed conflict as schooling continues.

4 - EMPIRICAL METHOD

Following Todd and Wolpin (2003), cognitive achievement can be described in the context of a production function (g). In the function, the achievement at the entrance of first grade (A_1) depends on the Family inputs during the preschool time (F_0) and and the child's endowment of ability (μ), or: $A_1 = g(F_0, \mu)$. At this stage, family inputs are defined by the family's permanent resources (W); the family choices about where to live and to send offspring either to private and public education defines the level of school inputs (S) in the function. Families do not have complete information about the school inputs and, even with complete information, the inputs applied to each children may deviate from the school aggregate. For the beginning of the second year, the achievement production function is $A_2 = g(S_1, F_1, F_0, \mu)$. As children progress through their education, the function will contain the history of family inputs, the school inputs and children's ability.

Cognitive achievement should be understood as the outcome or the product of the learning at the level of the student. Education has many individual and social outcomes (UNESCO, 2008), but this paper sole focus is the learning in math and languages. Most of the discussion on cognitive achievement is centered around the relevance of school inputs and family background; however, relevant for this paper is the use of the Saber Tests scores as a measure of the cognitive achievement in language and math, which is the best approximation to assessing learning. Other applied papers in the context of a developing country (like Behrman et al, 1997) have also used scores in tests as the cognitive achievement indicators; besides, the OECD PISA tests and the UNESCO SERCE and PERCE tests also relied on on standardized tests scores as measures of cognitive achievement or competences.

Civil conflict can affect the history of cognitive achievements in several ways. Armed Conflict may reduce the family resources through the destruction of family assets, drops in income due to decreased labor opportunities or due to the killings of household members. Because of the economic effects, families are exposed to lower food intake during the time of conception and gestation of children, resulting in lower weights at birth and learning difficulties during the school years. Armed conflict forces the most vulnerable families to relocate in places without access to proper sanitation services or housing; in this unhealthy new settings, the increased morbidity in children may deteriorate their academic performance and achievement. Armed conflict possibly brings the destruction of school buildings and the killings or displacement of teachers, which altogether diminish the quantity and the quality of the education that children can attain. Children

could be forced to to leave school for prolonged periods during the war, decreasing the probability of future academic achievement. Direct and indirect exposure to violence and conflict may generate posttraumatic stress and learning disorders if children do not have the adequate family and community support. With posttraumatic stress, the efficiency of the family and schools inputs is reduced since children are not able to focus on learning and might have behavioral or memory problems.

Specifically to the variables being considered for this paper, they can affect children's learning through economic or psychological channels. In the economic channel either the resources available for households are reduced because of conflict or the gains to education decrease due to the conflict impact on markets and firms. This economic channel also includes the destruction of school inputs (like destruction education facilities, killings of teachers) or anything that increases the opportunity cost of education. In the psychological channel, direct or indirect exposure to armed conflict leads to posttraumatic stress disorder in children that impairs their ability to learn at school.

In regards to the chosen variables to capture the intensity of the Colombian internal armed conflict, extortion works mainly through the economic channel; when a household is extorted the income is reduced and less is available for parents to spend on children's education. The risk of posttraumatic disorders due to extortion would be only materialized if a household refuses to pay and the criminals attack household members. Terrorist attacks have a negative consequence for learning mainly causing posttraumatic disorders in children. Children can witness a terrorist attack or may suffer from the chaos and terror, as well as from the forced changes in daily routines, those attacks bring to the places they live in. Similarly, attacks against the police act through this psychological channel. The only way terorist attacks may act through the economic channel is when terrorism leads to severe market disruptions or when the uncertainty they create translates into less jobs availables. Finally, mass murder victims has mainly a psychological impact, but in some places of the country (specially, in the most violent zones of Uraba, the basin of the Magdalena River, among others), this was the main way forces fought among themselves and the likelihood of a household member to be killed was high (with its consequences in reducing income).

Preliminarly, the relationship between state level average the test scores and the total level of armed conflict during the year of the test at the state level (adding up the number of extortions, kidnappings, terrorist attacks, mass murder victims and attacks against the police) is explored through scatter plots. The graphs with the 5th grade (**Graph 5** for math and **Graph 6** for language), the 9th grade (**Graph 7** for math and **Graph 8** for language) and for the 11 grade the 5th grade (**Graph 9** for math and **Graph 10** for language) state level average test scores and the state level armed conflict for each year of the exam that will be used for the regression do not reveal a negative relationship. It can be entirely possible that a relationship exists when more factors at the state level are controlled for.

With this cognitive achievement production function and the channel through which the internal armed conflict variables may be operating, the general equation to be estimated in the present

paper is

$$Score_{ijt} = \alpha + \beta_1 Conflict_{jt} + \pi_j Statetrend_t + \gamma X_i + \eta_t + \varepsilon_{ijt} \quad (1)$$

Where $Score_{ijt}$ is the score (either math or language) of student i born or residing in state j and taking the test in year t. $Conflict_{jt}$is the value of the chosen violence indicator (Extortion, Terrorism, Kidnapping, Mass Murder Victims and Terrorist Attacks against the Police) per 100,000 inhabitants in state j during the test year t . η_t is year of the test fixed effects. The test year fixed effects stand in the equation to take into account events during the year of the test that are not controlled with the selected variables. The $Statetrend_t$ variable is created in order to control for state specific linear trends; this state specific linear trend aims at controlling for linear variations in economic development or conflict intensity in each state during the period of analysis. The last element of the equation, X_i, contains the control variables: gender and parental education for the 11th grade sample estimations, and location of the school (rural or urban school) and type of school (public or private school) for the 5th grade and 9th grade samples. The coefficient of interests is the coefficient on the armed conflict indicator.

Equation 1 estimates the effect of exposure to the armed conflict during the year of the test. It could be expected that increased armed conflict during the test year impairs the concentration and memory of students and generates additional stress during the test sessions. It can be also expected that households may take some time to adjust to the economic shocks due to conflict; if so, the student scores may be harmed by all the transitioning happening at home. This is, nonetheless, only one part of the story. Acknowledging that conflict at birth may reduce the weight and hinder children development, it can be proposed that there is also a effect of exposure to armed conflict at birth. For instance, the gestation and development of the children suffers from the increased stress hormones of mothers during pregnancy; moreover, conflict may result in permanent changes for households and household could be place in trajectory of lower income and lower education (both in years of education available or quality). If $Conflict_{jb}$ is the level of conflict at state j during year of birth b and with year of birth fixed effects δ_t , the equation for the effect of exposure to conflict at birth is:

$$Score_{ijt} = \alpha + \beta_1 Conflict_{jb} + \pi_j Statetrend_t + \gamma X_i + \delta_t + \varepsilon_{ijt} \quad (2)$$

For the 5th grade and 9th grade scores, t takes values of 2002-2003, 2005-2006 and 2009, corresponding to the years when the tests where applied. The datasets do not provide the specific date of the test for each school, which makes difficult the year identification. To overcome this, the average level of conflict (for each of the 5 chosen indicators) at the state level was taken for the periods 2002-2003 and 2005-2006. Sadly, the yearly state variation is reduced by this averaging, but it is the only way in order to carry out the estimations. Another difficulty with the dataset for 5th grade and 9th grade is the lack of the date of birth of the test takers. The year of birth was calculated by assuming that the students in the sample were of the expected age in each grade: 5th grade students are expected to be 11 years old and 9th grade students are expected to be 15 years old. Accordingly, 5th grade students taking the tests in 2002 are assumed to be born in 1991, and

they are assumed to be born in 1992 if they took the test in 2003; for the level of conflict at birth, the state average between 1991 and 1992 is calculated. The same procedure, just changing the assumed year of birth, applies for 2005-2006, and for the two cases related to 9th grade students (2002-2005, 2005-2006). The Ministry of education reports that from 2002 to 2008, the percentage of students that passed their grades went up from 82% to 90% (with the related drops in those who left school and who failed their grades). This figure alone may support the assumption of the year of birth; however, the very same figure may overlook great variation of failing and dropping rates for the later years of secondary. As the dataset does not include individual level features, no gender or parental control variables are used in these regressions.

In the case of the 11th grade sample, t takes values of from 2000 to 2004; the period of 2005-2007 was excluded because of the lack of parental education control for the regressions. In facing the trade off of number of observations or having control variables available, the latter is chosen because parental education plays a relevant role in explaining family income and wealth, family schooling decisions. Also, more educated parents would be more interested in keeping their sons and daughters in school despite the violence and they may be more engaged in the learning process. As the data set reports the birth date, no assumption about the conflict indicator values at birth are made.

The 5th and 9th grade dataset and the 11th grade dataset do not report the state of birth of the test takers. If internal migration is high and it is mainly caused by conflict, assuming that the student still lives in the state of birth would bias downwards the estimations. This bias happens because students could be living, at the time of the test, in a safer state, rather than in a more violent state; if so, the sample is not longer representative since observations from more violent states at birth may be underrepresented. **Figure 2** (on the left axis) shows that internal displacement caused by the conflict has been significant; however, the problem could be even bigger as these figures are approximations based on the self reported displacement status. It is entirely possible that not all those displaced people reported themselves or went to the government offices to ask for assistance. In looking at **Table 1**2, the 2005 Colombian census reveals that around 90% of the students at the expected age for each of the grades still lives in the same state (departamento) of birth. From the same table, it seems that there is not direct relationship between conflict intensity and across state migration as the most violent states both exhibit high rates (Putumayo and Guaviare) and low rates (Antioquia, Santander, Valle). Most of the internal migration happens within the state and that is why the state level violence is more appropriate than municipal level.

Another point to be made is about the school mobility. The student is observed only at the moment of the test and nothing is registered about the academic history. It is entirely possible that a student changes of school several times during primary and secondary education. This mobility can be important in explaining the scores in the tests. For instance, a student can move from a lower quality school to a higher quality school (or in the terms of the cognitive achievement model, a school with higher and better inputs) in which, despite the level of violence, the student is going

to get higher test scores. The contrary is also true: a student can move to a lower quality school (a school were lower and worse levels of inputs are applied into the learning) and being exposed to higher violence levels aggravates the already existing learning problems. School mobility can be an issue in, particular, in the public education since primary and secondary are provided by different educational institutions; yet, the centralized management of the public schools may reduce the quality differences.

Earlier, when describing the Colombian education (**Tables 1, 2** and **3**), it was showed how the net enrollment rate drops from elementary education to secondary education or, in terms of the Colombian education system levels, the reduction in enrollment rates from basic to middle education. Lower enrollment rates are a serious problem for the 9th grade and (even more) for 11th grade samples. Those who dropped out school may do it for economic reasons and or due to the civil conflict: if households were forced to displace, they may not be able to enroll their children in school; if a family member is killed, children may be taken out of school for working; finally, children leave school if they are recruited by any of the terrorist groups. A different argument, like Leon (2010) pointed out, is that conflict may reduce the gains of education and parents just decide to put their children to work (either at home or in the market).

