


The sources of social violence in Latin America: An empirical analysis of homicide rates, 1980–2010

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Mauricio Rivera

Department of Political Studies, Centro de Investigación y Docencia Económicas (CIDE)

Abstract

The study of social violence in Latin America has stood at the periphery of cross-national research despite the region being one of the most violent in the contemporary world. This article provides a comprehensive review of theories of crime and presents an empirical analysis of social violence in Latin America from 1980 to 2010. The literature often emphasizes one theoretical approach over others and existing explanations are seen as competitive rather than complementary. Yet, the empirical findings of this study support different explanations and illustrate how considering different theoretical approaches helps improve our knowledge on social violence phenomena. The results from different estimation methods reveal that youth bulges, female workforce, and post-conflict states are positively associated with social violence, as measured by homicide rates. The results also show that states' efforts to strengthen judicial system capacity and increase school attendance can promote peace. Moreover, while drug producers and/or transit countries are not systematically related to social violence, money-laundering countries experience higher homicide rates, suggesting that not all dimensions of drug-markets increase violence. Whereas Latin America as a whole has experienced few episodes of civil wars in the past decades, the findings suggest that several factors affecting the onset of civil wars also influence other forms of non-political violence such as social violence. This echoes earlier calls in the literature on the necessity of bridging conflict and criminology research.

Keywords

democratic regimes, homicide rates, Latin America, social violence

Introduction

Social violence has been commonplace during the last decades in Latin America.¹ Estimates from the United Nations suggest that more than one million people died as a consequence of an unlawful purposefully inflicted killing by another person between 2000 and 2010 (UNDP, 2013). Paradoxically, the region is one of the most violent worldwide and yet there is a lack of systematic cross-national research on the subject (see Bergman, 2006, for a review). This lack of attention is puzzling for several reasons. Fox & Hoelscher (2012) show that institutionalized democracies experience lower levels of

social violence – as measured by homicide rates – than 'hybrid' regimes. From a theoretical perspective, it is thus surprising that social violence has been endemic despite most Latin American countries being democratic, suggesting that political-institutional arrangements cannot fully account for variation in homicide rates in the region. From a policy perspective, the lack of attention is puzzling not just because of the severity of the violence, but also because of its effects on economic development and democratic governance. The consequences of social violence extend far beyond the direct deaths and injuries, and it has profound detrimental effects on development. The estimated material costs of social violence are 3.6% of the

¹ Social violence is defined here as 'acts of violence between individuals or small groups of individuals' (Fox & Hoelscher, 2012: 431).

Corresponding author:
mauricio.rivera@cide.edu

region's GDP, and this increases to 5.65% when the costs of health services due to violence are considered (Soares, 2006). Moreover, social violence undermines democratic consolidation as it has a strong negative effect on democracy satisfaction and motivates support for human rights violations and authoritarian regimes (Bateson, 2012). As such, the pervasive social violence ranks among the most important challenges for political and economic development in the region.

This article conducts an extensive analysis of homicide rates in Latin America. It strives not to develop new theory, but to assess empirically extant explanations from different social science disciplines to provide a more solid understanding of this phenomenon. Area studies have made progress in estimating the costs of social violence and describing states' responses to violence. However, the literature has failed to examine systematically the causes of violence and why homicide rates greatly vary in the region. The few studies addressing this question focus on a single or a few cases and thus we lack broader comparative research (e.g. Soares & Naritomi, 2010; Hoelscher, 2015). Global research addresses the determinants of social violence, but has some limitations that hinder our ability to understand homicide patterns in Latin America. Leading studies emphasize structural economic factors as the main drivers of violence, but alternative explanations highlighting the role of non-economic factors have remained largely unexamined (e.g. Fajnzylber, Lederman & Loayza, 2002; Pridemore, 2011). Furthermore, global research tends to rely on limited samples that are biased towards industrialized democracies. Fajnzylber, Lederman & Loayza's (2002) influential study analyzes 39 countries over a 30-year period and nearly half of the countries are industrialized democracies. Neumayer (2003) uses homicide rates averages over three years from 1980 to 1997 and provides the most comprehensive study in the field by assessing a number of theories in a global sample; yet it overlooks several factors that pundits and policymakers often relate to the high levels of violence in Latin America. Finally, most empirical studies use data covering up till the mid-1990s and thus we lack analyses including more recent trends of homicide.

