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How the Mexican drug war affects kids and schools? Evidence on effects and mechanisms

Brenda Jarillo *, Beatriz Magaloni, Edgar Franco, Gustavo Robles

Program on Poverty and Governance – Freeman Spogli Institute for International Studies, Stanford University, 616 Serra St C100, Stanford, CA 94305, United States

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ABSTRACT

We investigate the impact of drug-related violence in Mexico on academic achievement. We use panel of elementary and lower secondary schools and locality-level firearm homicides from 2006 to 2011. We rely on school fixed-effects models to estimate the impact on math test scores of turf war exposure and turf war persistence (e.g. months of exposure) during the academic year. According to the results, both exposure and persistence of criminal violence reduces math test scores. The analysis of heterogeneous effects shows that schools located in poor urban settings experience the largest negative effects. Further, we find stronger negative effects of drug-related violence exposure in lower secondary schools with street gang presence nearby. Finally, we further examine potential mechanisms driving the effects of criminal violence on test scores. Our findings indicate that turf war exposure and persistence are associated with a loss of instructional time due to higher teacher absenteeism and turnover, as well as student absenteeism, tardiness, and propensity to leave school days early.

1. Introduction

Violence is a critical development challenge that affects the lives of millions around the world. Much attention has been concentrated on the devastating impact of civil wars. But battle deaths pale in comparison to the number of people who die as a result of homicides in non-conflict settings. Criminal violence imposes serious human costs in terms of lives lost and human suffering, and it also hinders economic development (e.g., Londoño et al., 2000; Lora and Powell, 2011; Dell, 2015; Robles et al., 2013; Pshisva and Suarez, 2014). Concentrating around 30% of the world's murders and 8% of its population, Latin America is the most violent region of the world. The region is home to 43 of the world's 50 most dangerous cities. This paper focuses on one of the consequences of violent crime, focusing on how it affects one of the most vulnerable groups, children and adolescents. The study examines the consequences of criminal violence on education. In particular, it focuses on estimating the impact of the sharp escalation of drug-related violence observed in Mexico in recent years on educational quality, as measured by academic achievement test scores. Drug-related violence disproportionately affects the poor, further marginalizing socially and economically deprived population groups (Berkman, 2007). Failed development places poor communities at a greater risk of being caught in a violence trap (Collier et al., 2003). Since high-quality learning is a key contributor to individual earnings and to national economic growth (Hanushek and Kimko, 2000; Hanusheck and Woessmann, 2010) understanding how violence affects education outcomes is fundamental to design effective interventions targeted to schools and communities affected by violent crime.

The purpose of this paper is twofold. First, drawing from a unique panel of nationwide academic assessments of elementary and low-secondary schools, we estimate the impact of drug-related violence on school-level achievement test scores and empirically explore transmission mechanisms explaining this effect. The interest in the impact of violence on education caused either by armed conflict, post-conflict settings or chronic criminality has spurred a large body of literature. While the effects of violence on school enrollment, school attendance and educational attainment is well established (Barrera and Ibáñez, 2004; Shemyakina, 2011a,b; Akresh and De Walque, 2008; Yuksel-Akbulut, 2009; Leon, 2012; Rodríguez and Sanchez, 2009); we know less about the consequences of violent crime on educational quality (Bruck et al., 2014).

Recent research in developing countries show negative effects of violent conflict on educational quality, as measured by academic achievement. By exploiting within-school variation in the number

* Corresponding author.

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of conflict-related fatalities, Bruck et al. (2014) and Monteiro and Rocha (2013) provide reliable evidence of small but significant negative impacts of armed conflicts on student-level academic test scores. Bruck et al. (2014) find that the Israeli–Palestinian conflict during the Second Intifada (2000–2006) reduces in 1% the probability to pass the final high school exam for Palestinian students from West Bank. In a sample of 5th graders attending school in favelas of Rio de Janeiro, Monteiro and Rocha (2013) found a significant reduction of 0.05 of a standard deviation in math test scores due to persistence of violent crime (measured as cumulative days of drug battles throughout the academic year). On the other hand, based on state-fixed effects models, Ortiz-Correa (2014) found a small impact of armed-conflict indicators – such as extortion, kidnapping and terrorist attacks – on academic outcomes in 5th and 9th graders in Colombia. One threat for identification in the Ortiz-Correa (2014) study is that crime is not distributed randomly within states. Empirical results could be biased if unobservable characteristics within state entities are correlated with both violence and educational outcomes. For the case of Mexico, there is less robust evidence regarding the effects of violence on academic achievement. Using school grades, Caudillo and Torche (2014) estimate an increased probability of grade failure in Mexico due to drug-related violence. These results are suggestive of the negative consequences of violence on academic performance in Mexico but preliminary. School grades have long been recognized as an inaccurate measure of student academic performance, since they reflect differing grading practices across academic subjects, teachers and schools. To overcome the main limitation in the Caudillo and Torche (2014), our analysis relies on a unique nationwide panel of school-level math test scores in Mexican elementary and lower secondary schools.