The datasets only report those student enrolled at the moment of the test and no information is available on the cognitive achievement of all those who dropped out of school about. Nothing can be said about them. The mechanics of attrition was approached by using the state level net enrollment rates per year and the 11th Saber tests. Firstly, regressions on the net enrollment rates were run, with the state GDP growth and conflict indicators as independent variables (with year and state fixed effects). Not reported here, those regressions indicate that the effect of conflict is mainly insignificant and only GDP growth may have a positive effect. These results show evidence that support the assumption that economic reasons for Colombian households to keep children in school. Secondly, with the 11th grade datasets, the following proportions were constructed at the school level at every year available: females enrolled, students reporting that her family has a mortgage on their house, students living in a house owned by the family, those with at least one of their parents attained some or more than secondary education. Again, GDP growth and conflict indicators were chosen as independent variables and each of the proportions as dependent variables. The school and test year fixed effects, and state specific trend regressions (not reported here) give a very diverse picture: conflict seems not to have an impact on the proportion of enrolled females; when significant (at 10%), extortion and kidnapping mainly reduce the all proportions, while terrorism, mass murder victims and attacks against the police do not show a consistent pattern of effects on the proportions (regressions not reported here). The proportion tests may indicate that conflict changes the composition of those staying until 11th grade, with respect to parental education and the house inhabited, but changing the composition of those staying in school is not necessarily an explanation of why other dropped out of school.

A full understanding of how and why Colombian children drop out of school goes beyond

the reach of this paper. Perhaps, conflict works through different mechanisms or it is just one of the elements in making the decision of whether or not keeping children in school. Changes in the regulation of education (easier passing grades standards) and other social policies (like conditional cash transfers) may have an impact on parents and students decision. Specially for the years considered for this research, the unemployment rates around 10% and the increase in the self employment (employment without benefits), may signal that education gains are slim regardless of the conflict level. Another issue to consider is the profits from criminal activities (like drug trafficking) may tempt some children to drop out of school. For the purposes of this paper, following Akresh et al (2009), the impacts of civil conflict on the Saber scores are conditional on being enrolled in school at the year of the test.

Even though Colombia suffers from a lot of underreporting of criminal activity due to the inefficiency of the judiciary system (Nazih, 1997) and the alleged corruption of the armed and police forces, this is not a major source of concern for the the estimation results. Certainly, victims do not report all the extortion cases due to their distrust in the judiciary system and the armed forces, but this is not the case for the other variables. First, terrorist attacks, mass murders and attacks against the police are very difficult to hide from the authorities and the general media; second, since the early 90's there is a law in Colombia that obliges families to report any kidnapped relative and the efficiency of the government in dealing and rescuing kidnapped citizens has drastically improved. Surely, underreporting is a problem in the country, but only for other of crimes, more related to common criminality, that were not considered for the estimations.

A very valid point, like the one raised by Levitt (1997) is about the endogeneity between policing and crime: more policing implies more recording of criminal events and more policing leads to higher reporting since people believe there is an increased probability of solving the cases. The same argument can be applied to Colombia after the US funded Plan Colombia and the military expansion and campaigns (the Plan Patriota), as it was discussed in previous pages. In Colombia, the increase in the armed conflict indicators is explained by the growing terrorist involvement in drug dealing and by the demilitarized zone the government created for the failed peace talks. When, finally, US funded Plan Colombia and Plan Patriota came in to force, they led to the reduction of most of the conflict indicator. According to this timing of events, it is reasonable to expect that no endogeneity exists between policing and the conflict figures.

With all the turmoil and chaos the left wing and right wing narco terrorists caused, individual criminals and other types of organized criminal organizations take advantage of the reduced costs of carrying out their activities. With more criminals to be chased and prosecuted, the average police effort to chase each of them goes down and criminality increases. In other words, police and armed forces cannot chase all the criminals with the same intensity at all times. That some of the kidnappings, extortion, attacks against the police, mass murder victims and terrorist attacks comes from other sources than the right wing or left wing terrorist groups is something that cannot be ignored. This can be some sort of pollution of the conflict data because it implies that a share of

each indicator happens regardless of the dynamics of the fight between the state and the terrorist groups; on the other hand, this is not a source of concern, at most, this is an indication of the complexity of the conflict and how its effects amplify through different criminal activities.

Up until here, no causality is implied. Causality will exist as long as the state fixed effect remove all observed and unobserved features that are constant over time and common to all the individuals born and residing in each state. If there is any variable explaining armed conflict levels and the scores at the state level, and it stays constant during the period of analysis (like whether or not the state is a cocaine producing area, presence of mineral rents that atract terrorist groups or geography and infrastructure), the state level fix effects will cancel it out. Additionally, year fixed effects control for shocks that are common to all children taking the tests whether at their year of birth or the year they took the test. And the state specific trends capture changes for each state through time. With all these fixed effects, the results will not be the effect of the armed conflict on learning attainment at a national level, but rather the average effect with respect to the state average and year average, after factoring the state trends out.

Finally, causality will also imply that the error term is not correlated with the armed conflict levels. If those states that were affected by violence were also those with lower learning attainment (lower scores in the test), this assumption would be violated. The case of Colombia is quite unique since there is not a relationship between poverty and conflict: relatively wealthy states have the same, and even higher, levels of conflict that the poorest states. More interestingly, there is not a geographical pattern of how the conflict has spread through the territory. With all this in mind, the estimates can be read as causal.

5 - ESTIMATION RESULTS

In this section, the results of estimating **Equation (1)** and **Equation (2)** are presented. The effects exposure to conflict at birth on language and math scores, are discussed first and, then, the estimates of exposure during the year of the test. Results are going to be presented with different especifications: estimations without state nor year fixed effects and without state specific trends (**Regression 1**); estimations with only state and year fixed effects (**Regression 2**); estimations with state and year fixed effects and state specific trend (**Regression 3**); and estimations with school and year fixed effects and state specific trend (**Regression 4**). Errors are clustered at the state level (**Regression 2** and **Regression 3**) and the school level (**Regression 4**). Regressions for the 11th grade scores are going to include as controls: gender and two indicators variables controlling for fathers and the mothers having some or more than high school education. Given the information available in the datasets, no indivual level controls are include in the regressions for 5th and 9th grades; only controls for the location of the school and the type of school are included. Conflict variables per 100,000 inhabitants per state per year (extortion, kidnapping, terrorist attacks, mass murder victims and terrorist attacks against the police) are used in all the regressions. Additionally, assuming that all variables are criminal events and that those criminal events can be added up, estimations are going to include a variable called total conflict. Since

aggregation can be an issue, a principal component factor analysis is also going to be employed to try estimating the effect of principal factor of the aggregate conflict.

In general, several things can be said about the regressions. First, the fixed effects, either at the state level or at the school level, matter. Ignoring the fixed effects leads to biased results. Second, the main difference between the state level and the school level fixed effects is that the later result in more accurate and significant estimates; using the school fixed effects reduces the variability(which mainly happens and the state level) and gives smaller standard errors. Third, for 5th and 9th grades, exposure to conflict at birth is more deleterious on the scores than the exposure to conflict during the year of the test; besides, the math scores are more sensitive to conflict than the language scores. Due to desertion or dropping out of schools, there seems not to be a relationship between the scores and conflict for the 11th grade sample. Adding up the exposure at birth and the exposure during the year of the test, higher levels of armed conflict lead to a 3-4 points drop in the math and language scores for 5th grade students, while the reduction is around 2-3 points for the 9th grade students. In regards to the controls used for the 5th and 9th samples, students attending rural and public schools had lower scores (almost 30 points lower) than the students attending urban and private schools. The controls used for the 11th grade sample, parents with some or more than high school education had children with scores that were 3 points higher than those of children whose parents have less than secondary education; gender difference seems to change depending on the specification.

a) Effect of Exposure to Armed Conflict At birth

The impact of armed conflict experienced at birth on the Language and Math scores in the 5th grade and 9th grade are presented in **Table 13** (5th grade) and **Table 14** (9th grade). For the language scores, the point estimate for extortion is negative and significant, but larger for 5th grade than for 9th grade; any possible reduction can be caused by the attrition effect that was mentioned before: large numbers of students drop out of school, specially, through out the secondary grades (6th to 11th grades). The estimate for the number of mass murder victims is of the correct sign in 5th grade, but it is not significant. It is noticeable that Attacks against the police, an event that creates a lot of turmoil in any community, is significant and positive for the 5th graders' language scores; perhaps, the military and police response after an attack may increase the population safety and reverse the initial negative effects. Even though of negative sign, none of the estimates are significant for the 9th grade scores; again, the reduction in the heterogeneity of the sample, due to the attrition, may be behind this finding. Total conflict is only negatively significat, but marginal, for the 9th grade scores on language. Going to the math scores estimates, extortion and kidnapping have a significant and negative effect for the 5th grade scores. For the 9th grade scores, attacks against the police and the main factor from the principal component analysis have a negative and significant impact. In the previous paragraph, it was mentioned the reason why Attacks against the Police could have a positive impact; here, in the case of the 9th grade scores, the same argument is valid for the negative impact: conflict intensifies

with the augmented of police and military activity after an attack to the troops

Estimates of the exposure to conflict at birth for the 11th grade students' scores are on **Table 15**. On the language scores side, extortion and kidnapping and are negative and highly significant, but their point estimates are very small (less than one point). The relative reduction in point estimates, and even the change in sign (as the case of terrorist attacks) can be fully explained by the reduction in heterogeneity in the sample, as only 40% of the population supposed to be enrolled at 11th grade is enrolled. That kidnapping has a negative effect due to all the uncertainty and related violence it brings, it is understandable.About the positive impact of the terrorist attacks poses an interpretation challenge, it is important to note that, by the time these 11th grade students were born, most of the terrorist attacks happened in big cities (as part of the war waged by the drug cartels against the Colombian government), where education offer is better. On the math scores, Extortion, Terrorism and Kidnapping have a negative and significant impact, while the total conflict (both the summation of all the indicator and the main factor from the principal component analysis) have a positive and significat effect.

b) Effect of Exposure to Conflict during the Year of the Test

As it will be seen, this effect tends to be smaller than the effect of conflict at birth (the point estimates are smaller). Estimations for 5th grade (**Table 16**) and 9th grade scores (**Table 17**) found that extortion and terrorism are both significant and negative for the 5th grade language scores; nevertheless, extortion is the only significant conflict indicator, but of positive sign, for the 9th grade language scores. This change of sign may be related to the schooling desertion. What should be pointed out here, is that Extortion may affect schooling by imposing an extra cost on households that, under the strain of conflict, may be forced to take children out of schools; Extortion can also lead to forced displacement of household across states, within the state of residence or even within the municipality, changing the access and the quality of the education available. Interestingly, the main factor of the principal component analysis has a negative and significant effect on language scores for both grades (a little bigger than 1 point) and, then, conflict during the year of the tests does have a negative impact and the channels can be both economic and psychological.

