An Evaluation of the Effect of Quality of Education on Violence: Evidence from Colombia*

Andres Giraldo† Manini Ojha‡

December, 2016

Abstract

This paper evaluates the impact of quality of education on violence and crime exploiting transfers of funds from central government to municipalities as a source of exogenous variation. Using test scores as a measure of quality of education at municipality level, the paper establishes that better education has a negative impact on kidnapping rates, rate of theft on persons as well as the presence of illegal armed groups. Our results are found to be consistent with an opportunity cost effect and a pacifying effect of education. High quality education may increase higher expectations of being absorbed by the labor market discouraging engaging in criminal activities. This is the mechanism through which the opportunity cost effect works. Alternately, the other mechanism could be one of a pacifying effect such that improvement of education quality may generate less violent environments, promoting social and political stability. Although we find a positive effect of education quality on ambush rates, an indoctrination effect, one where education leads to indoctrination of political ideas and higher violence, cannot be definitively attributed as a cause for this. The results are found to be robust to a number of econometric concerns and different measures of quality of education.

PRELIMINARY DRAFT: PLEASE DO NOT QUOTE OR CITE.

1 Introduction

Researchers have asserted that growing up in a violent environment hurts development in the long run and affect households' decisions like human capital accumulation or child participation in labor market (Rodríguez et al., 2009). In such environments, better socio-economic conditions are believed to have an assuaging effect. From policy stand-point, a way to achieve better socio-economic conditions is to improve local educational systems. While the causal impact of educational attainment or level of education on violence has been a subject of several empirical studies ((Barakat and Urdal, 2009; Collier et al., 2004; Hegre et al., 2009; Melander, 2005; Shayo, 2007)), much less is known about the causal impact of quality of education on violence and our paper contributes to this strand of literature.

*We are deeply indebted to Daniel Millimet and Ömer Özak for his useful insights and guidance. Comments, critics and suggestions from Federico Curci, Klaus Desmet, Elira Kuka, Berthold Herrendorf, James Lake, Lance Lochner, Luigi Pistaferri, Michael Lovenheim, and Punarjit Roychowdhury as well as participants at the 86th Southern Economic Association meeting, the 5th Congress of Colombian Economy organized by Universidad de os Andes, the Empirical Microeconomics Workshop III organized by University of Calgary, Canada and SMU Research Day are greatly appreciated. We also wish to acknowledge the Studies Center of Economic Development (CEDE) at Universidad de los Andes (Colombia), the National Administrative Department of Statistics (DANE, Colombia) and IPUMS International at Minnesota Population Center (University of Minnesota), the National Department of Planning (DNP, Colombia) and the Colombian Institute for Evaluation of Education (ICFES, Colombia) for providing the information used in this research. All remaining errors are our own.

†Email: agiraldopalo@smu.edu

‡Email: mojha@smu.edu

Recent education debates emphasize the importance of looking at education quality rather than only quantity as a reliable indicator of economic impacts. Evidence points to the fact that the number of years a student stays in school may not be an adequate measure of a good education system or even student achievement. In fact, measures of individual cognitive skills that incorporate dimensions of test-score performance provide much better indicators of economic outcomes (Hanushek et al., 2016). In line with such evidence, we assert that assessing the impact of education quality is essential for researchers to understand the existence and persistence of violence and conflicts. Moreover, from a policy perspective, investment in better quality education may be a tool of social mobility and long run development for the country. When students learn more in school, they become more skilled and effective participants in the country's workforce. Over the long run, successful efforts to improve school quality would thus imply an extraordinary rate of return.

Although it is understandably difficult to collect data on individual motivation of involvement in crime and violence, quantitative analysis of this causal link at a dis-aggregated level is lacking from the existing literature (see (Østby and Urdal, 2011) and our paper builds on this.

We hypothesize that education quality may affect violence through four channels. First, investments in improvement of education quality may generate environments that are less violent, promoting social and political stability. It is a way in which the government may positively affect social development and in this sense, better quality education may have what can be termed a 'pacifying effect'. Second, high quality education may increase higher expectations of being absorbed by the labor market or of future returns in the labor market, discouraging engaging in criminal activities. This is what we term the 'opportunity cost effect'. Third, education may even be used as a means of indoctrination in regions with a strong presence of religion on State. We call this the 'indoctrination effect'. As a fourth channel, education quality is likely to impact the quantity of education in the country over time which in turn has a direct impacts on violence levels.[1] We examine the first three hypotheses and asses the causal relation between quality of education and violence using Colombia as a case study. This relationship between education and violence is particularly of interest in the context of Colombia given that it is a country that has suffered long standing conflict and has a tradition of high exposure to violence.

In 1948 the most likely candidate to be elected president in Colombia was assassinated and this triggered a period of high levels of violence known as La Violencia. There was a civil conflict among the main political parties mainly in rural areas. This period ended with a political agreement known as Frente Nacional, where the two parties agreed to alternate power as a sign of peace. This phenomena was interpreted as discriminatory by some factions of the liberal party and motivated the creation of the FARC and later of the ELN, the two main left wing guerrillas that are still active today. The drug phenomena appeared at the end of 1970s and permeated the country with high level of violence in urban areas. According to the United Nations Office on Drugs and Crime (UNODC), Colombia was one of the most violent countries in 1990s measured by the homicide rate and remains a country with a high levels of violence although the homicide rate has decreased significantly during this century, starting at 64 in 2000 and falling up to 25 in 2015. However, these rates are considerably high when compared at an international level.

Our empirical analysis is at municipality level and spans a period of six years (2007-2013). We use results from a standardized examination in Colombia for students at the last level of high school as a measure of quality of education. We recognize the existence of selection issues associated with using test scores as a measure of quality since test scores are conditional on taking the standardized exam. We go on to correct for the self - selection problem in test scores to minimize measurement error in our estimates.

We use an instrumental variable approach in our estimation strategy since education quality is endogenous.

[1] In this paper we do not explore this channel. See Lochner (2010) for discussion on school quality and school choice impacting educational attainment and in turn crime.

Quality of education depends on funding for education which is allocated by the central government. However, this allocation is likely endogenous as there are unobservables associated with the process of allocation of funds that could be correlated with violence at municipality level. We construct two instruments for our analysis. The first instrument is a spatial instrument constructed by taking spatially lagged transfers of funds from central government to municipalities. More specifically, it is based on central government transfers to neighboring municipalities for investment in quality of education. The second instrument is based on a shift share approach which exploits variation in the size of the central budget, but is not a function of current allocation decisions. This takes the investment in education quality by the central government in own municipality based on the allocations decisions in 2001 as fixed and employs a shift-share formula to arrive at investment figures for our period of analysis. We use one period lag of both our instruments for education quality recognizing the fact that investment in education may take some time to have its effect.

Our findings show that quality of education has a significant and negative impact on certain measures of violence. In order to test the 'opportunity cost effect', we use outcome measures associated with economic crimes perpetrated by criminals against people. These measures are non political kidnappings, car theft, commerce theft, theft on persons and household thefts. We find that quality of education causes a reduction of these types of crimes. The results are found to be robust to sample restrictions like exclusion of Bogota or municipalities with less than 200,000 population or urban areas. Excluding state capitals and considering only rural areas, we do not find any 'opportunity cost effect', the reason being that thefts are more often than not perpetrated in urban and richer areas.

Results pertaining to outcomes like homicides, political kidnapping, ambushes and terrorist attacks pertain to the conflict situation Colombia has long suffered and effectively belong to the category of violent crimes. A statistically significant negative causal relationship is found between quality of education and total kidnapping rates and may be suggestive of a 'pacifying effect' of better education quality.

With regard to ambush rate, our results are counter-intuitive as we find a positive and statistically causal relationship. At first glance, one could interpret this effect as an 'indoctrination effect' as theory suggests. However, we explore ambushe rates further as this measure of conflict could be capturing what can be termed as an 'attraction effect'[2] since these kind of acts occur in areas that are more developed. In order to investigate this effect in dept, we use presence of illegal armed groups in municipalities and surrender rate by members of illegal armed groups to the police as other outcome variables. We find that better quality of education in municipalities reduce the probability of presence of illegal armed groups. Furthermore, better quality of education increases the surrender rate by members of illegal armed groups to the police. Both these effects are found to be statistically significant. Given these findings, one may assert that better quality of education generates a 'pacifying effect' with respect to variables associated to conflict.