This article seeks to put the Latin America area study of homicide on a more solid footing. While popular coverage typically homogenizes the region as the most violent worldwide² and global research stresses similarities

over differences among countries, this article exploits the great variation in homicide rates within the region. The remainder of the article reviews theoretical approaches on crime, describes the research design, and then presents the results and some quantities of interest. The results suggest that youth bulges, female workforce, and post-conflict states are positively associated with homicide rates. While drug producer and/or transit countries do not experience higher levels of violence, money-laundering countries experience higher homicide rates, indicating that not all dimensions of drug markets increase violence. The results also show that violence is sensitive to state intervention and efforts towards improving judicial system capacity and educational attainment can promote peace. Whereas Latin America as a whole has experienced few episodes of civil wars in the past decades, these findings suggest that several factors affecting the onset of civil wars likewise influence other forms of non-political violence such as social violence. This echoes earlier calls in the literature on the necessity of bridging conflict and criminology research (Fox & Hoelscher, 2012; Thyne & Schroeder, 2012).

Theoretical approaches

Theoretical models have reduced varied accounts of criminal activity, including nonviolent and violent crime, to a few common logics, each of which can be organized along four concepts: motivation, control, opportunity, and constraints. *Motives* refer to the factors that provoke offending. *Control* refers to state constraints affecting crime. *Opportunity* denotes social interactions facilitating criminal behavior. *Constraints* embrace informal controls that shape individuals' decisions regarding criminal activity. I borrow these labels from Thyne & Schroeder (2012).

Motivation

This approach highlights structural economic factors affecting individuals' incentives to participate in criminal activities. Economic models posit that individuals are more likely to resort to crime when the benefits of offending exceed its costs (Becker, 1968). To quote Becker (1993: 390), 'rationality implies that some individuals become criminals because of the financial and other rewards from crime compared to legal work, taking account of the risk of apprehension and conviction, and the severity of punishment'. Scholars thus focus on the factors influencing the opportunity costs of criminal activity and emphasize adverse economic conditions as the main drivers of it. From this perspective, researchers argue that poor economic performance accounts for

² See <http://www.economist.com/news/americas/21589889-how-prevent-epidemic-alternatives-iron-fist>.

variation in homicide rates by increasing the expected benefits of crime. This explanation suggests that poverty and unemployment reduce legitimate labor market opportunities, making criminal activity more attractive. Thus, the costs of violence and crime for a low-income and/or unemployed individual will be lower compared to a middle-class individual, who has better prospects of upward mobility (Fajnzylber, Lederman & Loayza, 1998). According to this view, the economic profile of perpetrators of both nonviolent and violent crime is associated with the condition of being poor and/or unemployed. These adverse economic conditions raise the benefits individuals can obtain from crime relative to its costs.

Another argument relates homicide rates to large disparities in income. Inequality constitutes a prominent feature of Latin America and, thus, it is not surprising that inequality has figured as one of the main triggers of violence. Scholars commonly stress individuals' incentives and often highlight how inequality influences incentives for crime. Large income disparities often trigger grievances among underprivileged sectors of society when they compare their situation with that of more advantaged groups. In an unequal society a small share of the population is wealthy and has access to high income, but many people lack wealth. Thus, underprivileged individuals under these contexts face lower costs of criminal behavior and wealthier individuals become the targets of criminal activity (Hagan & Peterson, 1995). According to Fajnzylber, Lederman & Loayza (1998: 8), 'in the case of the poor, an increase in inequality may be crime inducing, because such an increase implies a larger gap between the poor's wages and those of the rich, thus reflecting a larger difference between the income from criminal and legal activities'.

Control

This strand of research focuses on states' constraints that influence individuals' decisions regarding criminal behavior. Scholars examining the effect of states' strength on crime also look at individuals' incentives, but emphasize how states' capacity to enforce the law increases the opportunity costs of illegal activity, refraining people from criminal behavior. As in motivation theories, this argument is based on Becker's (1968) model highlighting that a higher risk of apprehension and conviction, as well as the severity of punishment, dissuade individuals from crime.