The story for the 5th and 9th grades math scores goes as follows: terrorism and kidnapping have negative and significant coefficients; surprisingly, the coefficient on extortion is positive and relatively large and significant for both grades. Specifically for 5th grade, attacks against the Police reduces the math scores, but the point estimate is small; on the contrary, the main factor of the principal component analysis has a very large and negatively significant effect. After 2000, the switched sign on extortion may be pointing at the environment of higher economic activity during the decade that, in spite of the armed conflict, may have augmented the possible loot for the criminals and terrorists. With more money circulating, more profit from extortion for the criminals and, maybe, less impact on the households budget.

Lastly, the effect of exposure during the year of the test on 11th grade language and math scores.

Table 18 shows how deleterious can be desertion throughout high school on biasing the sample and the results: point estimates of the significant coefficients on extortion, terrorism, kidnapping and attacks against the police (only for math scores) are positive. Attacks against the police has a negative, but not large and not very significant effect, reducing the math scores. .

c) Robustness checks

From the previous results, it was seen that the effect of the internal armed conflict gets smaller from 5th grade to 11th grade and that, even in some cases, the sign on the coefficients of the conflict indicators switch from negative to positive. That extortions or kidnappings have a negative sign is not necessarily worrisome since more income available leads to potentially higher criminal gains by extorting and kidnapping people. Nevertheless, positive sign on the coefficients for terrorist attacks, mass murder victims and attacks against the police may point to a different problem. The school desertion happening after 5th grade may be the real issue behind the reduction of the point estimates, their lack of significance or their sign change. It is important to remind the reader that the results presented are conditional on being enrolled in schooll and that the real impact of the armed conflict on learning attainment would need to include all those who also dropped out of school.

Desertion biases the results by biasing the sample. Desertion, by the auxiliary regressions ran for this paper (not reported here) does not seem to be directly affected by the armed conflict, but it might be more sensitive to annual GPD growth. Poor households may not find profitable to keep their children at school either because of high opportunity costs (foregone wages), because of high educational costs or just because the gains to education are low. Gains to education could be low in a country with unemployment around 10%, high levels of self employment or employment without benefits and lack of upward social mobility. Therefore, children who remain in school are substantially different than those who dropped out. Those staying in school may come from families that can cope better with economic shocks or that place a higher value on educational achievement. These children at school may have parents with relatively higher education levels and that earn enough to afford all education expenses.

There is not way, given the available data, to know who the dropouts are. As a way to handle this attrition problem, the technique Bharadwaj and Neilson (2011) used for estimating the effect of early interventions on Chilean children with low weight at birth is going to be adapted for the purposes of this paper. Bharadwaj and Neilson have information on children at birth, their performance in language and math scores when they are at school. They cannot observe the scores of children who died and they assign those children an artifical score ranging from the 55th percentile to the 80th percentile of the scores of those who did survive. Something similar is going to be done and presented in this paper.

The net enrollment rate can be defined as: $NetEnrollment_{jt} = \frac{DO_{jt}+TT_{jt}}{Agepopulation_{jt}}$ and j =9th grade, 11th grade and t is the year of the test for 9th grade (2002-2003, 2005-2006 and 2009) and for 11th grade (fromm 2000 to 2004).

Where, $NetEnrollment_{jt}$ is the net enrollment rate for grade j at the year of the test t; DO_{jt} is the variable for the dropouts (not observed in the the Saber tests samples) or those who are not enrolled in grade j and at the year of the test t; TT_{jt} stands for those who are observed, take the tests and scores are reported. Finally, $Agepopulation_{jt}$ is the reference age group or the total number of people aged 15 for 9th grade or aged 17 for 11th grade at the year of the test t.Assuming that net enrollment rate stays constant throughout all grades of primary and secondary education, that is 90% for 9th and 11th grades during each year of the test (as it was for 5th grade) , the number of dropouts can be found as:

$NetEnrollment_{jt} = \frac{DO_{jt}+TT_{jt}}{Agepopulation_{jt}} = 0.9 \Rightarrow DO_{jt} = 0.9\,(Agepopulation_{jt}) - TT_{jt}$

For each of the mentioned years, the total age reference population was taken from the Colombian statistic bureau (DANE, 20011) population series. Acknowledging that sticking to the 15 years old for 9th grade and 17 years old for 11th grade may not be very representative of the Colombian context, a weighted age reference was computed like follows: 80% of the reference population of the expected age, 10% of the population one year younger and 10% of the population one year older than the age reference population. The samples of the dropout were constructed in such a way that they have the same proportions of the controls used in the regressions with the real samples: same proportion of students attending private and of students attending rural schools (for the 9th grade sample) and the same proportion of female students and of students with mother and/or father with some or more than high school education (for the 11th grade sample). The dropouts were assigned the mean score in math and the mean score in language, as well as the 95%, 90%, 85% and 80% and so on of the of those means (but only reported up until 80% here). They were also given the same armed conflict indicators levels (by place of residence and year of birth and year of the test) as the real test takers. Regressions were ran using state fixed effects, year of birth or year of the test fixed effects and state specific linear trends, as well as clustering errors at the state level. Due to computational limitations on stata, only state level fixed effects were employed.

The inclusion of the artificially created dropouts in the 9th grade and 11th grade sample leads to different results. Overall, it would seem that armed conflict is no longer deleterious for learning achievement if students stay in school until 11th grade. Second, exposure to conflict at birth may dissapear for students enrolled in 9th grade and 11th grade; if this result is to be accepted, exposure to conflict could last only through the early years of education. The estimations do not indicate how the imputed scores to the dropouts would be in order to find a negative impact of armed conflict. Although this paper only reports regressions using the mean scores and values up to 80% of the mean scores as imputed values to the dropouts, lower levels of imputed scores would be low enough that no relationship was found with regards the armed conflict impact. In other words, assuming very low scores would be indicative of extremely poor learning attainment, for which no negative impact of conflict would be needed. A final comment is that the coefficient on some of the conflict indicators remain positive even after including the artificially created droppouts.

Specifically, results for effects of exposure to armed conflict at birth on the 9th grade scores including the dropouts (**Table 19**) reveal that no variable is significant; however, the value of the t-statistic on the kidnapping coefficient may indicate that the variable would be significant if school fixed effects were used. For the 11th grade sample (**Table 20**), exposure to conflict at birth would lead to positive and significant effects of extortion and kidnapping, but the point estimates are smaller than 0.5. As it was said on the previous paragraph, it can be that the education system in Colombia, making sure that parents keep their children in school, can eliminate the negative impact of the armed conflict. Perhaps, as more information will be available and net enrollment rates increase as a byproduct of the conditional cash transfers programs in this country, this last point can be empirically tested in the future.

Results are perhaps more interesting for the exposure to the armed conflict during the year of the test. For the 9th grade sample including the dropouts (**Table 21**), there is a reduction in the language scores (until using the 95% of the mean as the imputed scores for the dropouts) as consequence of higher number of mass murder victims, but the coefficient is significant only at a 10%. When the 9th grade dropouts are imputed only 80% of the scores in math, kidnappings, terrorist attacks and attacks against the police lead to a reduction of around 1 point; again, the coefficient as only significant at a 10%. The final table (**Table 22**) shows the effects of exposure to conflict during the year of the tests for the 11 grade sample including dropouts. Kidnapping produces very small and not very significant reductions in the language scores for all the 5 estimations; the same story is true for terrorist attacks. Math scores are negatively impacted by the number of mass murder victims throughout the 5 especification; only when the imputed score is 80% of the mean to the dropouts, math scores are also negatively impacted by kidnappings, terorist attacks and attackst against the police. These last results are equally marginal and significant to the 10%-5% level as it was the case for the 9th grade sample.

The creation of a sample with dropouts is a procedure with some weaknesses. Desertion through secondary education biases the sampleand the proportion of the control variables used, as well as the test scores. Only those who are better or more fit to take and to absorbe the negative impact of armed conflict will stay in school; those individuals may not be very sensitive to the violent environment either because they have better coping strategies or better families. If this happens, which can be entirely true in the case of Colombia, the regression coefficients are also biased. As it was not possible to use school fixed effects, due to computational limitations on Stata. Certainly, state fixed effects standard errors clustered at the state level can be relatively bigger than the ones when clustering at the school level. Finally, the inclusion of the artificially created dropouts did not solve the problem of having conflict indicators with positive signs. This last puzzle, perhaps, could be solved by observing the scores for the total individuals aged 15 years and of individuals aged 17 years; as such a sample is not feasible, hypothesis like the duality of sign due to higher economic loots when GDP grows faster or the authorities responses to criminal events (that may result in increased safety for the population) can be held as adhoc explanations.

The last robustness check is based on what some previous works describe as the existence of non linearities in understanding the effects of conflict and violence on school achievement. In particular, Sharkey (2010) found the impact of homicides in the neighborhood fades away as the time gap between the tests day and the day of the killings gets wider. From the intervention perspective, Burdwick-Will, et al. (2010) call into attention the possible existence of the non linear effects of violence on children. Is this the case for the Colombian armed conflict? Not reported here, Equation (2) was re-estimated with an squared term for each conflict indicator and without the state-specific trend, leaving only school and year of the test fixed effects. Although results should be taken with care and more theoretical discussion may be needed in order to draw an ultimate conclusion, it can be said that there are non linear effects: extortion has negative and significant non linear impact on the 5th and 9 grades language scores; terrorist attacks only have a negative non linear effect on the performance of 5th grade language scores. For the math scores, that only extortion and terrorist attacks have non linear negative impact on the 5th grade students; 9th grade math scores are also negatively impacted by extortion, but also by kidnapping and attacks against the police. The preliminary resuls on this non linear effects on 11th grade language and math scores are mainly insignificant.

6 - CONCLUSIONS

Colombia has experienced conflict during most part of its republican history. What began as a war against a left wing guerrilla group evolved into a conflict marked by terrorism and high levels of violence due to the money coming from drug production and trafficking. The armed conflict reached its peak during the late 90's and after the failure of peace talks; with the implementation of the US funded Plan Colombia, the country military and police forces were modernized and took on the challenge posed by the left and right wing terrorist groups, as well as by the drug trafficking organized crime. From 2002 to 2008, under the government of Alvaro Uribe, the country enjoyed a significant reduction of conflict and an increase of education expenditure. Despite the gains, safety and education still pose problem for the country: groups are reorganizing and transforming, and more needs to be done to increase enrollment in the later years of secondary.