The rest of the paper is organized as follows. Section 2 presents a review of related literature on education and violence. Section 3 consists of three subsections. Subsection 3.1 describes how we construct our dataset for the analysis followed by subsection 3.3 describing our estimation strategy and section 3.4 gives a detailed account of our identification strategy. Section 4 discusses the baseline results followed by robustness checks in section 5. The paper ends with conclusion and policy discussion in Section 6.

2 Literature

Considerable amounts of macro-level and cross-national studies exploring the correlation between the levels of education and conflict exist (Barakat and Urdal, 2009; Collier et al., 2004; Hegre et al., 2009; Melander, 2005; Shayo,

[2]Ambushes are criminal acts committed when police patrols or military units are on the move

2007). These papers find that countries with higher average levels of education have a lower risk of experiencing conflict. Most of the evidence focuses on education levels measured by some variant of secondary education enrollment or years of education. In particular, it is found that young male population are more likely to increase the risk of conflict in societies where male secondary education is low. This is especially true for low and middle income countries. Thus, increasing secondary male enrollment reduces conflict risk (Barakat and Urdal, 2009 and Collier et al., 2004). Hegre et al. (2009) find an impact of increased education on future global conflict levels which in turn transmits into neighboring countries. Melander (2005) interestingly highlights that lower levels of ratio of female-to-male higher educational attainment are associated with lower levels of intrastate armed conflict for about 100 countries. Shayo (2007) however, shows a causal impact of increasing average schooling of population and finds that it reduces the risk of civil war and conflict.

Single country papers such as Urdal (2008), Mancini (2005) and Krueger and Malečková (2003) study the causal impacts of quantity of education on terrorism, religious and ethno-communal violence in detail. Urdal (2008) suggests that literacy has no causal impact on armed conflict risk, slightly positive effect on political violence, and negative impact on Hindu-Muslim riots for India. Mancini (2005) found that on average, inter-ethnic educational inequality is generally lower in peaceful districts for Indonesia. Krueger and Malečková (2003) investigates a causal link between poverty or low education and terrorism. They present that terrorists have slightly better average education than the population in general in Gaza. Other papers exploring the relation between quantity of education and violence for single countries are Berrebi (2007), Humphreys and Weinstein (2008) and Oyefusi (2008) but these papers report correlations. Berrebi (2007) looks into Palestinian terrorism and finds higher education is positively correlated with participation in Hamas and with becoming a suicide bomber. Humphreys and Weinstein (2008) find that lack of education predicts participation in both rebellion and counter-rebellion in Sierra Leon. Oyefusi (2008) suggest that primary, secondary and tertiary education reduce the willingness to participate in violent protests with the latter also reducing the probability of having a disposition to armed struggle for Niger Delta.

Another body of literature in this field focuses on educational policies and violence. Brown (2011) in his theoretical paper examines the ways in which education levels and educational policy impact dynamics of violent conflict and finds no direct effect but that education interacts crucially with many other dimensions of conflict. Among the causal papers studying the impact of levels of education, educational policies and violence are Moretti (2005) and Lochner (2004). Moretti (2005) argues that the reductions in violence and property crime are caused by increased schooling and most of the effect of education may come from increased wages although, education may increase the returns to white collar crime more than the returns to work. Consistent with this, Lochner (2004) find that arrest rates for white collar crime increase when education levels rise. One paper that explores the causality between quality of education and in-prison behavior is by Rodríguez et al. (2009). They use indicators of in-prison violent behavior and participation in educational programs to asses the effect of education conflict for Argentina to find that educational programs significantly reduce indicators of property damages in prison.

Lochner (2010) in his review of empirical work in related literature recognizes that both school quality and the type of school students attend are important for determining the impacts of quantity of education on crime. However, there are no studies estimating a direct impact of school quality on crime. Some causal papers exist which investigate the impact of school choice on student outcomes including delinquency and crime (Cullen et al., 2006, Deming, 2011 and Guryan, 2004). These papers mention school quality has an impact on school enrollment and through this channel reduces crime.

Some papers investigate the causal effect of conflict on education and labor market outcomes (see Rodriguez and Sanchez (2012), Barrera and Ibánez (2004)). Rodriguez and Sanchez (2012) estimate the causal effect of armed conflict exposure on school drop-outs and labor decisions of Colombian children between the ages of 6 and

17. They find that conflict affects children older than 11, inducing them to drop out of school and enter the labor market too early. Barrera and Ibánez (2004) develop a dynamic theoretical model on the relationship between violence and education investments. They identify that violence can affect utility of households directly and modifies consumption of education. Extreme violence can destroy physical capital which lowers investment and production. It also modifies the rates of return of education thus changing the investment on education. Empirically, they find evidence that school enrollment is low in Colombian municipalities with homicide rates above the national median.

3 Data and Identification

3.1 Data

Our data for this analysis is taken from four different sources. We use the Municipal Panel of CEDE, constructed by the Studies Center of Economic Development (CEDE by its acronym in Spanish). This panel contains information on 1122 municipalities and around 2000 variables from the last two decades. The panel is constituted by 5 sub-panels: general characteristics, land and agriculture, fiscal policy, conflict and violence and education. The CEDE has collected information from different public and private institutions and provides this information to be used by general public. We also use the Colombian Institute for Evaluation of Education (acronym ICFES in Spanish) database for test scores at individual level within the municipalities. We gather census information from the National Administrative Department of Statistics (acronym DANE in Spanish) administered by Minnesota Population Center, University of Minnesota, IPUMS International. The IPUMS sample contains information for approximately 4 million individuals and the Census was conducted between May 2005 to February 2006. Lastly, we use data from the National Planning Department (DNP) for information on investment in educational quality. Our final constructed data is at municipality level and spans the years 2007 to 2013.

Our outcome variables are different forms of violence and crime in a particular municipality at a given point in time. We take into account five kinds of crimes that occur in a municipality - homicides, kidnappings, terrorism, ambushes and thefts. Theft is further divided between theft on persons, car theft, commerce theft and household theft. Kidnapping is segregated between total, political and non-political kidnappings. Homicides are the number of people killed. Kidnapping is the abduction or illegal transportation of a person and political kidnapping is a kidnapping committed by an illegal armed group. Ambushes are actions perpetrated by illegal armed groups against police patrols or military units that are moving and where the expected response is lower than the intensity of attack. Terrorist attacks are actions of violence against civilians to cause fear. [3] We construct ten different rates violence and crimes where violence or crime rate is total crime divided by total population times 100,000 inhabitants. Presence of illegal armed groups is another outcome variable considered in our anaylsis. It is a dummy variable which takes value 1 if either FARC, ELN or both are present in the municipality. This outcome is of particular interest because it suggests the impact on violence solely associated with conflict.

Our main variable of interest is quality of education at municipality level for which we consider student test scores at a standardized examination at their last level of high school. ICFES provides detailed individual standardized test scores dis-aggregated by specific subjects namely mathematics, language, social sciences, philosophy and biology. We construct a municipality level measure of test scores that account for selection into the examination. Our preferred measure of quality of education is the average of the selection-corrected median scores in the five subjects taken together. We explore other measures of test scores as well wherein we concentrate on only some subjects to ascertain performance in terms of cognitive ability. This measure is the average of the selection-corrected median

[3] Political kidnapping is perpetrated by guerrillas and para-militaries and non political kidnapping is perpetrated by common delinquencies, narco-traffickers and others.

scores in mathematics and language. Additional measures of quality of education are also explored in this paper such as average z-score index of the selection-corrected median in different subjects,[4] average individual total score, median score in mathematics and median score in language.

Our control variables include a linear time trend, municipality level controls like birth rate, death rate, infant mortality rate, a rurality index of municipality as an indicator of inequality, and fiscal characteristics like per-capita property tax revenue, per-capita industry and commerce tax revenue, per-capita royalties revenue, per-capita expenditure on personal services, per-capita general expenditure, per-capita operating costs and transfers in compensations, agricultural yield.[5] [6] Table 4 summarizes the variables used in our analysis.