Control-based explanations have captured a great deal of attention among scholars and policymakers in Latin America, mainly because of the recognition that states'

fragility has been related to the wave of crime and violence that has shaken the region since transitions to democracy (Munck, 2003). From a broad perspective, O'Donnell (1993) highlighted the existence of 'brown areas' as a way to capture the lack of effective state presence in some areas, which are often characterized by severe public insecurity and unlawful abuses at hands of state security agents. Subsequently, case-study research has paid greater attention to specific state institutions and suggests that failures of the judicial system are related to greater impunity and higher levels of violence and delinquency (see Bergman, 2006). In line with this, Fajnzylber, Lederman & Loayza (1998) show that a country's number of police personnel is negatively associated with homicide rates.

While empirical research emphasizes the role of *legal* strategies of law enforcement, government authorities often promote the use of *illegal* strategies, including repressive methods and human rights violations as active responses to public insecurity. Specifically, advocates of heavy-handed tactics contend that government repressive strategies tolerating abuses and human rights violations at the hands of state security actors increase the costs of criminal behavior and dissuade individuals from participating in criminal activities (see Rivera, 2010). Examples of heavy-handed policies are abundant in contemporary Latin America, from such well-known cases of lethal police violence in Brazil to widespread abuses against alleged criminal actors by law enforcement officials in Mexico. Likewise, repressive responses are often seen in Central American countries, where a perception of helplessness dominates public debates and politicians stress the need for iron-first anticrime policies (Holland, 2013). The underlying assumption of these tactics is that heavy-handed policies help strengthen public order. Despite popular views with regards to the effectiveness of repression, however, its alleged deterrent effect on crime has not been tested in a cross-national setting.

Finally, some scholars have analyzed the link between democracy and homicides in the cross-country literature. Lin (2007) focuses on motives and points out that democracy reduces social grievances and thus individuals have lower incentives for criminal behavior. This proposition is plausible for most industrialized democracies where economic development is high and income disparities relatively low. However, it does not fit well with political and economic trends in Latin America, where democracy has failed to promote development and welfare. Related research instead examines how regime transitions and changes toward greater democracy increase murder rates. The main argument underlines the role

of institutional coherence and predicts an inverted U-shaped relationship between democracy and homicide rates, since democratic transitions and hybrid regimes are often associated with greater instability and states under these conditions lack the capacity to enforce the law (Fox & Hoelscher, 2012; Neumayer, 2003).

Opportunity

As control theories, the opportunity literature focuses on conditions that facilitate/prevent criminal activity. However, instead of focusing on state institutions, opportunity explanations are concerned with social interactions from which criminal behavior emerges. For example, some scholars suggest that urbanization increases opportunities for criminal behavior, as social interactions are more frequent in urban than in rural areas. The likelihood of apprehension and punishment is expected to be lower in urban conglomerates and hence homicide rates should be higher in these areas³ (Fajnzylber, Lederman & Loayza, 1998).

The size of youth cohorts is another factor that can facilitate crime (Neapolitan, 1997). It has been argued that young males are more likely to participate in criminal activity because they tend to be more aggressive due to high male sex hormone levels (Hirschi & Gottfredson, 1983), or because large youth cohorts increase youth unemployment and the opportunity costs of crime are lower. Young males are the main perpetrators of violent crime and thus states with a larger share of young males are expected to experience higher homicide rates (Neumayer, 2003). Practitioners and international organizations are increasingly coming to view youth bulges as one of the main determinants of public insecurity in Latin America, where most victims and perpetrators of violent acts are young males aged 15 to 24 (e.g. World Bank, 2011). Despite the policy relevance of demographic patterns linked to crime, we certainly do not have a clear understanding of the net effect of youth bulges on homicide figures in the region. Moreover, the empirical results from global studies are mixed. While some scholars show a positive association between youth bulges and homicide rates (e.g. Lafree & Tseloni, 2006; Nivette, 2011), other scholars fail to find any significant relationship between these variables (e.g. Cole & Gramajo, 2009; Fox & Hoelscher, 2012).

³ Modernization theorists anticipate the same effect but highlight a different logic, where urbanization processes lead to the breakdown of informal social constraints that previously influenced individuals' propensity for criminal activity.