Previous research indicates that civil conflict reduces the number of completed years and test scores. Several mechanisms can explain how the effect operates. This type of war imposes economic costs to families due to the destruction of assets or reduction of revenues; as a way to smooth consumption, households may take their children out of school either to reduce expenditure or to have them available for work. Governments may reduce their expenditure in education to make more funds available for the military effort. In the heat of the confrontation, schools are destroyed and teachers killed. Households may be forced to relocate and settle in places where education is insufficient or of a lower quality. Children, directly or indirectly exposed to violence, may suffer from post traumatic disorder, reducing their learning abilities; furthermore, their environment may not the learning conducive due to the violence concerns at home and the economic constraints. Altogether, these mechanisms operate lead to a situation where the overall human

capital accumulation goes down.

Using data collected by the Colombian Police, this paper estimated the effect of conflict on the Saber Tests math and language scores. Students throughout the country take those tests either as a way to assess the quality of the education (5th and 9th grade students) or as a requisite to apply for higher education (11th grade students). The tests are designed by the Ministry of Education and are applied depending on the grade: the 11th grade tests is of yearly frequency and implies a special process of application, while the 5th and 9th grade are applied every 3 years. The estimation is carried out through models where the test score is the dependent variable and the conflict indicator (Extortion, Kidnapping, Terrorist Attacks, Mass Murder Victims and Terrorist Attacks against the Police) is the main independent variable; the models have school fixed effects and year of the test fixed effects, besides a state-specific linear trend. The identification strategy is based on the level of violence the student was exposed at the year of birth at the state of birth (long run effects) or at the year of the test in the state of residence (short run effects). It was assumed that all children of 5th and 9th grade are of the expected age at those grades because datasets do not report the birth date; also, it was assumed for all the grades that students reside in their state of birth.

The results indicate that the exposure to conflict at birth has a bigger impact on scores than the exposure to conflict at the year of the test. The reduction in the scores, even though of at most 2-3, is bigger for the 5th and 9th grade students than for the 11th grade students; this is explained by the attrition of the sample due to lower net enrollment rates in the later years of high school. Only applying for the 5th and 9th grades, it can be said that the effects seem to be bigger for the math scores than for the language scores and that the total effect (short run plus long run effect) is around 3-4 points. The combined effect of the exposure at birth and the exposure during the year of the test results in small reduction of language scores (5% SD for 5th grade and 3% SD for 9th grade) and of the math scores (6.5%SD for the 5th grade and 6% SD for the 9th grade). Including the artificially created dropoutseliminates any effect of the exposure to conflict at birth, implying that the education system cancels out any pervasive effect of the violent conflict environment childre grew up; this would also suggest that cash transfer programs, conditional on keeping children in school, may alleviate the effects of the long lasting armed conflict on the human capital accumulation of the country. The control variables for the 11th grade sample suggest that women tend to have lower scores and that parents with some high school or more education help in improving the scores of their children. Overall, the variables leading these results are Extortion, Kidnapping and Terrorist attacks.

Small effects? On average. Some regions deviate from the average and were the scenario o high levels of conflict intertwined with poverty and forced displacement for long periods. Regions like Uraba, the middle range of the Magdalena River basin and the South of the state of Bolivar were the center of violence perpetrated by all the terrorist groups and of alleged abuses by armed forces. These results may highlight the relevance of special interventions in these areas; such interventions

would need to target, in particular, children and mothers to help them to overcome the trauma and stress generated by conflict; furthermore, these regions need to be put back on the track of human capital accumulation with programs targeting adults that could not complete their schooling due to economic constraints and the burden of violence.

The results are very relevant for the present situation of the country. First, they emphasize the important of cash transfer programs conditional on keeping children on school (like the current scheme of Familias en Accion). Second, they highlight the importance of keep fighting the crimes that have more negative incidence on the population because of the economic cost or because of the uncertainty they generate. In particular, as the recent developments of the conflict indicate, authorities should focus their efforts in fighting all the different types of extortion that are taking place in the poor city areas. Higher levels of extortion are an indication of both higher loots available due to improved economic activities and also more criminal activity (organized or not) in the cities. The effects on human capital can be deleterious if government does not take a serious action. Government should also promote programs to offer support to families and communities, giving them the resources they need to help children to cope with the stress and trauma caused by violence. Police should also work for schools with the best climate for teaching and learning (as Osofsky, 2010, mentions), making sure that surrounding areas are safe and free of crime. The country should build on the role of churches and community organizations (social, cultural and political groups) to provide a network of support for families and children. Programs like schools for peace funded like the World Bank (2011) should be expanded in coverage and community involvement.

Future research in this area should address the dynamics of the attrition problem. The more is known about why students drop out of school after primary education, the better will be the assessment of the impacts of civil conflict on human capital accumulation. Data should allow to cross information from the census data and from the Saber Tests datasets. Also, data should allow to track the same student at the 5th, 9th and 11th grade tests to explore the evolution of the effect of conflict, controlling for individual level fixed effects. Solving the attrition problem would allow researchers to sort out the issue of the peace dividend or war hang over, at least, for the human capital accumulation process. Improvement in test scores due to lower violence, which may appear as a peace dividend, may ignore all those who dropped or are dropping out of school and that can be the worst war hang over during the expected years of peace.

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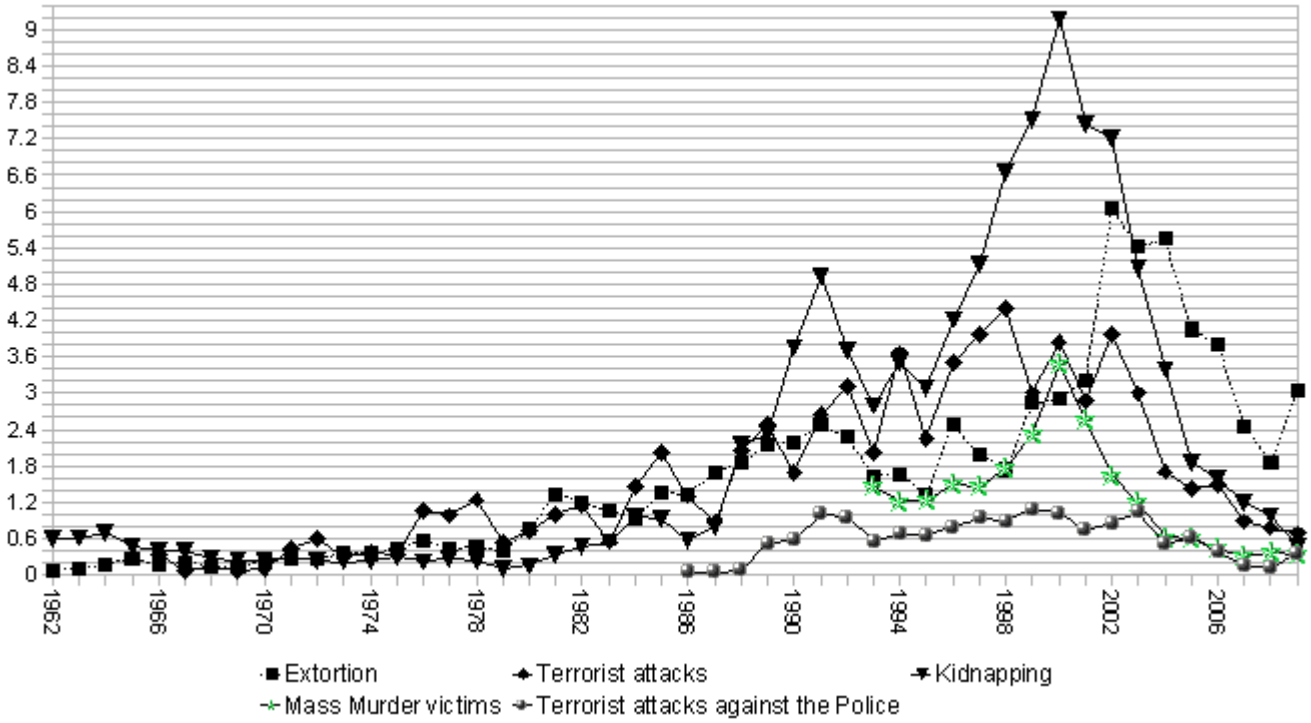
Figure 1: Internal Armed Conflict indicators (per 100,000 inhabitants) 1960-2009



Source: Colombian National Police, 2009; DANE population Series, 2011.

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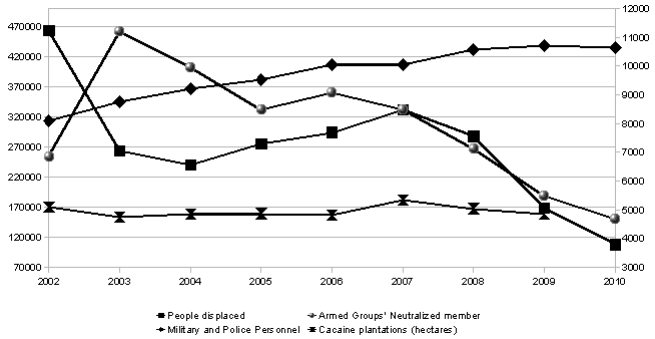
TABLES AND GRAPHS

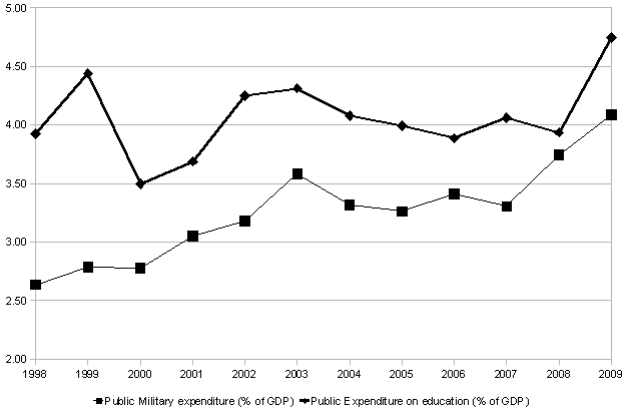
Figure 2: Colombian Internal Conflict Main indicators, 2002 - 2010



Source: Ministry of Defense, March 2011. Right axis for people displaced and military and police personnel.

Left Axis: People displaced, Military and Police Personnel

Figure 3: Public Expenditure on Defense and Education as percentage of GDP, 1998 - 2009



Source: World Bank, World Development Indicators; UNESCO Data Center.