Further, while the vast majority of studies discuss potential mechanisms that might connect violent conflict and educational outcomes, very few identify the links empirically. The channels through which violent conflict affects academic achievement are manifold. From an ecological perspective (Bronfenbrenner, 1979; Garbarino and Abramowitz, 1992), environmental stressors such as exposure to violence negatively impact academic outcomes by directly threatening physical and emotional safety and, indirectly, by reducing the availability, access, and quality of learning opportunities at home, school and community (Bowen and Bowen, 1999). Prior studies have demonstrated that psychological distress due to exposure to criminal violence hampers student academic performance (Burdick-Will Ludwig et al., 2011; Bruck et al., 2014). Further, criminal violence erodes economic activity (Robles et al., 2013). Loss of earning capacity among families caused by community's economic deprivation may change families' and students' investment decisions in schooling due to higher opportunity costs and lower returns to education (Justino et al., 2013; Valente, 2013; Gerardino, 2013).

Alternatively, there is some evidence suggesting that changes in school supply is another relevant channel explaining the impact of violence on student academic achievement. Bruck et al. (2014) find that Israeli–Palestinian conflict worsened the quality of the learning environment in high schools by increasing average class overcrowding. Monteiro and Rocha (2013) find that gang-related violence in Rio de Janeiro's favelas is positively associated with higher teacher absenteeism, principal turnover, and number of school closing days in elementary schools. Prior studies suggest that various measures of instructional time loss such as teacher turnover (Ronfeldt, 2012), teacher absenteeism (Glewwe et al., 2011; Suryadarma et al., 2006) and student absenteeism seriously harm academic test scores (Abadzi, 2007). We contribute to the strand of literature by analyzing whether teacher and student absenteeism, teacher turnover, and students frequently leaving school early are significant mechanisms underlying the relation between drug-related violence and academic achievement in Mexican schools.

A second objective of the present study is to investigate how both locality characteristics (poverty level and degree of urbanization) and school characteristics (education level and principal-reported gang presence nearby schools) may mediate the impact of criminal violence. During the past decade, criminal violence in Mexico has become more urban and spatially clustered with other indicators of socio-economic disadvantage. Residents of violent communities also experience multiple forms of economic hardship, proliferation of street gangs, social exclusion, weak rule of law, and lack of safety. Hence, we expect larger effects of criminal violence among poor urban schools.

Despite the fact that street gangs have propagated in many violent cities of Latin America, we know very little about the influence of street gang presence in high-crime neighbors on schools and students outcomes. The presence of gang members inside and outside the school can deteriorate schools' social environment with negative consequences on student academic performance. Jarillo et al. (2016) show that in Mexican high schools, students who reside in violent localities and self-reported to be part of a gang display more violent behaviors at school. In a nationally representative sample of middle and high school students in the United States, Bowen et al. (2002) find that school attendance and grades are negatively correlated with exposure to negative neighborhood peer culture – measured as respondents' perceptions that youth in their neighborhood were likely to join a gang and engage in other risky behaviors.

Finally, we also estimate heterogeneous effects of criminal violence by education level. Because peer relationships and a broader local culture at the community level might have a stronger influence in adolescents compared to younger children (Brooks-Gunn et al., 1997), we expect that of street gangs presence in poor and violent localities has a stronger impact on lower secondary schools compared to elementary schools (Brooks-Gunn et al., 1997).

Another important contribution of our paper is the use of novel measures of exposure and persistence of drug-related violence at the locality level. Rather than using a continuous measure of violence intensity, we follow Justino et al. (2013) to implement an event approach to model high-intensity violent events or turf wars. We claim that a turf war approach is a more accurate way to model the sudden and dramatic waves of shootouts and executions associated to drug-related violence in Mexico (Robles et al., 2013). We assume that people respond differently to ordinary crime compared to high-intensity violent events. Scholars analyzing behavioral changes triggered by exposure to violent conflicts agree that the reaction to crime is defined by the risk or fear to become a victim of crime (Justino, 2010). Fear of crime is not static and might be influenced by prior levels of violence experienced in the community. We expect that the spike of intra or inter-cartel conflict induces behavioral changes, such as parents refusing to send their children to school or principals shutting down schools temporarily.

Based on school-fixed effects models, we find that drug-related turf war exposure and persistence have a negative effect on academic achievement. Further, prior studies have shown that student displacement or migration are common reactions to violent crime (Velásquez, 2014; (Brown, 2014)). We show that our empirical findings are robust to the presence of selective migration. Our results also suggest that teacher turnover and tardiness, student and teacher absenteeism, and students frequently leaving school days early are channels linking the negative effects of drug-related turf war persistence on academic achievement. The analysis of heterogeneous effects shows that schools located in poor urban settings experience the largest negative