For illustration purposes, Figures (1) and (2) show the distribution of two economic crime measures and two measures of quality of education across the country in 2007 and 2013. The correlation between theft on commerce per 100,000 inhabitants and the average score in subjects is 0.2401 in 2007 and 0.1702 in 2013, whereas the correlation between theft on person rate and the average score in subjects is 0.2195 in 2007 and 0.2430 in 2013. The initial positive correlation apparent from the figure is intriguing and speaks to the importance of examining further if there exists a causal impact of quality of education on violence in Colombia.

3.2 Selection Issues

A potential issue with using test scores as a measure of educational quality is that test scores suffer from self-selection issues. Since the test scores are conditional on going to school till grade 11 and taking the standardized test, it does not represent the true quality of education in the municipality and our estimates would suffer from measurement error. We correct this self-selection issue by using data from the 2005 IPUMS Census and estimate drop out rates at municipality level to minimize the measurement error. All municipalities of a state are not included in the IPUMS Census sample. IPUMS aggregates the municipalities with population less than 20,000 into one category for every state. To arrive at the final municipality level dropout rates, we make two assumptions. First, we assume that the dropout rate for each municipality that falls under the aggregated category of IPUMS is same. We believe this to be a valid assumption since these smaller municipalities are similar in population characteristics to each other. Second, municipality level drop out rates do not change significantly across time.

To estimate the drop out rates, we first use probability weights provided in the census data and calculate the total population in each state in 2005 for the age group of 16, 17 and 18 years. This is the age group at which most students take the examination in high school in Colombia.[7] We then calculate the population of 16, 17 and 18 year olds who never attended school, were not attending school in 2005 or had studied up to middle school but did not complete schooling in 2005. This depicts the total number of dropouts for each municipality. Dividing the total dropouts by the total population in this age group for each municipality gives us the weighted drop out rates for 2005.

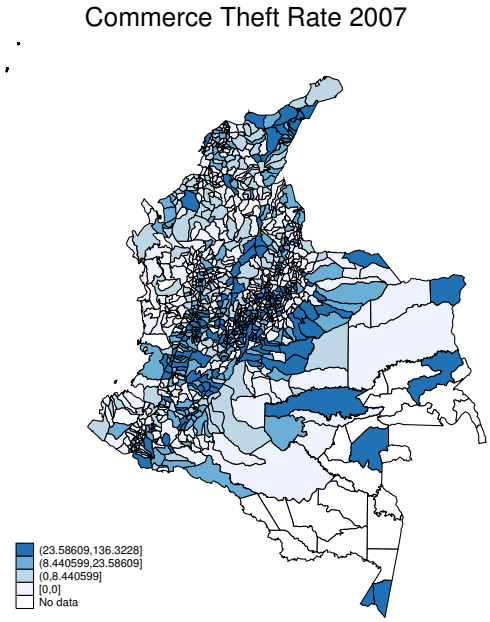
[4] This summary index is defined to be equally weighted average of z-scores of its components. Z-scores are calculated by subtracting the group median and dividing by the group standard deviation giving us a standardized z-score variable for test scores.

[5] Agricultural yield is the ratio of agricultural cultivation to agricultural production for all crops at municipality level.

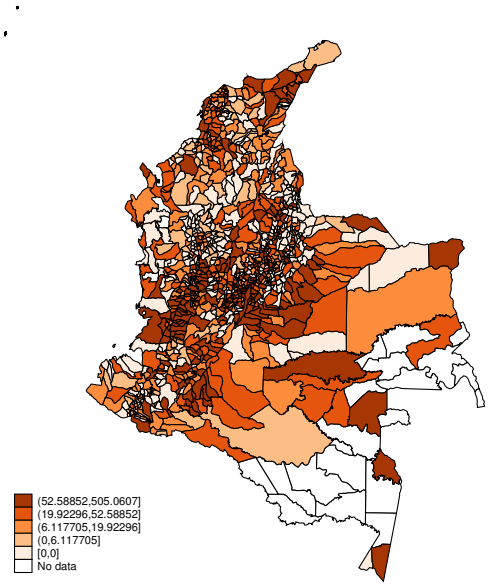
[6] General characteristics of municipality (notaries, banks, churches, health centers, clinics, tax collection offices, electricity coverage), historical characteristics (history of violence, Spanish occupation of municipality, presence of indigenous population, presence of land conflict, presence of illegal crops, armed groups) and geographical characteristics (area of municipality in squared km., height of municipality in squared km., linear distance to state capital in squared km) distribution of land and land owners in municipality are not included as we are running a fixed effects model and these are time invariant characteristics of the municipalities.

[7] ICFES data shows that approximately 77% of the population belonged to the age group of 16, 17 and 18 years in 2007 who took this examination.

Figure 1: Economic Crime and Education 2007



Source: CEDE



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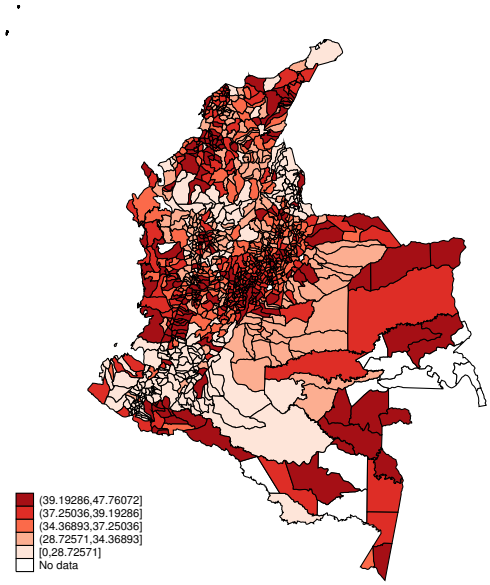
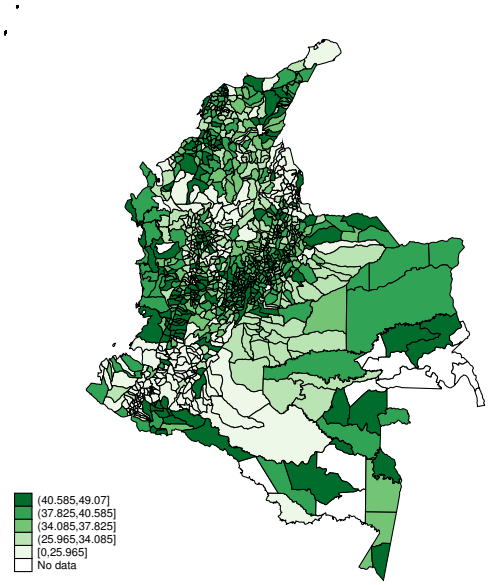
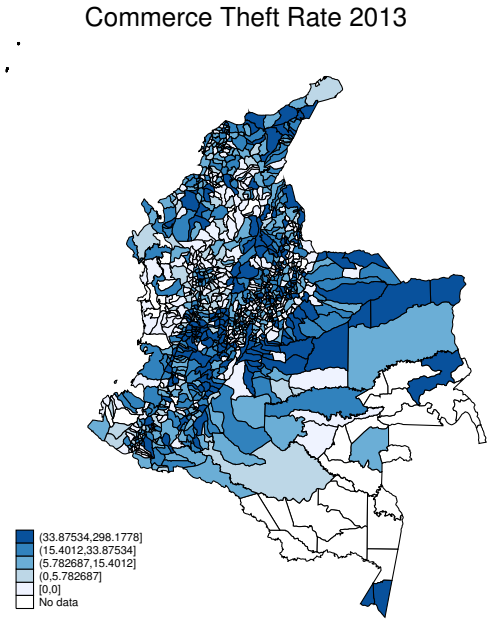


(Source: ICFES, IPUMS, and authors' calculations)



(Source: ICFES, IPUMS, and authors' calculations)