Table 1: Proportion of children enrolled in an education center by selected ages

Enrollment in any educational center by age

State	Enrolled at age 10	Enrolled at age 15	Enrolled at age 17
Antioquia	0.914	0.748	0.567
Atlántico	0.917	0.837	0.631
Bogotá	0.944	0.852	0.672
Bolívar	0.919	0.789	0.590
Boyacá	0.943	0.728	0.539
Caldas	0.958	0.740	0.567
Caquetá	0.856	0.641	0.421
Cauca	0.905	0.633	0.425
Cesar	0.884	0.742	0.508
Córdoba	0.930	0.794	0.546
Cundinamarca	0.951	0.807	0.581
Chocó	0.664	0.619	0.467
Huila	0.921	0.666	0.468
La Guajira	0.651	0.587	0.468
Magdalena	0.901	0.770	0.561
Meta	0.946	0.803	0.534
Nariño	0.867	0.614	0.431
Norte Santander	0.924	0.705	0.506
Quindío	0.931	0.803	0.632
Risaralda	0.930	0.771	0.546
Santander	0.950	0.756	0.573
Sucre	0.940	0.840	0.600
Tolima	0.903	0.737	0.526
Valle	0.954	0.827	0.543
Arauca	0.953	0.791	0.465
Casanare	0.928	0.744	0.485
Putumayo	0.821	0.628	0.390
San Andrés	0.972	0.829	0.696
Amazonas	0.852	0.780	0.563
Guainía	0.826	0.731	0.597
Guaviare	0.862	0.628	0.270
Vaupés	0.873	0.726	0.558
Vichada	0.701	0.528	0.370
Total	0.918	0.767	0.561

Source: DANE, 2005 Census

Table 2: Enrollment (proportion) by relationship between household income

Enrollment by age and by level of income

Age	Enrollment	Income covers expenditure			
		Enough	More than Enough	Not Enough	Not Reporting
10 years	Enrolled	0.955	0.937	0.917	0.596
	Not enrolled	0.039	0.052	0.070	0.097
	Not reporting	0.007	0.011	0.013	0.307
15 years	Enrolled	0.841	0.835	0.756	0.395
	Not enrolled	0.153	0.159	0.235	0.193
	Not reporting	0.006	0.006	0.009	0.412
17 years	Enrolled	0.659	0.657	0.547	0.267
	Not enrolled	0.336	0.337	0.444	0.251
	Not reporting	0.004	0.005	0.009	0.483

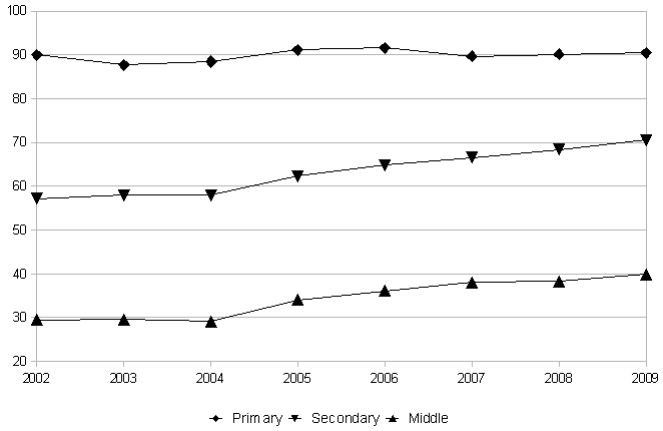
Source: DANE, 2005 Census

Table 3: Enrollment (proportion) by age and selected ages

Enrollment	Gender	10 years	15 years	17 years
Enrolled	Male	0.505	0.494	0.493
	Female	0.495	0.506	0.507
Not Enrolled	Male	0.575	0.558	0.516
	Female	0.425	0.442	0.484
Not Reporting	Male	0.522	0.514	0.496
	Female	0.478	0.486	0.504

Source: DANE, 2005 Census

Figure 4: Net Enrollment rates (percentage) by education level, 2002-2009



Source: Ministry of Education, 2011

Table 4: OECD PISA National Mean Scores 2006 and 2009

Country	Reading Mean		Math Mean	
	2006	2009	2006	2009
Brazil	373.72	412	369.52	386
Colombia	**385.31**	**413**	**369.98**	**381**
Argentina	392.89	398	381.25	388
Mexico	410.5	425	405.65	419
Chile	412.52	449	411.35	421
Uruguay	442.09	426	426.8	427
Peru		370		365
OECD Average	491.79	493	497.68	496

Source: OECD PISA Tests.

Table 5: Legal Definitions of Selected Internal Armed Conflict Variables

Variable	Description
Extortion	When someone threatens to use force or harm another person unless a payment is made; threats can be made by members of the narco-terrorists groups, organized criminal gangs or common criminality to entrepreneurs, business people, government officers or citizens
Terrorist Attacks	Attacks carried out using explosive devices or any other form of destruction, bringing terror or uncertainty to the population and endangering lives, buildings, communication means and infrastructure
kidnappings	Seizing a person against her/his will in return of a ransom or for propaganda gains. The kidnapping can be simple, for less than three people kidnapped at the same time by the same criminal, or collective, for three or more people.
Mass Murders	When 4 or more people are killed at the same time and place and by the same perpetrators. This variable does not include the military personnel killed in action or when a group of 4 or more criminals are killed during police or military operations.
Terrorist Attacks against the Police	Attacks against the police units and officers. These attacks can be ambushes, open combats, attacks against police stations or patrols or when the attacker retreats without engaging in combat.

Source: Colombian National Police Website, 2011.

Table 6: Average level of conflict indicators (per 100,000 inhabitants) for 5th grade and 9th grade sample

Conflict Indicator	Year of indicator	5th Grade			9th Grade		
		2002-2003	2005-2006	2009	2002-2003	2005-2006	2009
Extortion	Birth year	2.59	1.50	1.72	1.50	2.62	1.60
	Test year	5.99	4.11	3.19	5.71	4.00	3.09
Terrorist Attacks	Birth year	2.97	3.27	4.39	1.51	2.28	3.54
	Test year	4.10	1.53	0.68	4.38	1.34	0.61
Kidnappings	Birth year	4.61	3.48	6.56	1.88	4.26	3.44
	Test year	6.92	1.73	0.49	7.83	1.61	0.45
Mass murder victims	Birth year	NA	1.25	1.75	NA	NA	1.19
	Test year	1.50	0.38	0.36	1.66	0.33	0.33
Attacks against the police	Birth year	1.09	0.74	0.92	0.09	0.80	0.65
	Test year	1.12	0.48	0.37	1.21	0.38	0.29

Source: Colombian National Police, 2009.

Table 7: Average level of conflict indicators (per 100,000 inhabitants) for 11th grade sample

Conflict Indicator	Year of indicator	11th Grade							
		2000	2001	2002	2003	2004	2005	2006	2007
Extortion	Birth year	0.97	0.98	1.10	1.30	1.59	1.84	1.96	2.21
	Test year	3.97	4.74	9.02	7.86	7.86	5.33	4.95	3.25
Terrorist Attacks	Birth year	0.99	1.32	1.51	1.38	1.42	1.83	2.03	2.09
	Test year	5.36	4.01	5.47	3.86	2.15	1.77	1.89	1.05
Kidnappings	Birth year	0.49	0.63	0.64	0.67	1.02	1.61	2.21	3.12
	Test year	12.43	9.80	9.39	6.70	4.51	2.33	2.03	1.51
Mass murder victims	Birth year	NA	NA	NA	NA	NA	NA	NA	NA
	Test year	4.62	3.21	2.05	1.65	0.82	0.72	0.60	0.34
Attacks against the police	Birth year	0.18	0.04	0.04	0.05	0.07	0.20	0.38	0.57
	Test year	1.36	0.98	1.08	1.22	0.56	0.68	0.45	0.19

Source: Colombian National Police, 2009.

Table 8: Statistics for 5th grade and 9th grade sample

Variable	5th Grade			9th Grade		
	2002-2003	2005-2006	2009	2002-2003	2005-2006	2009
Rural School	0.23	0.21	0.25	0.14	0.11	0.15
Private School	0.18	0.15	0.18	0.18	0.18	0.20
Observations	465706	521421	512137	242362	357632	401038

Source: Saber Tests, ICFES-Ministerio de Educacion nacional, 2010.

Table 9: Statistics for the 11th grade sample

Variable	11th Grade							
	2000	2001	2002	2003	2004	2005	2006	2007
Female	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Age at test	18.66	18.43	18.60	18.32	18.15	18.08	17.96	17.99
Graduating at the test year	0.95	0.95	0.89	0.94	0.93	0.98	0.95	0.87
Mother with high school or more education	0.47	0.50	0.51	0.52	0.55	NA	NA	NA
Mother with high school or more education	0.47	0.49	0.50	0.50	0.55	NA	NA	NA
Number of siblings	2.94		2.82	2.74	2.72	NA	NA	NA
Observations	432488	398846	433673	424432	431322	451133	471882	502317

Source: Saber Tests, ICFES-Ministerio de Educacion Nacional, 2010.

Table 10: Math and Language Scores Statistics for the 5th grade and 9th grade sample

Variable	Period	5th Grade				9th Grade			
		Mean	S.D.	Min	Max	Mean	S.D.	Min	Max
Math Score	2002-2003	294.88	72.79	80.91	476.14	296.97	71.57	88.84	569.18
	2005-2006	290.22	58.83	149.88	448.35	295.27	47.97	211.54	487.09
	2009	284.31	73.07	35.47	524.47	290.49	75.49	31.40	575.35
Language Score	2002-2003	297.83	68.13	57.59	483.26	296.38	68.65	44.68	519.49
	2005-2006	293.03	61.50	118.59	420.80	299.96	55.97	131.29	426.46
	2009	292.35	71.54	63.31	518.04	293.74	74.71	18.41	539.73

Source: Saber Tests, ICFES-Ministerio de Educacion Nacional, 2010.

Table 11: Math and Language Scores Statistics for the 11th grade sample

Variable	Statistic	11th Grade							
		2000	2001	2002	2003	2004	2005	2006	2007
Math Score	Mean	42.99	41.15	42.68	41.77	41.04	44.45	45.75	45.31
	S.D.	5.44	5.38	6.35	5.34	6.16	8.05	8.76	9.57
	Min	0	0	0	0	0	-1	-1	-1
	Max	87	100	102	103	98.2	104.89	115.67	121.49
Language Score	Mean	46.39	46.36	48.20	48.69	52.19	46.37	48.39	47.01
	S.D.	6.40	6.00	6.76	7.80	8.33	8.70	7.00	7.38
	Min	0	0	0	0	0	-1	-1	-1
	Max	77	75	83	103	104.6	86.97	100.28	99.69

Source: Saber Tests, ICFES-Ministerio de Educacion Nacional, 2010.