The end of a civil war provides opportunities to reform or even build new state institutions. Both scholars and practitioners suggest that constellations of international and domestic actors help strength the rule of law in post-conflict societies (e.g. Mazzuca & Munck, 2014). Although improving the rule of law is possible once civil wars come to an end, internal armed conflicts are often related to specific conditions that create windows of opportunities for crime in the postwar period. In the wake of civil wars a large number of combatants are demobilized and are likely to participate in criminal activity, particularly because armed conflicts hinder countries' economies and former combatants face severe barriers to entry to the labor market. In El Salvador, for example, 'within one year, 12,362 guerrillas, some 20,000 soldiers and around 30,000 civil defense guards were left unemployed' (Call, 2003: 843). The post-conflict context is even worse because easy access to small weapons and fragile state institutions facilitate the unlawful use of firearms among citizens. Taken together, these conditions suggest that the end of civil wars is not necessarily accompanied by a substantive improvement in public security, but the emergence of a different type of violence: adverse economic conditions motivate crime and violence, and availability of arms and weak enforcement institutions raise opportunities for it.

Social constraints

While control-based explanations highlight formal mechanisms to prevent or sanction offenders, scholars highlighting social constraints suggest that existing informal controls prevent actors from criminal activity (Thyne & Schroeder, 2012). Sociologists argue that school attendance builds and sustains informal rules that strengthen social controls and constrain criminal behavior. Hirschi (1969) claims that schooling helps to develop and reinforce individuals' linkages with other members and institutions within society, as well as influencing how individuals value their social relations and future goals. Accordingly, education enhances attachment and commitment to values that reduce incentives to engage in crime. Beyond social constraints, involvement in routine activities linked with the educational system decreases the available amount of time and energy that otherwise could be allocated to criminal activity. Although constraints theories do not pay direct attention to the role of the state, an important implication of the argument is that governments can reduce violence by improving education.

Other scholars examine how female participation in the labor market hinders traditional mechanisms of

control and increases social anomie (Neumayer, 2003: 624). The underlying logic is that the increasing role of women in the workforce can disrupt family structures and reshape effective relationships between potential offenders and their parents. The break of social bonds within families drives young people into criminal activities. Another approach sees female work participation as a window of opportunity for deviant behavior since unsupervised people are more likely to resort to crime, including violent crime (Gartner & Parker, 1990). While these two perspectives represent different ways of interpreting a similar phenomenon, they yield the same empirical prediction: countries that experience higher female labor participation will experience higher violent crime rates.

To summarize, homicide rates are expected to be higher in environments with specific structural economic conditions such as underdevelopment, unemployment, and inequality, and in contexts where state institutions are not sufficiently strong to dissuade individuals from acts of homicidal violence. Beyond economic motives and state imposed constraints, large youth cohorts and post-conflict societies are expected to positively affect homicide. Finally, other approaches focus on informal controls and hypothesize that murder rates will be higher in societies where aggregated levels of educational attainment are low and a large share of the female population participates in the workforce. So far, however, existing comparative analyses have examined only a set of hypotheses, without considering all the empirical implications of theories simultaneously. Examining only a set of hypotheses leaves us unable to understand the variation of homicide rates in a comprehensive way, raising the usual perils of spurious correlations as a consequence of omitted variable bias, and prevents us from providing useful recommendations to policymakers. The next sections present an extensive empirical analysis that considers extant explanations simultaneously.

Empirical indicators

I employ a time-series cross-sectional (TSCS) research design to examine variation in homicide rates in Latin America. Based on data availability, the analysis includes 19 countries over the period 1980–2010: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, and Venezuela.

I use reported homicide data from the United Nations Crime Trend Surveys (UNCTS). Homicides

are defined as any ‘unlawful death purposefully inflicted on a person by another person’ (UNODC, 2015). I calculated homicide rates per 100,000 inhabitants using population data from the World Bank (2010). Other types of criminal activity such as robbery, theft, and assault are also theoretically relevant, but data on these types of crime are less reliable and are missing for many country-year observations. The UNCTS data are available from 1970 but homicide figures are concentrated on several countries, so analyses based on these data are likely to depend on only a few countries. Furthermore, early efforts of data collection were less accurate and reliable (Allen & Flynn, 2013). For these reasons the analysis is limited to the period 1980–2010. Because homicide data are not available on a yearly basis for all countries, I fill in missing values using linear interpolation between observed values to create a more complete time series for each country. The data increase from 335 country-year observations to 413, but in no case were missing values extrapolated beyond the first and last data points for a country. The next section displays results using both the original and the linearly imputed homicide data, and shows that the results do not change substantively.