Figure 2: Economic Crime and Education 2013



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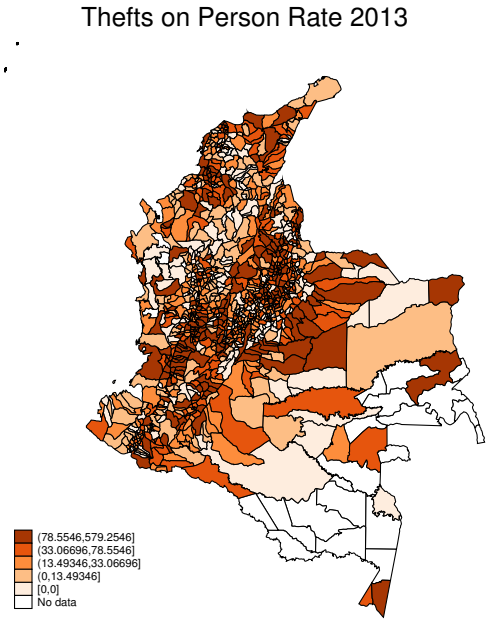

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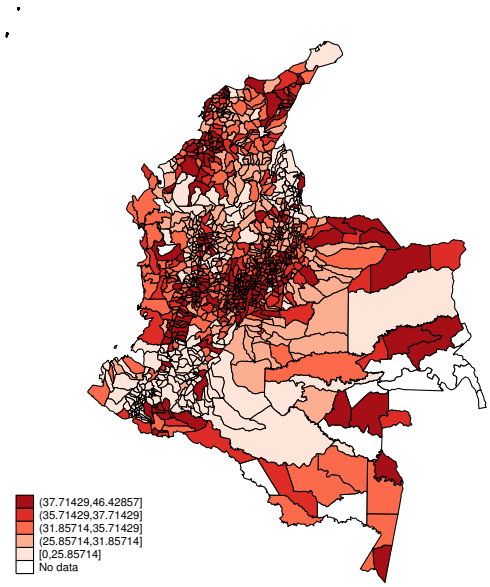
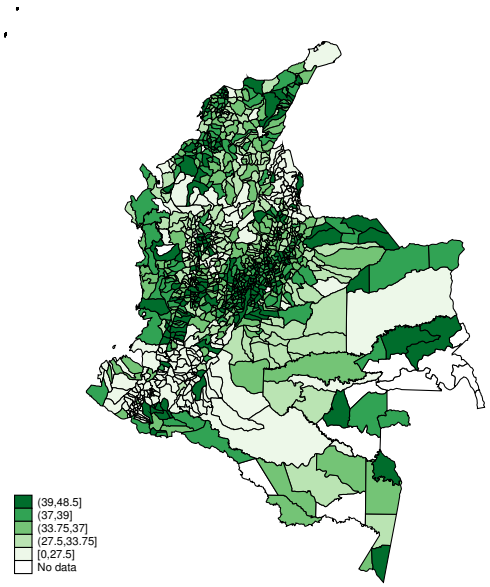


(Source: ICFES, IPUMS, and authors' calculations)



(Source: ICFES, IPUMS, and authors' calculations)

From the information consolidated by ICFES, using individual level test scores we arrive at the median score at municipality level. Our aim is to impute the dropouts as those scoring below this median score. We impute zeros for those students who belong to the dropout category and then take median score for the municipality since the zero is irrelevant as long as dropouts would have been below the median. The assumption for this imputation is that those students who did not appear for the exam or dropped out are considered to be students who would have scored below the median. This brings us to the selection-corrected median test scores which is a measure of educational quality at the municipality level. We then standardize this test score conditional on the imputed scores using the formula $\frac{(Y - sample\,mean)}{(sample\,sd/10)} + 50$.[8] Note that in the databases, there are some missing values for the municipality of residence, so we also impute the municipality of residence from the municipality where the students took the examination.[9]

3.3 Estimation

We estimate the following model to identify a causal impact of quality of education on crime

$$Y_{mt} = \beta_0 + \beta_1 EducationQuality_{mt} + \beta_2 X_{mt} + \mu_m + trend_t + \varepsilon_{mt} \tag{1}$$

where Y_{mt} are nine different rates of violent crimes in municipality m at time period t; $EducationQuality$ is municipality level measure of test scores explained in the previous section; X_{mt} are the set of covariates; μ_m are the municipality fixed effects; $trend_t$ captures time trend of the outcome variable and ε_{mt} the mean zero error term in equation. The parameter of interest is β_1 giving us the causal impact of education quality on violence. We also estimate another model to identify the causal impact of quality of education on presence of illegal armed groups

$$Presence_{mt} = \beta_0 + \beta_1 EducationQuality_{mt} + \beta_2 X_{mt} + \mu_m + trend_t + \varepsilon_{mt} \tag{2}$$

where the outcome variable $Presence_{mt} = 1$ if any of the illegal armed groups (ELN or FARC) is present in municipality m at time t. We also decompose this outcome variable and estimate the model separately for presence of FARC and presence of ELN. We estimate a third model by changing the outcome variable to $Surrender_{mt}$ which is a continuous variable denoting the rate of voluntary surrenders to the police by members from any illegal armed groups per 100,000 inhabitants in municipality m at time t.[10] Right hand side of our models remain similar to model 1.

3.4 Identification Issues

With reverse causality present from violence to education, a simple Ordinary Least Squares (OLS) estimation is not likely to yield unbiased or consistent estimates of the impact of education quality on violence measures. Education quality is likely endogenous even otherwise, since test scores are a noisy proxy of true education quality. We therefore employ an Instrumental Variable approach to find a causal impact of education quality on violence in Colombia. We use two instruments in our model.

Our first instrument is constructed from the information on central government transfers to municipalities for investment in quality of education. Quality of education depends on central government's allocation of funds to municipalities. Central government transfers funds for investment in quality of education to every municipality based on three criteria, which are, population projected to attend school in the municipality, population that

[8] This form of standardization is widely used in the education literature.

[9] For 2007 there were 198, 2008: 207, 2009: 223, 2010: 535, 2011: 1171, 2012: 95 missing values in ICFES database.

[10] The government has a program wherein it provides monetary compensation or protection to those who decide to surrender.

attended school in the municipality and a measure of equality between municipalities.[11] Given this, transfers directly assigned to own municipalities is likely endogenous since there could be unobservables associated with this process of allocation of funds that are correlated with violence in the municipality. Thus, we do not use the central government transfers directly to municipality m as this may impact violence in municipality m directly and would violate the exclusion restriction required for a valid instrument. We use transfers to neighboring municipalities in period $t-1$ given that central government has a fixed budget for education in a state determined by Law. The central government determines how this budget for education is distributed to different municipalities. Funds allocated from the central government for this purpose to the neighboring municipalities are thus going to affect the funds allocated to municipality m which in turn would affect the quality of education in m, thus serving as a valid instrument. We believe that investments such as these do not have a contemporaneous correlation with test scores. Such kinds of investments have a gestation period and take time to have an impact. Thus, we consider the investment in education quality for neighboring municipality in time period $t-1$ to be one of the instruments. Additionally, in construction of this instrument, we exclude the neighboring municipalities that share a common border with municipality m because government funds to the neighbors may still impact the crime level in m. With easy mobility between municipalities that share borders with m, this is likely to have an indirect impact on the crime levels in municipality m. To avoid such crime spillovers, we exclude the first ring of neighbors. Finally, we take the average of the funds for investment in quality of education in the neighbors eliminating the first ring of neighbors in time period $t-1$.

The second instrument is based on the central government investment for education quality in the municipality in consideration, m. It is constructed using a 'shift-share' formula. We take the base year of 2001 for investment in education and calculate the share of government funds allocated to each municipality in 2001, $s_{m,2001}$ which is municipality specific and time invariant. The shift-share of investment is calculated by multiplying the share $s_{m,2001}$ by the total central government budget in years 2007 to 2013. Here again, we use one period lag of this shift-share of investment as the instrument for test scores given the belief that education quality has a lagged impact on violence and crime. This is posited to be exogenous since the proportion of funds are based on the year 2001 making it time invariant and unlikely to be correlated with violence or crime today. One can say the violence in Colombia is persistent and that could invalidate the exogeneity restriction. However, during the decade, violence in Colombia at an aggregate level has been on a declining trend. So, theoretically, the fixed share of government investment in education quality in 2001 will not likely influence or be influenced by violence rates today.[12]

3.5 Institutional Framework[13]

According to the political constitution of 1991, the central government in Colombia was required to provide resources to other subnational levels with the aim of encouraging decentralization. These transfers were allocated to states, special districts, and municipalities. Fraction of transfers to states and special districts were called *Situado Fiscal* (SF) and the fraction to municipalities were called municipalities participations (PM by its acronym in Spanish). The SF and PM resources were calculated as a fraction of the current national revenue (ICN by its acronym in Spanish). Resources constituting the SF were to be spent on education and health, whereas the PM on health,

[11] Details on the institutional framework is provided in the next section.