Figure 5: Relationship between Total Armed Conflict during the year of the test and the 5th grade State Average Math scores

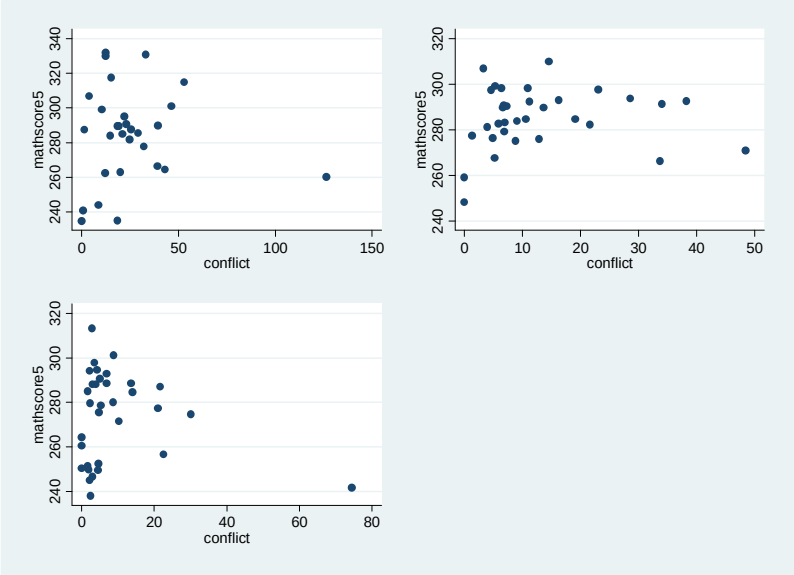


Figure 6: Relationship between Total Armed Conflict during the year of the test and the 5th grade State Average Language scores

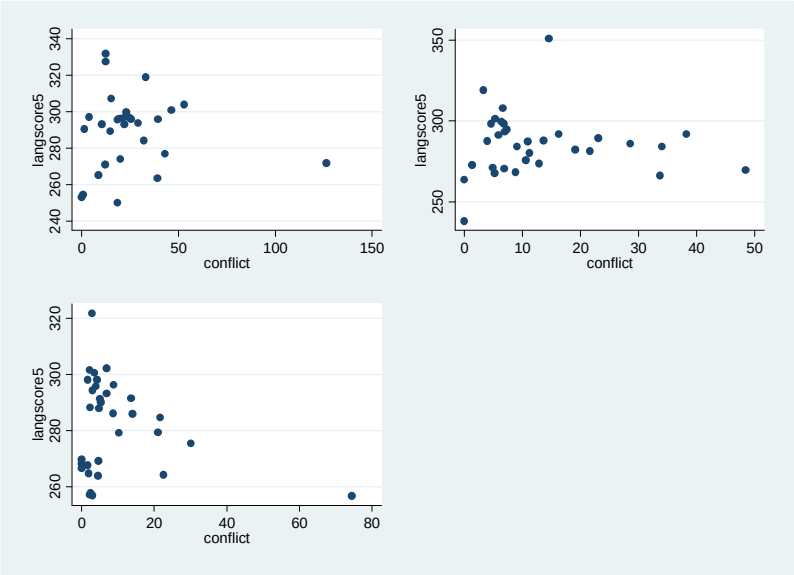


Figure 7: Relationship between Total Armed Conflict during the year of the test and the 9th grade State Average Math scores

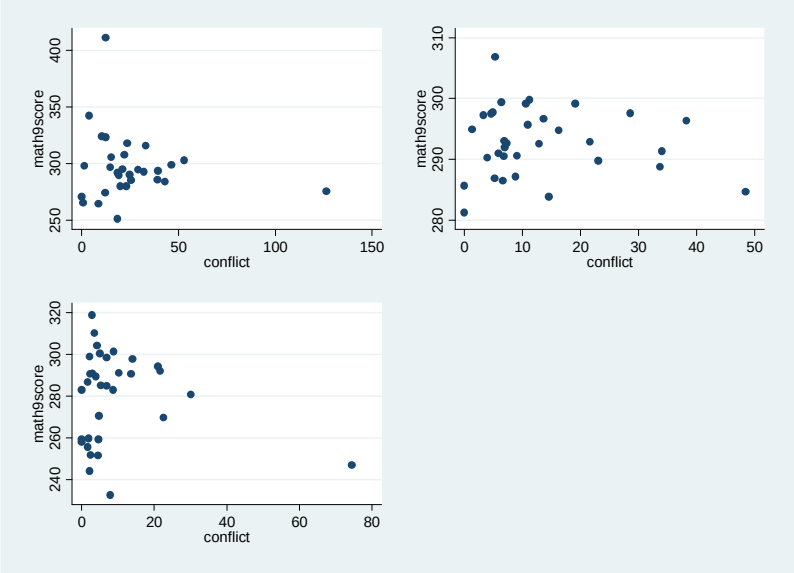


Figure 8: Relationship between Total Armed Conflict during the year of the test and the 9th grade State Average Language scores

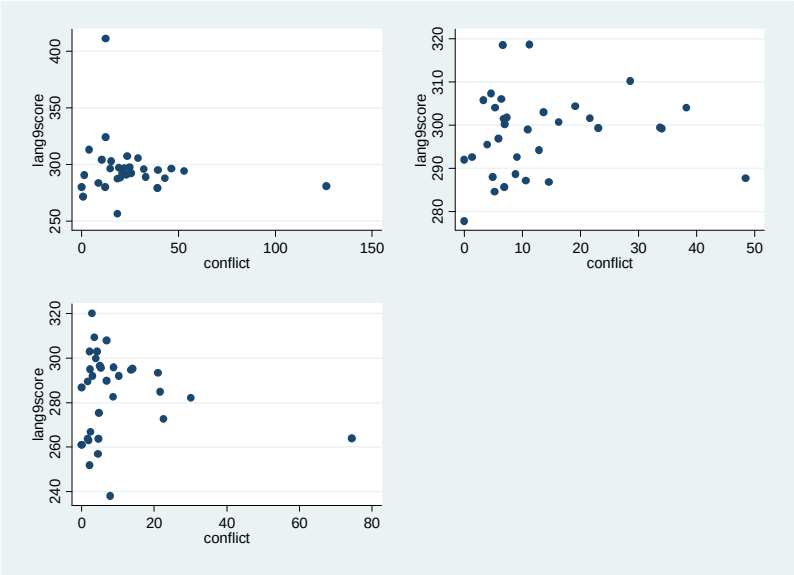


Figure 9: Relationship between Total Armed Conflict during the year of the test and the 11th grade State Average Math scores

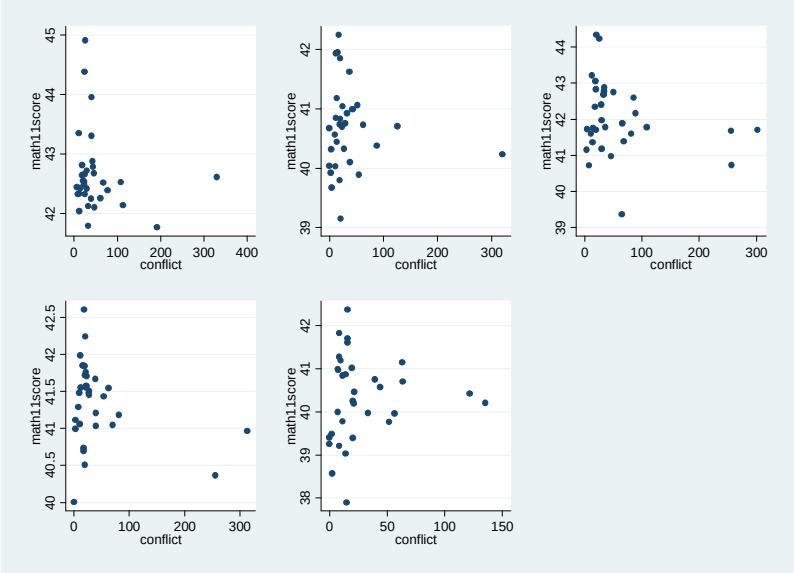


Figure 10: Relationship between Total Armed Conflict during the year of the test and the 11th grade State Average Language scores

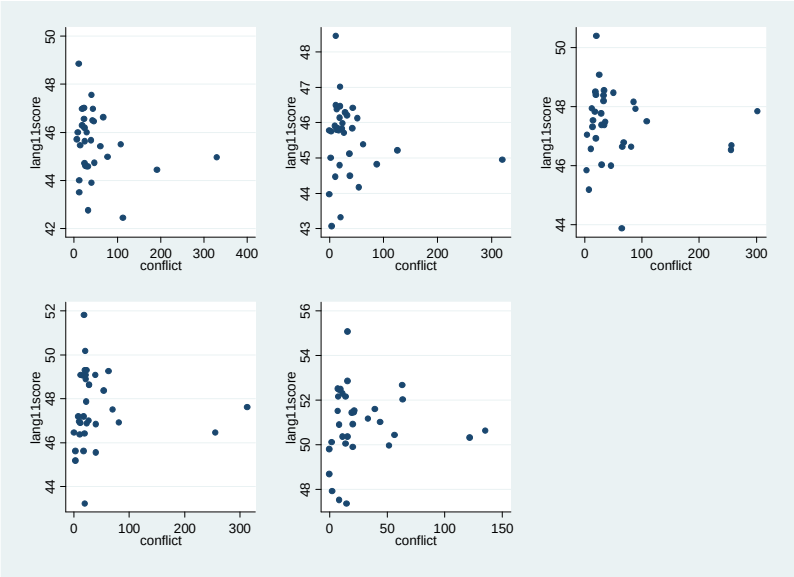


Table 12: Living in the same department of birth by expected age at 5th, 9th and 11th grade

State	11 years old	15 years old	17 years old
Amazonas	0.918	0.920	0.913
Antioquia	0.945	0.944	0.940
Arauca	0.909	0.878	0.839
Atlántico	0.967	0.967	0.965
Bogotá	0.938	0.941	0.942
Bolívar	0.964	0.961	0.954
Boyacá	0.932	0.926	0.905
Caldas	0.884	0.878	0.866
Caquetá	0.831	0.819	0.795
Casanare	0.908	0.925	0.892
Cauca	0.942	0.929	0.918
Cesar	0.935	0.926	0.912
Chocó	0.654	0.670	0.680
Córdoba	0.959	0.953	0.943
Cundinamarca	0.923	0.918	0.903
Guainía	0.929	0.932	0.890
Guaviare	0.779	0.762	0.775
Huila	0.927	0.919	0.908
La Guajira	0.923	0.924	0.902
Magdalena	0.956	0.954	0.944
Meta	0.884	0.880	0.861
Nariño	0.918	0.925	0.911
Norte Santander	0.943	0.944	0.935
Putumayo	0.646	0.640	0.650
Quindio	0.874	0.865	0.862
Risaralda	0.876	0.879	0.876
San Andrés	0.942	0.941	0.916
Santander	0.926	0.927	0.917
Sucre	0.958	0.957	0.943
Tolima	0.910	0.902	0.883
Valle	0.920	0.924	0.922
Vaupés	0.880	0.869	0.837
Vichada	0.898	0.883	0.873
Total	0.909	0.908	0.899