With regards to the independent variables reflecting motives, I include the natural log of GDP per capita and the growth rate of GDP per capita from the previous year. Unemployment is the proportion of the labor force that is unemployed but available for and seeking employment. These variables come from the World Bank (2010). I also include inequality, which captures disparities in the net income in the total population. The GINI coefficient measures the concentration of income in a continuous scale which ranges from 0 (absolute equality) to 100 (maximum inequality) from the Standardized World Income Inequality Database (Solt, 2009).

The measurement of control-based explanations is not as straightforward as measuring economic factors that are expected to affect social violence. Scholars often use data on police personnel and incarceration rates to assess propositions on the negative effect of law enforcement capacity on crime and violence. Whereas these propositions have been tested in advanced democracies and in a handful of developing countries (e.g. Levitt, 1996; Di Tella & Schargrodsky, 2004), the lack of comparative data has prevented researchers from testing these propositions in most developing countries. To proxy the effectiveness and the overall country’s judicial system capacity, I use judicial independence data from the Latent Judicial Independence scores from Linzer &

Staton (2012).⁴ The authors combine eight *de facto* judicial independence indicators into a single measure and the resulting indicator is continuous, ranging from 0 (no independence) to 1 (full independence). Thus, higher levels of judicial independence should be related to lower homicide rates. Other approaches may suggest that judicial independence can affect reported crimes since governments have lower capacity to manipulate crime data. This is relevant because governments and law enforcement agencies often have incentives to underreport crime data; however, if this argument is true we should observe the opposite relationship, as judicial independence would increase crime reports.

In Latin America, democratically elected governments often employ repressive policing strategies to fight crime and social violence (Brinks, 2008; Rivera, 2010). Heavy-handed policing tactics embrace a number of illegal actions that are related to systematic violations of human rights. To account for these repressive strategies, I use the Political Terror Scale (PTS) based on the US State Department reports. This is a five-point indicator of repression and it is widely used in the human rights literature (e.g. Poe & Tate, 1994; Nordås & Davenport, 2013). The PTS is normally used as an indicator of government political violence and may be seen as a poor proxy of repressive policing tactics. In their re-introduction of the PTS, however, Wood & Gibney (2010: 370) suggest that this measure also captures non-political violence perpetrated by state actors. 'The PTS focuses on state-sponsored killings that take place outside of the normal judicial setting'. These executions are related to different acts of violence, ranging from 'death squad killings of political enemies' to the 'unlawful use of lethal force by police forces (e.g., shooting unarmed suspects)'. These illegal acts of lethal force or extrajudicial killings are the hallmark of repressive policing tactics in Latin America (Brinks, 2008), and the US State Department Human

Rights reports often reflect the non-political nature of state violence and suggest violence is linked with repressing policing tactics. For instance, the US State Department documented non-politically motivated killings in 90% of the countries where state killings were registered in 2010.⁵ Moreover, most events are linked with episodes where law enforcement actors use excessive force against people participating in criminal activities or crime suspects. To cite just a few examples: in Brazil, 'the uniformed police summarily executed criminals rather than apprehend them, and then filed false reports that the suspects were resisting arrest'.⁶ In Dominican Republic, 'the government or its agents did not commit any politically motivated killings'. Yet 'the police continued to employ unwarranted deadly force against criminal suspects'.⁷ In Paraguay, there are 'allegations of police torture and other abuses designed to extract confessions or intimidate detainees'.⁸ Indeed, a detailed inspection of the reports indicates that security forces normally perpetrate violence against crime suspects and civilians who have been involved in criminal activity.

I incorporate a state's score on the 21-point institutionalized democracy scale in the Polity data (Jaggers & Gurr, 1995). I also explore a non-linear relationship between democracy and rates of homicide by including the Polity scale and its squared term.

Three variables capture opportunity-based explanations. The percentage of population who live in urban areas (World Bank, 2010), and the proportion of youth males aged 15 to 24 in the total population (UN, 2013). A dichotomous variable for post-conflict states indicates whether a country experienced an internal armed conflict according to the 25 battle-related deaths indicator from Gleditsch et al. (2002). I only include countries where civil wars lasted three years or more because negative externalities of civil wars are likely to be less severe in shorter wars. Accordingly, post-conflict states include Guatemala, El Salvador, Nicaragua, and Peru.⁹

⁴ Someone may argue that existing rule of law indicators also capture states' law enforcement capacity. However, widely used measures such as the Law and Order from the International Country Risk Guide (ICRG) and the VI rule of law from the WB Worldwide Governance Indicators consider crime and social violence. The Law and Order measure from the ICRG evaluates 'popular observance of the law. Thus, a country can enjoy a high rating – 3 – in terms of its judicial system, but a low rating – 1 – if it suffers from a very high crime rate [...]'. The World Bank indicator measures 'the extent to which agents have confidence in and abide by the rules of society [...] as well as the likelihood of crime and violence'. For a review of rule of law measures, see Haggard, MacIntyre & Tiede (2008).