[12] One concern that could arise here is that even though the trend of violence is declining, if there exists a positive serial correlation between the violence measures over time, then central government allocations in 2001 may still be correlated with violence today. However, in our analysis, we cluster the standard errors at municipality level which takes care of the serial correlation in the idiosyncratic error term (Drukker 2003; Wooldridge 2010). Moreover, we see no serial correlation between most of violence measures from 2007-2013 except for the case of homicide rates and rate of household thefts.

[13] An excellent summarize of the way the fiscal decentralization works in Colombia may be found in Bonet et al. (2014). This section is mainly based on this document.

education, potable water, physical education, recreation, sports and free investment. However, this initial system underwent two big reforms.

The first reform was approved post the 1999 crisis. The SF was eliminated and replaced by the General System of Participations (SGP by its acronym in Spanish). The main fiscal units became the states and municipalities. Starting 2009, the central government calculated the average ICN growth over last 4 years and the total amount as well as the criteria of distribution was revised by Congress every 5 years. The resources allocated were to be invested in education (58.5%), health (24.5%) and general purposes (17%). The criteria of transfers changed overtime to inclue population that attended school and population projected to attend for education; population projectec to attend, equality and administrative efficiency for health; and relative poverty, rural and urban population, fiscal and administrative efficiency for general purposes.

The last reform was implemented in 2007. The new law included investment in education, health and general purposes as well as potable water and basic sanitation. Share of resources to be allocated changed to 58.5% for education, 24.5% for health, 11.6% for potable water and basic sanitation and 5.4% for general purposes. In order to allocate resources to water and sanitation, the central government considered coverage deficit, attended population, effort exerted by subnational levels to increase coverage, poverty, and fiscal and administrative efficiency. The Congress and central government also included a strategy to control and monitor the way the resources were invested in this reform.

By 2012, the SGP represented 4% of the GDP, 30% of the ICN and 15.7% of the total public expenditure (Bonet et al., 2014). In general, the subnational transfers increased steadily between 3% and 5.5% between 1993 and 2001. The transfers were growing more than taxes and the ICN. Eventually the share of SGP changed from 4.8% of the GDP in 2012 to 3.8% in 2012. SGP as part of ICN changed from 40% in 2002 to around 27% in 2012(Bonet et al., 2014). With respect to education, its share in ICN changed from 23.17% in 2002 to 16.61% in 2012. This sector receives the biggest portion of the national transfers. The reform in 2007 sought to include quantity and quality criteria. The main goal was to increase coverage to 100% of territory and improve the score on the standardized test, Saber.[14]

4 Results

4.1 Economic Crimes

Our measure of education quality is the average of the selection-corrected median scores in all subjects (see section 3.1). Panel A of Table 1 depicts the impact test scores have on five outcomes of economic crimes to explain the opportunity cost effect. The outcome variables are rate of theft on cars, commerce, persons and household and non-political kidnapping rate. Our models fair well on all specification tests. We report the p-value of the Kleibergen Paap rk LM statistic which depicts the underidentification test. The null here is that the model is underidentified and we are able to safely reject the null for all nine specifications implying that our instruments are relevant and correlated with the endogenous regressor. The Kleibergen Paap F statistic is also reported which depicts the weak-identification test. The F statistic is well above 10 across all specification suggesting absence of weak-instrument problem. Since we use two instruments, we report the Hansen J statistic for overidentification of our model. The null here is that the instruments are jointly valid and we do not reject the null in our specifications (see Baum et al., 2007).

The point estimates from Table **??** show that test scores leads to a statistically significant decline in rate of theft on persons and non-political kidnappings per 100,000 inhabitants. An increase in average median test scores

[14] We do not discuss whether the quality goal has been achieved.

in all subjects by one standard deviation results in a marginal decline of 2 standard deviations in the rate of theft on persons and 3 standard deviation in non-political kidnapping rates. In general, we obtain a negative impact of higher average median test scores on all other measures of theft rates (car, commerce and households) although not statistically significant. The results give support to the assertion that better quality of education has an 'opportunity cost effect' on such economic crimes. Better performance in the school-exit examination encourages students for better potential opportunities in the labor market increasing their opportunity cost of engaging in criminal behavior.

4.2 Violent Crimes

Panel B of Table 1 shows the the effects of test scores on violent crimes like total kidnapping rates, political kidnapping rates, homicide rates, terrorist attacks rates and ambush rates. As before, our models do well on the specification tests and our IVs are valid and strong. If the effect of education quality is found to be negative on these measures, one could assert a 'pacifying effect' of education in play. We find a statistically significant and negative impact of test scores on total kidnapping rates. An increase in average median test scores in all subjects by one standard deviation results in a decline of approximately 5 standard deviations in total kidnapping rates per 100,000 inhabitants. However, the impact of test scores on homicides, terrorist attacks and political kidnappings are found to be positive although are not precisely estimated. It can be said that improvement in quality of education is not sufficient to reduce these kinds of violent crimes. Furthermore, it is difficult to disentangle the pacifying effect from the opportunity cost effect in kidnappings conclusively as it includes both political and non-political kidnappings.

Additionally, the effect of test scores on ambush rates are found to be positive and statistically significant. According to the theoretical framework, a positive effect on violence measures would imply an indoctrination effect. We find that one standard deviation increase in the average median test scores leads to a 1.4 standard deviation rise in the ambush rates. Simce ambush is largely caused due to conflict in Colombia, we cannot conclude definitively at this point if this positive impact is suggestive of a causal indoctrination effect of education quality. We delve deeper into studying this mechanism further to gauge if indoctrination effect is in play.

We compare the results found on ambush rates with a measure of presence of illegal armed groups in the municipalities to understand whether the mechanism is indoctrination.[15] To begin with, we find a positive correlation between ambush rates and presence of either FARC or ELN or both. The effect of educational quality on presence of illegal armed groups in municipalities is estimated by a correlated random effects (CRE) probit model (refer to equation 2). The advantage of the CRE probit model is that it places some structure on the nature of the correlation between unobserved effects and the covariates. In order to capture the municipality fixed effects, we include the means of all the controls at the municipality level across time as additional controls in the model. we use our instruments as before to deal with the endogeneity of education quality thereby estimating a CRE IV-probit model.[16]

Results for the model 2 from Table 2 suggests that better quality of education lowers the likelihood of presence of the illegal armed groups in the municipalities. Studying the marginal effects, we see that one standard deviation increase in test scores leads to a decline in probability that FARC is present in the municipality by 1.1 percent; ELN by 1.1 percent; and either FARC or ELN by approximately 1.2 percent. These marginal effects are found to be statistically significant.[17]

[15] Given our period of time in the data, we cannot include the presence of paramilitaries because during this period, they were part of the peace negotiations and we do not have information about presence of AUC. Moreover, ambushes are mainly perpetrated by the Guerillas.

[16] We run a linear probability model for this as well and find a negative impact of education quality on likelihood that the illegal armed group is present in the municipality but the estimates are not statistically different from zero and thus maybe imprecisely estimated.

[17] We also used presence of coca crops as an indication of criminial activities associated with illegal armed groups in the municipalities. Using instrumental variable probit estimation, we find better education quality reduces the probability of presence of criminal activities

Further, we estimate the effect of education quality on the rate of voluntary surrender by members of these groups to the government (see Column 1, Table 3). We find better education quality to have a statistically significant positive impact on the surrender rates. One standard deviation increase in test scores causes an increase of 1.5 standard deviation in the surrender rates in the municipality. Better quality of education discourages not just engaging in violent acts of conflict but also acts as a catalyst to discourage continuation in such armed groups.