Source: DANE, 2005 Census

Table 13: Effect of exposure to conflict at birth on the 5th grade Language and Math Scores

Independent Variables	Regression 1		Regression 2		Regression 3		Regression 4	
	Language	Math	Language	Math	Language	Math	Language	Math
Extortion	1.554	2.208	0.179	1.862	-2.404	-0.489	-2.494	-0.573
	(46.56)***	(64.46)***	(0.39)	(2.70)**	(2.60)**	(0.24)	(11.92)***	(2.31)**
Terrorism	-0.569	-0.553	-0.278	0.433	-0.124	-0.34	0.155	0.022
	(37.41)***	(35.42)***	(0.66)	(0.65)	(0.22)	(0.37)	(0.64)	(0.07)
Kidnapping	-0.533	-0.663	0.02	0.025	-0.008	-0.261	0.027	-0.279
	(56.59)***	(68.87)***	(0.23)	(0.16)	(0.05)	(0.71)	(0.40)	(3.73)***
Mass Murder victims	-0.38	-1.015	-0.018	0.252	-1.23	-3.13	-1.568	-2.161
	(10.42)***	(27.69)***	(0.05)	(0.35)	(11.52)***	(27.84)***	(1.06)	(1.42)
Attacks Against Police	-0.808	-0.624	0.749	0.326	0.818	-0.394	1.134	-0.128
	(18.01)***	(13.58)***	(0.99)	(0.30)	(0.68)	(0.28)	(3.60)***	(0.39)
Total Conflict					0.023	-0.119	0.005	-0.093
					(5.51)***	(27.30)***	(0.08)	(1.47)
Total Conflict- Factorial Analysis					1.68	-1.685	0.071	-1.32
					(5.1)***	(27.30)***	(0.08)	(1.47)
Clustered Errors	NO		State Level		State Level		School level	
Fixed effects	NO		State Level		State Level		School level	
Year of test fixed effects	NO		YES		YES		YES	
State specific linear trend	NO		NO		YES		YES	

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Errors clustered at the school level
Conflict variables in per 100,000 inhabitants per state per year
Factor Eigenalue 2.52; Proportion 0.47; KMO 0.70.
Coefficients from separate regressions (controls for private and rural schools where appropriate)

Table 14: Effect of exposure to conflict at birth on the 9th grade Language and Math Scores

Independent Variables	Regression 1		Regression 2		Regression 3		Regression 4	
	Language	Math	Language	Math	Language	Math	Language	Math
Extortion	1.118	-0.031	-2.681	-0.003	-1.978	-0.769	-1.130	0.285
	(26.15)***	(0.73)	(1.76)*	(0.01)	(1.32)	(0.38)	(3.68)***	(0.64)
Terrorism	-0.257	-0.512	0.521	-1.133	-0.179	0.175	-0.020	0.394
	(10.54)***	(21.33)***	(0.54)	(1.99)*	(0.39)	(0.20)	(0.08)	(1.07)
Kidnapping	-0.097	-0.365	0.795	-0.475	0.416	0.55	-0.223	-0.244
	(4.45)***	(17.07)***	(1.05)	(0.81)	(0.69)	(0.70)	(1.48)	(1.07)
Attacks Against Police	1.402	0.011	3.02	-0.431	1.276	-1.16	-0.130	-2.984
	(16.70)***	(0.13)	(1.36)	(0.20)	(0.79)	(0.53)	(0.34)	(5.40)***
Total Conflict					-0.014	0.084	-0.172	-0.130
					(0.01)	(0.26)	(2.21)**	(1.14)
Total Conflict-Factorial Analysis					0.521	-0.128	-0.745	-1.733
					(0.37)	(0.07)	(1.77)	(2.81)***
Clustered Errors	NO		State Level		State Level		School level	
Fixed effects	NO		State Level		State Level		School level	
Year of test fixed effects	NO		YES		YES		YES	
State specific linear trend	NO		NO		YES		YES	

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Errors clustered at the school level
Conflict variables in per 100,000 inhabitants per state per year
Factor: Eigenvalue 2.41; Proportion 0.60; OKM 0.66
Coefficients from separate regressions (controls for private and rural schools where appropriate)

Table 15: Effect of exposure to conflict at birth on the 11th grade Language and Math Scores

Independent Variables	Regression 1		Regression 2		Regression 3		Regression 4	
	Language	Math	Language	Math	Language	Math	Language	Math
Extortion	0.405	0.547	-0.181	0.254	0.565	0.159	-0.018	-0.065
	(113.74)***	(156.49)***	(1.81)*	(2.87)***	(5.40)***	(2.99)***	(1.56)	(6.06)***
Terrorism	0.152	0.289	0.091	0.153	0.231	0.131	0.017	-0.048
	(60.72)***	(113.25)***	(1.11)	(1.87)*	(1.91)*	(2.00)*	(1.90)*	(5.44)***
Kidnapping	0.032	0.169	0.130	0.052	0.439	0.151	-0.052	-0.036
	(15.97)***	(93.93)**	(3.33)***	(0.92)	(3.79)***	(3.65)***	(4.52)***	(3.66)***
Attacks Against Police	-0.041	0.282	0.226	0.222	-0.02	0.073	0.055	0.019
	(5.94)***	(36.57)***	(1.94)*	(2.05)**	(0.04)	(0.64)	(0.45)	(0.21)
Total Conflict					0.3	0.18	0.192	0.118
					(8.18)***	(7.56)***	(52.51)***	(35.13)***
Total Conflict-Factorial Analysis					0.505	-0.002	0.967	0.283
					(1.50)	(0.03)	(9.49)***	(3.81)***
Clustered Errors	NO		State Level		State Level		School level	
Fixed effects	NO		State Level		State Level		School level	
Year of test fixed effects	NO		YES		YES		YES	
State specific linear trend	NO		NO		YES		YES	

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Errors clustered at the school level
Conflict variables in per 100,000 inhabitants per state per year
Factor: Eigenvalue 2.47; Proportion 0.61; KMO 0.72
Coefficients from separate regressions (controls for female, education of mother and education of father)

Table 16: Effect of exposure to conflict during the year of the test on the 5th grade Language and Math Scores

Independent Variables	Regression 1		Regression 2		Regression 3		Regression 4	
	Language	Math	Language	Math	Language	Math	Language	Math
Extortion	0.046	0.351	-0.559	0.192	-0.431	1.596	-0.579	1.505
	(3.20)***	(23.80)***	(1.27)	(0.26)	(0.67)	(1.16)	(3.55)***	(7.85)***
Terrorism	-0.201	-0.085	-0.679	-1.3	-0.857	-1.019	-0.892	-1.100
	(15.57)***	(6.36)***	(2.04)**	(2.59)**	(1.66)	(1.84)*	(5.40)***	(5.95)***
Kidnapping	0.042	0.058	0.024	-0.613	-0.045	-1.238	0.024	-1.325
	(3.40)***	(4.62)***	(0.07)	(1.09)	(0.09)	(1.17)	(0.12)	(6.04)***
Mass Murder victims	0.439	1.153	-0.47	-0.529	-0.497	-0.529	-0.334	-0.351
	(9.94)***	(25.42)***	(0.21)	(0.20)	(0.40)	(0.31)	(0.77)	(0.66)
Attacks Against Police	-0.274	-0.003	-0.925	-1.905	-0.402	-0.741	-0.297	-0.384
	(10.12)***	(0.11)	(2.79)***	(4.33)***	(1.22)	(1.00)	(1.37)	(7.25)***
Total Conflict					-0.282	-0.18	-0.288	-0.224
					(1.16)	(0.76)	(4.16)***	(2.85)***
Total Conflict-Factorial Analysis					-1.76	-4.845	-1.34	-4.819
					(1.55)	-1.31	(2.71)**	(7.00)**
Clustered Errors	NO		State Level		State Level		School level	
Fixed effects	NO		State Level		State Level		School level	
Year of test fixed effects	NO		YES		YES		YES	
State specific linear trend	NO		NO		YES		YES	

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Errors clustered at the school level
Conflict variables in per 100,000 inhabitants per state per year
Factor: Eigenvalue 2.66, Proportion 0.47, KMO 0.6421
Coefficients from separate regressions (controls for private and rural schools where appropriate)

Table 17: Effect of exposure to conflict during the year of the test on the 9th grade Language and Math Scores

Independent Variables	Regression 1		Regression 2		Regression 3		Regression 4	
	Language	Math	Language	Math	Language	Math	Language	Math
Extortion	0.316	0.193	-0.006	-0.003	1.722	1.951	0.898	1.028
	(17.67)***	(10.96)***	(0.01)	(0.01)	(1.90)*	(1.70)*	(5.86)***	(3.96)***
Terrorism	0.129	0.134	-0.537	-1.133	-0.216	-0.721	-0.065	-0.576
	(7.32)***	(7.77)***	(1.89)*	(1.99)*	(0.55)	(1.03)	(0.36)	(2.17)**
Kidnapping	0.058	0.148	-0.026	-0.475	-0.729	-1.581	-0.218	-0.948
	(3.76)***	(9.74)***	(0.07)	(0.81)	(1.06)	(1.59)	(1.32)	(3.57)***
Mass Murder victims	-0.268	0.814	-0.955	-0.431	-1.513	-1.265	-0.247	0.409
	(4.81)***	(14.87)***	(0.57)	(0.20)	(1.36)	(0.68)	(0.41)	(0.48)
Attacks Against Police	0.241	0.275	-0.493	-1.324	-0.645	-0.206	-0.286	0.191
	(6.38)***	(7.40)***	(1.89)*	(3.58)***	(1.32)	(0.35)	(1.13)	(0.61)
Total Conflict					0.191	0.028	0.161	-0.008
					(1.02)	(0.10)	(2.21)**	(0.07)
Total Conflict-Factorial Analysis					-3.257	-3.539	-1.10	-1.18
					(1.38)	(1.04)	(2.04)**	(1.46)
Clustered Errors	NO		State Level		State Level		School level	
Fixed effects	NO		State Level		State Level		School level	
Year of test fixed effects	NO		YES		YES		YES	
State specific linear trend	NO		NO		YES		YES	

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Errors clustered at the school level