⁵ I coded non-political killings if the 2010 US State Department reports document that 'the government or its agents did not commit any politically motivated killings'. See <http://www.state.gov/j/drl/rls/hrrpt/2010/wha/index.htm>.

⁶ <http://www.state.gov/j/drl/rls/hrrpt/2000/wha/724.htm>.

⁷ <http://www.state.gov/j/drl/rls/hrrpt/2010/wha/154503.htm>.

⁸ <http://www.state.gov/j/drl/rls/hrrpt/2010/wha/154515.htm>.

⁹ Colombia is not included because its armed conflict is still ongoing. Mexico, Panama, Paraguay, and Venezuela experienced a civil war in 1994, 1989, 1998, and 1992, respectively. However, none of these conflicts lasted at least three years.

Table I. Theoretical approaches on crime and empirical indicators

<i>Theoretical approaches</i>	<i>Indicators</i>
Motivation: Individuals compare the expected costs and benefits of crime, which is more likely if the expected benefits exceed its costs. Favorable economic conditions increase the opportunity costs of crime and reduce actors' incentives to commit crimes.	GDP pc Growth of GDP pc Inequality Unemployment
Control: Individuals compare the expected costs and benefits of crime, which is more likely if the expected benefits exceed its costs. State-based constraints prevent crime by increasing the costs of deviant behavior.	Repression Judicial capacity Democracy
Opportunity: Social environments and interactions generate favorable conditions that facilitate the commission of crimes.	Urbanization Post-conflict state Youth bulges
Constraints: Controls for crime extend beyond formal state institutions. Social-based constraints create informal controls, which refrain actors from committing crimes.	Educational attainment Female workforce

To account for social constraints, educational attainment reflects the average schooling years in the total population aged 15 and over from Barro & Lee (2010). The data are available in five-year intervals; hence, I interpolated missing values to create a complete time series for each country. Female workforce is the percentage of women aged 15 or over in the labor force (World Bank, 2010).

Finally, the presence of an internal armed conflict may increase homicide figures (Neumayer, 2003). To account for this possibility, I include a binary variable reflecting whether a country has a civil war at time t , according to the 25 battle-deaths related threshold from Gleditsch et al. (2002).¹⁰ Table I outlines the indicators capturing the main explanatory variables, organized along the theoretical concepts discussed above.

Method and results

Careful assessments of panel data analysis find that different methodological decisions often lead to different results (Wilson & Butler, 2007). Variables that matter in one model may not be significant in another due to the estimation method employed. Therefore, I consider alternative specifications to assess the robustness of the results. Ordinary least squared (OLS) models assume that unobserved unit factors do not exist. However, the assumption of homogenous units is often violated in TSCS data since error terms generally have different variances across units

(Beck & Katz, 1995). Inferences on the coefficients of explanatory variables tend to be biased when these variables are related to time-invariant unobserved unit factors. I thus employ fixed-effects estimates with robust standard errors to control for unit specific and time-invariant heterogeneity. These models also include lagged-dependent variables (LDV) since there may be a criminal inertia and murder rates are likely to persist over time (Fajnzylber, Lederman & Loayza, 2002).

While the fixed-effects estimator is helpful to control for unit heterogeneity, it does not allow estimating the effect of time-invariant exogenous variables and biases the estimates of slowly moving variables that tend to be correlated with unit effects – partly time-invariant variables generally have high standard errors since they are highly correlated with the fixed effects (Beck, 2001). This might be problematic in the analysis, where several explanatory variables move slowly across time. The use of a fixed-effect estimator can lead to rejection of the statistical significance of a partly time-invariant independent variable that does influence the outcome. Because of this, I also report TSCS estimates with panel-corrected standard error (PCSE) and a Prais-Winston (AR1) transformation to reduce serial correlation of errors. In all estimates the explanatory variables are lagged one year to mitigate potential endogeneity.