As a consequence of the above models estimated, we assert that the results are indicative of a 'pacifying effect' since a decline in the likelihood of presence of the illegal armed groups and increase in the surrender rates by the members of the same are found. Positive ambush rates found in our baseline model may not necessarily be an indoctrination effect as suggested by theory since Colombia is not a theocratic country. This positive effect could simply be due to greater presence of mobile police and military units in the municipalities that attract higher ambushes.

5 Robustness

5.1 Sub-Sample Analysis

We carry out some sub-sample analyses to check the robustness of our models (see Appendix). First, we restrict our sample to municipalities excluding Bogota from the sample (see Table 5) and find our results to be robust to this change.[18]

Second, we run a robustness check by restricting our sample to municipalities with population less than 200,000 to give some indication of how results change for smaller and more rural areas (Table 7). Results are robust with a statistically significant impact on commerce theft.

Lastly, we explore the rural-urban divide and choose municipalities with the proportion of rural population greater than half of the total municipality population to evaluate the effect for rural areas (Table 8). We do not find statistically significant results for theft rates in this case. However, restricting our sample to include only urban areas with the proportion of rural population less than half of the total, we find that the effects are broadly similar to the baseline results in terms of statistical significance as well as direction of impact (Table 9). This suggests that urban areas may be driving most of our baseline results. This seems to be a reasonable finding as most of our impact is found for crimes theft on persons and non-political kidnapping rates which are more commonplace in urban areas rather than rural.

5.2 Other Government Transfers

We run our baseline model using two different instruments - spatial as well as shift-share - based on central government transfers to municipalities for other purposes as instruments for our education quality measure. These transfers to municipalities are for purposes of education, health, food and general purposes (see Table 10 in the Appendix). We find our models to do well on the specification tests as the baseline for economic crimes. The coefficients for all economic crimes are found to be negative however not precisely estimated. For violent crimes, our models to perform well and the coefficients are similar to the baseline model in terms of direction of impact but not statistically significant. We can thus conclude that the transfers from central government for other purposes are good predictors of education quality but they do not have statistically significant impact on our outcome variables.

but the marginal effect is not found to be significant.

[18] We exclude all capital cities from the full sample and the results are found to be broadly similar to the baseline results in terms of the direction and magnitude of the impact (Table 6). The models perform well on all diagnostic tests for the instruments in both cases, although they are not statistically significant.

This implies that our baseline model does in fact capture the impact of transfers from the central government for improving quality of education specifically on violence and crime through test scores. The same effects are not found through other kinds of transfers from the central government to the municipalities.

Second, we include these transfers to municipality by the central government for other purposes mentioned above as an additional regressor in our models. We then instrument this variable by constructing spatial instruments based on central government transfers for other purposes to neighboring municipalities (see Table 11 in the Appendix). We also construct the shift-share instrument for these transfers. Thus, we utilize the IV approach, instrumenting both education quality as well central government transfer to municipalities for other purposes. We run this model to study if our results are not just capturing state presence in terms of transfers of funds to municipalities that is causing the impacts on the crime measures. Our IVs are valid and strong as in the baseline models. However, we find that the variable capturing other transfers from the central government to each municipality has no economic impact on crime and violence measures, the coefficient associated with the regressor is of the order of zero. The effect of test scores change slightly in terms of magnitude but the sign of the impact remains broadly robust to the baseline suggesting we are in fact capturing the effect of education quality and not just state presence in general.

5.3 Other Measures of Education Quality

We carry out our analysis using other measures of education quality to compare if our results change from the baseline. Other measures of education quality used are average of median selection-corrected test scores in specific subjects like mathematics and english depicting cognitive ability of students; z-scores of the selection-corrected median scores across different subjects; and the original test scores in the exam provided by ICFES without correcting for self-selection (see Appendix).

We find our results to be robust when we consider the median scores in cognitive subjects. The models perform well on the specification tests and instruments are valid and relevant based on the underidentification, weak-identification as well as overidentification tests. Our results are similar to baseline model.

Results are also found to be robust when we change the measure of education quality to be the z-scores of the selection-corrected median scores across different subjects. Lastly, using original test scores without correcting for self-selection as the measure of education quality also provides results consistent with the baseline models.

6 Conclusion

Extant literature has explored the impact of violence on education levels and some explore the impact of education levels on violence. The focus of our paper is to assess the impact of quality of education rather than education quantity on violence outcomes. The idea is to understand to some extent if the inherent assumptions about the trade-offs associated with education, work and crime do in fact exist (Lochner, 2004). Most research concludes that there exists a trade off between education quality and involvement in violence or criminal behavior. Through this paper, we assert that education quality could in fact have differential impacts on different forms of violence or crime. Better quality of education could have a pacifying effect on violence as a result of more political and social stability; or an opportunity cost effect like reducing incentives of engaging in criminal activities due to higher future labor market returns. In environments with stronger religious influence or political influence, it is possible that education may even have an indoctrination effect on violence thus leading to higher violence. We attempt to evaluate which kind of impact quality of education has on violence and crime. To do so, we use Colombia as a case study however our results could be applied to wider range of countries with a history of violence. Using Colombian data at municipality level, we employ an Instrumental Variable approach for our analysis.

We use performance of students in a standardized examination that they are required to take at the last level of their high school as a measure of quality of education. This performance is measured by test scores provided by ICFES database. Although the municipality level average total standardized scores in this exam is the first measure of quality of education that one can think of, it suffers from selection issues as the test scores are conditional on taking the exam. We correct for selection bias to minimize measurement error in our analysis by estimating the municipality level drop out rates using Census sample from IPUMS database. We impute zeros as the grades for those students who neither finished nor were studying at high school in 2005 for this examination. This way we arrive at the selection bias corrected test scores and use the standardized average median scores across subjects conditional on the imputation indicating education quality as a more accurate measure of central tendencies. Violence is depicted by homicide rates, kidnapping rates, terrorism rates, ambush rates and theft rates.

We instrument our municipality level measures of test scores by constructing spatial instruments for a municipality in consideration based on central government transfers of funds for investment in quality of education to its neighboring municipalities excluding the first ring of its neighbors. We also use instruments based on the investment by central government into education quality in every municipality in 2001 and construct shift-share of investments in each municipality for the periods 2007-2013.

Our results suggest that improvement in quality of education has a statistically significant and negative impact on theft rates one period later. More specifically, we find that the higher the average selection-corrected median scores in the exam, the lower the rates of thefts on persons one period hence. This is in line with our hypothesis that education has an opportunity cost effect thus lowering the incentives of engaging in economic crimes like theft. We also find that better education quality leads to a statistically significant but marginal decline in non-political kidnappings. It is noteworthy that we find some positive impact of education on ambush rates. However, because of the nature of ambushes, it is difficult to disentangle the exact mechanism behind this effect. Investigating this further, we find better education quality to consistently reduce the presence of illegal armed groups in the municipalities as well as increase the surrenders by the members of these groups suggesting a pacifying effect. These results imply that higher ambushes need not be due to an indoctrination mechanism but simply because these areas attract higher ambush rates.

In terms of policy advice, our results speak to the importance of designing educational policies that focus not only on increasing the quantity of education in terms of higher enrollments, more educational attainment or even construction of more educational establishments but also on improving the quality of education. Our results are suggestive of designing policies to improve quality of education may have significant impact on some specific outcomes of crimes and violence.