Conflict variables in per 100,000 inhabitants per state per year

Factor: Eigenvalue 2.68; Proportion 0.53; KMO 0.645

Coefficients from separate regressions (controls for private and rural schools where appropriate)

Table 18: Effect of exposure to conflict during the year of the test on the 11th grade Language and Math Scores

Independent Variables	Regression 1		Regression 2		Regression 3		Regression 4	
	Language	Math	Language	Math	Language	Math	Language	Math
Extortion	0.051	0.017	-0.006	0.005	-0.008	0.001	0.006	0.013
	(85.05)***	(33.81)***	(1.45)	(1.13)	(1.29)	(0.34)	(3.26)***	(2.81)***
Terrorism	-0.012	0.001	-0.014	0.001	-0.014	-0.002	0.008	0.019
	(24.92)***	(1.56)	(2.10)**	(0.21)	(1.95)*	(0.85)	(4.17)***	(4.12)***
Kidnapping	-0.041	-0.008	-0.009	-0.004	-0.014	-0.007	0.007	0.004
	(87.74)***	(19.09)***	(1.88)*	(1.98)*	(2.31)**	(1.98)*	(4.28)***	(2.50)**
Mass Murder victims	-0.136	-0.008	-0.011	-0.007	-0.026	-0.016	0.001	-0.005
	(99.88)***	(7.29)***	(1.03)	(0.65)	(1.85)*	(1.65)	(0.28)	(2.00)**
Attacks Against Police	-0.031	-0.007	-0.034	-0.007	-0.035	-0.004	-0.003	0.021
	(25.85)***	(6.62)***	(1.89)*	(1.06)	(1.65)	(1.20)	(0.90)	(3.91)***
Total Conflict					-0.005	-0.001	-0.001	0
					(2.27)**	(1.97)*	(1.87)*	(0.09)
Total Conflict-Factorial Analysis					-0.104	-0.028	-0.036	-0.01
					(1.60)	(1.21)	(1.74)*	(0.97)
Clustered Errors	NO		State Level		State Level		School level	
Fixed effects	NO		State Level		State Level		School level	
Year of test fixed effects	NO		YES		YES		YES	
State specific linear trend	NO		NO		YES		YES	

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Errors clustered at the school level

Conflict variables in per 100,000 inhabitants per state per year

Factor: Eigenvalue 2.61; Proportion 2.51; KMO 0.57

Coefficients from separate regressions (controls for female, education of mother and education of father)

Table 19: Effect of exposure to conflict at birth on the 9th grade Language and Math Scores including Dropouts

Independent Variables	Assigning mean to the dropouts		Assigning 95% of mean to the dropouts		Assigning 90% of mean to the dropouts		Assigning 85% of mean to the dropouts		Assigning 80% of mean to the dropouts	
	Language	Math	Language	Math	Language	Math	Language	Math	Language	Math
Extortion	-6.16	-5.635	-5.436	-4.935	-4.711	-4.236	-3.987	-3.536	2.257	1.828
	(1.10)	(0.87)	(1.14)	(0.87)	(1.19)	(0.88)	(1.26)	(0.89)	(1.15)	(0.80)
Terrorism	0.093	0.343	-0.151	0.098	-0.396	-0.148	-0.64	-0.394	0.604	0.135
	(0.08)	(0.28)	(0.14)	(0.09)	(0.40)	(0.15)	(0.65)	(0.40)	(0.37)	(0.08)
Kidnapping	2.397	2.676	2.121	2.394	1.845	2.111	1.569	1.829	0.494	0.434
	(1.34)	(1.33)	(1.37)	(1.37)	(1.39)	(1.39)	(1.37)	(1.39)	(0.94)	(0.57)
Attacks Against Police	6.629	5.072	4.891	3.407	3.153	1.741	1.415	0.076	0.354	0.292
	(1.19)	(0.81)	(1.02)	(0.63)	(0.74)	(0.36)	(0.36)	(0.02)	(0.11)	(0.08)
Clustered Errors	State Level		State Level		State Level		State Level		State Level	
Fixed effects	State Level		State Level		State Level		State Level		State Level	
Year of test fixed effects	YES		YES		YES		YES		YES	
State specific linear trend	YES		YES		YES		YES		YES	

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Errors clustered at the school level
Conflict variables in per 100,000 inhabitants per state per year
Coefficients from separate regressions (controls for private school and rural school)

Table 20: Effect of exposure to conflict at birth on the 11th grade Language and Math Scoresincluding Dropouts

Independent Variables	Assigning mean to the dropouts		Assigning 95% of mean to the dropouts		Assigning 90% of mean to the dropouts		Assigning 85% of mean to the dropouts		Assigning 80% of mean to the dropouts	
	Language	Math	Language	Math	Language	Math	Language	Math	Language	Math
Extortion	0.529	0.087	0.517	0.081	0.504	0.074	0.492	0.067	0.266	0.075
	(5.73)***	(1.24)	(6.42)***	(0.92)	(6.57)***	(0.70)	(5.96)***	(0.54)	(1.22)	(0.41)
Terrorism	0.165	0.073	0.176	0.081	0.188	0.088	0.2	0.095	0.495	0.384
	(1.53)	(0.71)	(1.59)	(0.76)	(1.64)	(0.80)	(1.68)	(0.84)	(1.54)	(3.19)***
Kidnapping	0.306	0.104	0.33	0.124	0.354	0.143	0.377	0.163	0.632	0.287
	(3.80)***	(2.91)***	(3.69)***	(2.88)***	(3.50)***	(2.65)**	(3.30)***	(2.42)**	(2.02)*	(1.71)*
Attacks Against Police	0.013	0.192	0.218	0.348	0.423	0.504	0.628	0.66	0.501	0.524
	(0.04)	(1.73)*	(0.56)	(2.09)**	(0.95)	(2.15)**	(1.23)	(2.15)**	(0.74)	(1.53)
Clustered Errors	State Level		State Level		State Level		State Level		State Level	
Fixed effects	State Level		State Level		State Level		State Level		State Level	
Year of test fixed effects	YES		YES		YES		YES		YES	
State specific linear trend	YES		YES		YES		YES		YES	

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Errors clustered at the school level
Conflict variables in per 100,000 inhabitants per state per year
Coefficients from separate regressions (controls for female, mother and father levels of education)

Table 22: Effect of exposure to conflict during the year of the test on the 11th grade Language and Math Scores including Dropouts

Independent Variables	Assigning mean to the dropouts		Assigning 95% of mean to the dropouts		Assigning 90% of mean to the dropouts		Assigning 85% of mean to the dropouts		Assigning 80% of mean to the dropouts	
	Language	Math	Language	Math	Language	Math	Language	Math	Language	Math
Extortion	-0.008	0.002	-0.007	0.003	-0.006	0.004	-0.005	0.004	-0.01	0.002
	(1.26)	(0.63)	(1.20)	(0.69)	(1.09)	(0.74)	(0.96)	(0.77)	(1.40)	(0.41)
Terrorism	-0.015	0	-0.015	0	-0.015	0	-0.015	-0.001	-0.018	-0.009
	(1.82)*	(0.03)	(1.87)*	(0.02)	(1.84)*	(0.06)	(1.76)*	(0.09)	(2.30)**	(2.77)***
Kidnapping	-0.016	-0.006	-0.017	-0.007	-0.018	-0.008	-0.018	-0.009	-0.025	-0.016
	(2.54)**	(1.46)	(2.61)**	(1.49)	(2.62)**	(1.49)	(2.58)**	(1.48)	(2.02)*	(2.34)**
Mass Murder Victims	-0.01	-0.017	-0.013	-0.019	-0.015	-0.02	-0.017	-0.022	-0.063	-0.041
	(1.03)	(1.75)*	(1.19)	(1.95)*	(1.31)	(2.11)**	(1.40)	(2.23)**	(2.34)**	(3.31)***
Attacks Against Police	-0.025	0.001	-0.027	-0.001	-0.029	-0.003	-0.03	-0.005	-0.05	-0.031
	(1.29)	(0.23)	(1.39)	(0.11)	(1.45)	(0.35)	(1.49)	(0.50)	(2.09)**	(2.82)***
Clustered Errors	State Level		State Level		State Level		State Level		State Level	
Fixed effects	State Level		State Level		State Level		State Level		State Level	
Year of test fixed effects	YES		YES		YES		YES		YES	
State specific linear trend	YES		YES		YES		YES		YES	

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Errors clustered at the school level
Conflict variables in per 100,000 inhabitants per state per year
Coefficients from separate regressions (controls for female, mother and father levels of education)

Table 21: Effect of exposure to conflict during the year of the test on the 9th grade Language and Math Scores including Dropouts

Independent Variables	Assigning mean to the dropouts		Assigning 95% of mean to the dropouts		Assigning 90% of mean to the dropouts		Assigning 85% of mean to the dropouts		Assigning 80% of mean to the dropouts	
	Language	Math	Language	Math	Language	Math	Language	Math	Language	Math
Extortion	3.594	4.027	2.809	3.241	2.024	2.455	1.239	1.669	0.104	-0.021
	(1.30)	(1.36)	(1.13)	(1.22)	(0.92)	(1.03)	(0.63)	(0.78)	(0.12)	(0.03)
Terrorism	-0.92	-1.321	-0.671	-1.06	-0.421	-0.8	-0.172	-0.539	-0.575	-1.052
	(1.17)	(1.43)	(0.97)	(1.33)	(0.69)	(1.17)	(0.31)	(0.94)	(1.47)	(1.94)*
Kidnapping	-2.881	-3.882	-2.581	-3.554	-2.281	-3.225	-1.981	-2.897	-0.88	-1.321
	(1.39)	(1.63)	(1.42)	(1.67)	(1.43)	(1.70)*	(1.43)	(1.71)*	(1.32)	(1.89)*
Mass murder victims	-4.213	-4.53	-3.581	-3.884	-2.949	-3.238	-2.318	-2.592	-2.005	-2.099
	(1.80)*	(1.68)	(1.74)*	(1.62)	(1.65)	(1.52)	(1.48)	(1.36)	(1.36)	(0.88)
Attacks Against Police	-0.862	-0.417	-0.772	-0.344	-0.682	-0.271	-0.592	-0.199	-0.861	-1.464
	(0.60)	(0.29)	(0.57)	(0.25)	(0.52)	(0.20)	(0.46)	(0.15)	(1.33)	(1.98)*
Clustered Errors	State Level		State Level		State Level		State Level		State Level	
Fixed effects	State Level		State Level		State Level		State Level		State Level	
Year of test fixed effects	YES		YES		YES		YES		YES	
State specific linear trend	YES		YES		YES		YES		YES	

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Errors clustered at the school level
Conflict variables in per 100,000 inhabitants per state per year
Coefficients from separate regressions (controls for private school and rural school)