In Table II, Models 1–4 display TSCS estimates with PCSE and a Prais-Winston (AR1) transformation. Models 1 and 2 report results for non-interpolated homicide data and Models 3 and 4 present estimates for interpolated data. Models 5 and 6 replicate Models 2 and 4, using fixed-effects estimates with robust standard errors and a LDV. The post-conflict state and civil war binary

¹⁰ Although there is no formal cutoff, a variance inflation factor (VIF) of 10 is often seen as a cause for concern about multicollinearity. I employed Stata's VIF command to test for multicollinearity and in no cases did independent variables exhibit significant collinearity.

Table II. Empirical estimates of homicide rates

		1	2	3	4	5	6	7
Motives	GDP pc	−0.365 (1.129)	51.282*** (12.019)	−0.943 (1.184)	41.074** (13.637)	−37.408* (16.503)	−40.446 (29.303)	−63.271* (27.771)
	GDP pc ²		−2.965*** (0.678)		−2.413** (0.779)	2.142* (0.905)	2.223 (1.662)	3.622* (1.595)
	GDP pc Growth	−0.001 (0.078)	0.012 (0.080)	−0.027 (0.051)	−0.015 (0.053)	−0.091 (0.065)	−0.087 (0.045)	−0.146* (0.066)
	Inequality	−0.967*** (0.232)	−0.804*** (0.219)	−0.779** (0.250)	−0.678** (0.241)	−0.523*** (0.115)	−0.462*** (0.138)	−0.525** (0.175)
	Unemployment	−0.254 (0.170)	−0.236 (0.168)	−0.034 (0.127)	−0.018 (0.129)	−0.067 (0.046)	−0.115 (0.074)	−0.099 (0.062)
Control	Repression	1.622* (0.794)	1.621* (0.805)	1.194* (0.514)	1.236* (0.526)	0.745* (0.359)	0.582 (0.351)	0.550 (0.358)
	Judicial independence	−17.328** (5.785)	−22.447*** (6.003)	−15.785** (5.147)	−19.463*** (5.650)	3.280 (2.837)	6.212 (4.103)	3.655 (5.672)
	Democracy	0.781*** (0.151)	0.856*** (0.159)	0.544*** (0.118)	0.612*** (0.127)	0.202* (0.084)	0.167** (0.061)	0.248 (0.144)
	Democracy ²	−0.077* (0.039)	−0.077* (0.038)	−0.061* (0.030)	−0.064* (0.030)	−0.020 (0.016)	−0.031* (0.013)	−0.030 (0.018)
Opportunity	Urbanization	−0.041 (0.054)	−0.101 (0.055)	−0.043 (0.053)	−0.094 (0.055)	0.263*** (0.057)	0.227* (0.090)	0.263 (0.159)
	Youth bulges	1.634 (0.878)	1.530 (0.863)	1.696* (0.850)	1.559 (0.835)	1.066*** (0.154)	1.064*** (0.274)	1.043* (0.420)
	Post-conflict state	8.210* (4.163)	8.492* (4.307)	8.121* (4.031)	8.522* (4.101)			
Constraints	Educational attainment	−5.098*** (0.855)	−5.606*** (0.814)	−4.722*** (0.902)	−5.159*** (0.863)	−1.251 (0.805)	−0.464 (0.729)	−0.409 (0.712)
	Female workforce	0.324*** (0.069)	0.377*** (0.069)	0.269*** (0.051)	0.302*** (0.052)	0.121** (0.044)	0.112* (0.044)	0.127** (0.039)
	Civil war	2.507 (2.392)	1.446 (2.474)	1.912 (1.299)	1.828 (1.366)			
	LDV					0.775*** (0.024)	0.800*** (0.048)	0.808*** (0.043)
	Constant	64.239** (23.929)	−156.605** (59.070)	58.789* (23.356)	−117.912 (60.192)	144.679 (74.825)	163.073 (123.304)	258.680* (117.811)
	N	335	335	413	413	312	406	377
	R-sq	0.334	0.351	0.313	0.328	0.968	0.972	

* $p < .05$, ** $p < .01$, *** $p < .001$. All explanatory variables are lagged one year.

variables are excluded in these estimates because country effects suppress the impact of time-invariant and slowly moving variables. I report results for each explanatory variable and discuss whether and why the results differ depending on the econometric specification.