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Table 1: Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Average Score in Subjects	-1.490	-1.969	-10.223**	-1.087	-0.730*
	(1.096)	(1.321)	(4.800)	(1.300)	(0.377)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	92.053	52.620	53.249	46.267	53.299
Overidentification	0.204	0.153	0.136	0.667	0.880
Endog. test	0.224	0.151	0.234	0.433	0.020
N	4586	5962	6130	6036	6213
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes
Average Score in Subjects	-0.666*	0.064	2.714	0.178	0.067*
	(0.394)	(0.140)	(1.872)	(0.224)	(0.035)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	53.299	53.299	53.257	53.299	53.299
Overidentification	0.895	0.237	0.850	0.599	0.186
Endog. test	0.038	0.731	0.154	0.131	0.362
N	6213	6213	6134	6213	6213

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 2: IV Probit (Instruments: Average Investment in Quality of Neighbors & Shift Share lagged 1 period)

Presence	FARC	ELN	Any Illegal Armed Group	Presence of Coca Crops
Average Score in Subjects	-0.079***	-0.075***	-0.081***	-0.025
	(0.013)	(0.011)	(0.012)	(0.060)
Control	Yes	Yes	Yes	Yes
Control_Mean	Yes	Yes	Yes	Yes
N	6215	6215	6215	6215

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include birth rate, death rate, infant mortality rate, years of establishment of municipality, rurality index, agricultural yield and fiscal characteristics. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 3: Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period)

	Surrender	Surrender	Surrender	Surrender	Surrender	Surrender
Average Score in Subjects	1.075**					
	(0.509)					
Average Score in Cognitive Areas		0.985**				
		(0.467)				
Math Median Score			1.153*			
			(0.678)			
Language Median Score				0.783**		
				(0.344)		
Subjects Median Z Score					15.318**	
					(7.248)	
Total Score						1.073**
						(0.510)
Control	Yes	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.001	0.000	0.000	0.000
Weak Identification	40.005	24.771	12.980	16.203	40.082	19.028
Overidentification	0.997	0.854	0.471	0.699	0.997	0.671
Endog. test	0.021	0.024	0.177	0.025	0.021	0.076
N	4136	4136	4136	4136	4136	4136

Notes: Estimation is via Instrumental Variable approach. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, years of establishment of municipality, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

A Appendix

Table 4: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Homicide Rate	31.707	38.241	0	485.794	7595
Total Kidnappings Rate	1.043	5.131	0	185.563	7762
Political Kidnapping Rate	0.461	3.791	0	185.563	7762
Non Political Kidnapping Rate	0.582	3.393	0	130.719	7762
Terrorist Attacks Rate	1.251	6.172	0	191.431	7762
Ambush Attacks Rate	0.042	0.695	0	32.949	7762
Car Theft Rate	5.664	11.209	0	124.681	5641
Commerce Theft Rate	16.144	25.989	0	405.077	7356
Thefts on Person Rate	44.41	73.807	0	632.972	7594
Household Theft Rate	22.466	38.755	0	471.884	7465
Total Score	47.602	3.088	32.434	62.587	7762
Language Score	47.703	2.624	23.389	64.807	7762
Math Score	48.114	2.585	30.703	69.078	7762
Philosophy Score	48.595	2.354	32.72	60.096	7762
Biology Score	48.198	2.483	34.167	61.19	7762
Social Sciences Score	48.176	2.711	27.883	68.369	7762
Total Median Score	32.621	15.251	0	61.354	7765
Language Median Score	31.055	14.849	0	57.32	7765
Math Median Score	28.83	14.139	0	69.010	7765
Social Sciences Median Score	29.469	14.094	0	58.775	7765
Philosophy Median Score	26.689	13.509	0	51.89	7765
Biology Median Score	30.687	14.549	0	53.19	7765
Average Median Score in Subjects	29.678	14.148	0	55.017	7765
Average Median Z Score in Subjects	0	0.988	-2.071	1.773	7765
Average Median Score in Cognitive Areas	29.943	14.38	0	62.78	7765
Birth Rate	13.284	4.608	0	52.217	7760
Death Rate	4.252	1.827	0	13.297	7760
Infant Mortality Rate	21.661	8.76	6.507	91.97	7763
Years of Establishment of Municipality	140.995	110.218	0	488	7763
Rurality Index	0.570	0.241	0.001	1	7762
Per-capita Property Tax	0.001	0.002	0	0.057	7676
Per-capita Industry and Commerce Tax Revenue	0	0.001	0	0.04	7676
Per-capita Gasoline Tax Revenue	0.001	0.003	0	0.04	7666
Per-capita (Indirect) Royalties	0.002	0.023	0	0.956	7676
Per-capita Expenditure on Personal Services	0.002	0.007	0	0.067	7676
Per-capita General Expenditure	0.001	0.003	0	0.054	7676
Per-capita Operating Costs and Transfers in Compensations	0	0.003	0	0.1	7676
Agricultural Yield	7.301	11.718	0.127	136.535	7648
Average Investment in Quality of Neighbors (2005 constant million $)	31.3	113.3	0	852.8	7679
Investment in Quality of Education (2005 constant million $)	768.2	2347.4	0	87388.0	7763

Source: DANE, CEDE, ICFES, DNP, IPUMS, National Police and author's calculations

Table 5: Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period without Bogota)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Average Score in Subjects	-1.490	-1.969	-10.223**	-1.087	-0.730*
	(1.096)	(1.321)	(4.800)	(1.300)	(0.377)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	92.053	52.620	53.249	46.267	53.299
Overidentification	0.204	0.153	0.136	0.667	0.880
Endog. test	0.224	0.151	0.234	0.433	0.020
N	4586	5962	6130	6036	6213
Panel B. Violent Crime	**Total Kidnapping**	**Political Kidnapping**	**Homicide**	**Terrorist Attacks**	**Ambushes**
Average Score in Subjects	-0.666*	0.064	2.714	0.178	0.067*
	(0.394)	(0.140)	(1.872)	(0.224)	(0.035)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	53.299	53.299	53.257	53.299	53.299
Overidentification	0.895	0.237	0.850	0.599	0.186
Endog. test	0.038	0.731	0.154	0.131	0.362
N	6213	6213	6134	6213	6213

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 6: Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period without Capitals)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Average Score in Subjects	-1.044	-2.455	-2.859	-0.059	-0.777
	(1.512)	(1.510)	(4.030)	(1.464)	(0.501)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	51.335	29.649	29.898	25.840	30.086
Overidentification	0.688	0.235	0.569	0.225	0.815
Endog. test	0.361	0.153	0.738	0.756	0.064
N	4424	5782	5950	5856	6033
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes
Average Score in Subjects	-0.701	0.076	3.223	0.087	0.071*
	(0.527)	(0.150)	(2.041)	(0.257)	(0.037)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	30.086	30.086	30.038	30.086	30.086
Overidentification	0.659	0.152	0.293	0.199	0.403
Endog. test	0.023	0.965	0.146	0.672	0.700
N	6033	6033	5954	6033	6033

Notes: (1): car theft rate, (2): commerce theft rate, (3): theft on person rate and (4): household theft rate, (5): non political kidnapping rate. Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 7: Economic Crime - Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period Municipalities with Pop. $< 200,000$)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Average Score in Subjects	-1.045	-2.561*	-2.989	-0.144	-0.785
	(1.510)	(1.512)	(4.028)	(1.473)	(0.501)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	51.931	29.694	29.919	25.887	30.115
Overidentification	0.689	0.236	0.549	0.229	0.796
Endog. test	0.360	0.135	0.721	0.716	0.066
N	4436	5812	5980	5886	6063
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes
Average Score in Subjects	-0.706	0.079	3.251	0.090	0.071*
	(0.527)	(0.150)	(2.039)	(0.257)	(0.037)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	30.115	30.115	30.064	30.115	30.115
Overidentification	0.686	0.148	0.303	0.193	0.404
Endog. test	0.023	0.973	0.142	0.665	0.699
N	6063	6063	5984	6063	6063

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 8: Economic Crime - Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period Rural Areas)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Average Score in Subjects	0.012	-1.094	2.753	2.052*	-0.318
	(1.262)	(1.481)	(2.160)	(1.173)	(0.357)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	61.934	24.606	24.368	23.294	24.638
Overidentification	0.581	0.344	0.677	0.446	0.561
Endog. test	0.812	0.554	0.211	0.122	0.154
N	2668	3805	3946	3858	4029
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes
Average Score in Subjects	-0.274	0.044	3.339	-0.003	0.076*
	(0.368)	(0.153)	(2.211)	(0.288)	(0.041)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	24.638	24.638	24.807	24.638	24.638
Overidentification	0.114	0.183	0.298	0.458	0.488
Endog. test	0.128	0.911	0.133	0.763	0.522
N	4029	4029	3961	4029	4029

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 9: Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period Urban Areas)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Average Score in Subjects	0.327	-8.473***	-32.079***	-2.146	-0.670
	(1.804)	(2.386)	(11.361)	(5.854)	(0.647)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.125	0.051	0.047	0.105	0.047
Weak Identification	7.448	17.066	16.056	6.596	16.056
Overidentification	0.644	0.082	0.298	0.028	0.056
Endog. test	0.924	0.304	0.030	0.770	0.402
N	1912	2148	2175	2169	2175
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes
Average Score in Subjects	-0.095	0.575	-2.963	1.110**	-0.040
	(0.838)	(0.542)	(2.933)	(0.458)	(0.063)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.047	0.047	0.046	0.047	0.047
Weak Identification	16.056	16.056	16.098	16.056	16.056
Overidentification	0.073	0.276	0.060	0.824	0.736
Endog. test	0.810	0.982	0.428	0.038	0.597
N	2175	2175	2165	2175	2175

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 10: Panel IV TestScores with FE (Instrument: Average SGP Transfers to Neighbors & Shift Share SGP lagged 1 period)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Average Score in Subjects	-1.138	-2.057	-6.683	-0.800	-0.424
	(1.100)	(1.413)	(4.541)	(1.238)	(0.315)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	33.672	47.317	50.443	37.602	50.506
Overidentification	0.183	0.205	0.145	0.199	0.992
Endog. test	0.556	0.096	0.932	0.665	0.152
N	4754	6183	6380	6274	6469
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes
Average Score in Subjects	-0.278	0.146	2.191	0.372*	0.063
	(0.318)	(0.136)	(1.680)	(0.215)	(0.041)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	50.506	50.506	50.683	50.506	50.506
Overidentification	0.859	0.567	0.854	0.440	0.187
Endog. test	0.391	0.320	0.217	0.021	0.807
N	6469	6469	6390	6469	6469

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 11: Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Average Score in Subjects	-0.772	-1.083	-5.910*	0.182	-0.415
	(0.970)	(1.279)	(3.173)	(1.250)	(0.310)
Total Transfers	0.000**	-0.000***	0.000***	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	37.995	22.587	22.951	19.507	22.878
Overidentification	0.142	0.468	0.041	0.089	0.174
Endog. test	0.300	0.217	0.099	0.687	0.038
N	4586	5945	6113	6019	6196
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes
Average Score in Subjects	-0.320	0.095	3.123*	0.249	0.073**
	(0.309)	(0.133)	(1.675)	(0.206)	(0.036)
Total Transfers	-0.000	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	22.878	22.878	22.856	22.878	22.878
Overidentification	0.035	0.047	0.428	0.054	0.070
Endog. test	0.067	0.927	0.065	0.095	0.481
N	6196	6196	6117	6196	6196

Notes: (1): car theft rate, (2): commerce theft rate, (3): theft on person rate and (4): household theft rate, (5): non political kidnapping rate. Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 12: Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Average Score in Cognitive Areas	-3.367	-2.693	-13.398*	-1.497	-0.980*
	(2.131)	(1.889)	(7.068)	(1.846)	(0.546)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.001	0.001	0.001	0.001
Weak Identification	25.326	12.094	12.152	11.664	12.219
Overidentification	0.230	0.149	0.145	0.664	0.893
Endog. test	0.195	0.123	0.209	0.404	0.021
N	4586	5962	6130	6036	6213
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes
Average Score in Cognitive Areas	-0.893	0.087	3.663	0.238	0.090**
	(0.570)	(0.186)	(2.578)	(0.303)	(0.043)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.001	0.001	0.001	0.001	0.001
Weak Identification	12.219	12.219	12.270	12.219	12.219
Overidentification	0.884	0.235	0.852	0.601	0.204
Endog. test	0.033	0.785	0.160	0.198	0.416
N	6213	6213	6134	6213	6213

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 13: Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Math Median Score	-1.224	-3.101**	-6.712*	-1.000	-0.787*
	(1.572)	(1.553)	(3.946)	(1.479)	(0.467)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	25.398	19.105	18.747	18.175	19.172
Overidentification	0.196	0.162	0.150	0.588	0.845
Endog. test	0.288	0.114	0.249	0.595	0.023
N	4586	5962	6130	6036	6213
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes
Math Median Score	-0.694	0.092	2.855	0.168	0.074*
	(0.486)	(0.152)	(2.047)	(0.257)	(0.038)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	19.172	19.172	19.021	19.172	19.172
Overidentification	0.658	0.262	0.565	0.485	0.693
Endog. test	0.034	0.610	0.160	0.319	0.123
N	6213	6213	6134	6213	6213

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 14: Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Language Median Score	-8.285***	-0.952	-25.118*	-2.217	-1.140*
	(2.288)	(2.730)	(13.296)	(2.374)	(0.620)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.140	0.019	0.019	0.017	0.020
Weak Identification	18.691	8.127	8.332	7.598	8.306
Overidentification	0.649	0.104	0.130	0.820	0.596
Endog. test	0.096	0.141	0.150	0.299	0.025
N	4586	5962	6130	6036	6213
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes
Language Median Score	-1.092*	0.049	4.433	0.332	0.100**
	(0.645)	(0.220)	(3.162)	(0.336)	(0.047)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.020	0.020	0.021	0.020	0.020
Weak Identification	8.306	8.306	8.484	8.306	8.306
Overidentification	0.809	0.231	0.700	0.811	0.115
Endog. test	0.034	0.872	0.190	0.184	0.722
N	6213	6213	6134	6213	6213

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 15: Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Subjects Median Z Score	-21.155	-27.714	-145.361**	-15.412	-10.340*
	(15.465)	(18.721)	(68.111)	(18.394)	(5.335)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	90.306	53.238	53.867	46.788	53.921
Overidentification	0.204	0.153	0.135	0.667	0.878
Endog. test	0.223	0.152	0.234	0.436	0.020
N	4586	5962	6130	6036	6213
Subjects Median Z Score	-9.437*	0.903	38.438	2.529	0.944*
	(5.569)	(1.979)	(26.499)	(3.174)	(0.495)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	53.921	53.921	53.873	53.921	53.921
Overidentification	0.897	0.237	0.853	0.600	0.185
Endog. test	0.038	0.734	0.152	0.131	0.365
N	6213	6213	6134	6213	6213
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.

Table 16: Panel IV TestScores with FE (Instrument: Average Investment in Quality of Neighbors & Shift Share lagged 1 period)

Panel A. Economic Crime	Car Theft rate	Commerce Theft rate	Theft on Person rate	Household Theft rate	Non-Political Kidnapping
Total Score	-1.098	-0.971	-14.146**	-1.085	-0.708**
	(0.743)	(1.534)	(6.289)	(1.145)	(0.356)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	20.609	20.169	20.055	26.333	20.035
Overidentification	0.204	0.123	0.106	0.804	0.673
Endog. test	0.208	0.129	0.110	0.319	0.014
N	4586	5962	6130	6036	6213
Panel B. Violent Crime	Total Kidnapping	Political Kidnapping	Homicide	Terrorist Attacks	Ambushes
Total Score	-0.668*	0.040	2.705	0.196	0.063*
	(0.355)	(0.138)	(1.763)	(0.209)	(0.037)
Control	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes
Underidentification	0.000	0.000	0.000	0.000	0.000
Weak Identification	20.035	20.035	20.296	20.035	20.035
Overidentification	0.885	0.240	0.814	0.727	0.184
Endog. test	0.048	0.859	0.176	0.405	0.812
N	6213	6213	6134	6213	6213

Notes: Estimation is via Instrumental Variable approach. Dependent variables are rates of different forms of violence per 100000 inhabitants. Control variables include municipality fixed effects, birth rate, death rate, infant mortality rate, rurality index, agricultural yield and fiscal characteristics. Underidentification Test reports the p-value for the Kleibergen-Paap (2006) rk statistic with rejection implying identification; Endogeneity Test reports the p-value with null being variable is exogenous; F-stat reports the Kleibergen-Paap F statistic and Cragg-Donald Wald F statistic for weak identification; Overidentification test reports the p-value for the Hansen J statistic with the null being that the instruments are jointly valid. Clustered standard error estimates are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level, all for two-sided hypothesis tests.