In line with constraints-based accounts, educational attainment is negative and statistically significant at the 0.001 level in Models 1–4. Educational attainment no longer exhibits a significant effect in Models 5–7, although this is not surprising since slowly moving variables such as educational attainment generally have high

standard errors because they are correlated with the unit effects. It is thus reasonable to conclude from Models 1–4 that educational attainment exerts a negative effect on homicide rates. This finding is compatible with research demonstrating that schooling is negatively related to murder rates in the United States (Lochner & Moretti, 2004). It is also consistent with conflict research showing that school enrollment decreases the risk of civil wars (Thyne, 2006).

Although government policies devoted to improving education are not a panacea, these strategies can help

enhance peace in the region. Education can have a significant effect on public security as most countries in the region are plagued by youth bulges, which are sensitive to educational programs. In the long run, state intervention to improve education is also relevant as education reduces inequality and promotes economic growth (e.g. Granato, Inglehart & Leblang, 1996), and there is evidence that these factors reduce nonviolent crime (e.g. Entorf & Spengler, 2002). On the other hand, female workforce exhibits a positive and significant impact on homicide rates. Notably, the results suggest that these variables have large substantive effects on the outcome. Based on the coefficients from Model 1, an increase of one standard deviation in educational attainment is associated with a decrease of nearly seven homicides per 100,000 inhabitants. Using the same approach, homicide rates increase by around four per 100,000 when there is a increase of one standard deviation in the female workforce.¹¹

With regards to opportunities, the coefficient for youth bulges is significant in Models 3 and 5–7.¹² These results indicate that homicides are higher in states that experience large youth cohorts and support claims pointing to a positive relationship between youth bulges and violence. Based on Model 5, an increase of one standard deviation in youth bulges is related to an increase of 1.7 in murders per 100,000 people. This is consistent with conflict research showing that youth bulges are positively associated with civil war onset (Urdal, 2006).

The binary variable for civil war is positive but not statistically significant. In contrast, the dichotomous indicator for post-conflict states reaches statistical significance in Models 1–4,¹³ supporting the claim that murder rates are larger in post-conflict states than in countries that did not experience a civil war, reflecting the challenges of strengthening the rule of law after an internal armed conflict. According to Model 1, post-conflict states have eight homicides per 100,000 more than states with a peaceful past. This helps understand why violence has been higher in Central American countries than in other countries, although there is variation in homicide rates in post-conflict states. Violence has been significantly lower

in Nicaragua than in El Salvador, Guatemala, and Honduras. Interestingly, qualitative research has linked these differences with public security reforms implemented during the post-war period (Cruz, 2011). While the Nicaraguan government implemented reforms that strengthened the state security apparatus, the parallel transitions from war to peace and dictatorship to democracy were not associated with substantial changes in law enforcement institutions in El Salvador, Guatemala, and Honduras. Whereas the state security apparatuses remained almost intact in these countries, Nicaragua experienced an institutional process where ‘the institutions and agents of the old dictatorship were all largely gone’ (Cruz, 2011: 19).

The coefficient for urbanization is negative but insignificant in Models 1–4. However, this coefficient turns positive and significant in Models 5 and 6,¹⁴ suggesting that positive trends in urban population are related to an upward trend in murder rates within countries. As such, the results support arguments suggesting that opportunities for crime, including violent crime, are larger in urban areas given that social interactions are more frequent and the risk of apprehension and punishment is lower than in rural areas. Based on Model 5, an increase of one standard deviation in urbanization is associated with an increase of five homicides per 100,000 inhabitants.

Turning to motivation theories, the results are somewhat puzzling since economic factors are not as influential as it is often argued. The coefficient for development is negative but it is far from statistical significance in Models 1 and 3. Models 2 and 4 incorporate the quadratic term of GDP per capita to test a non-linear relationship. The coefficients for development and development² in these models indicate that low- and high-income countries have lower rates of homicide compared to middle-income countries in the region. As noted above, Models 5 and 6 display fixed-effects estimates and assess within-country variation. In these models we see a reversal of sign in the coefficients for development and development.² The different signs of coefficients between these models are not necessarily incompatible given that the coefficient estimates from the fixed-effects models capture within-country variation, rather than between-country variation. The results from Models 5 and 6 suggest that a country with low levels of GDP per capita will show high murder rates, and as it develops, violence will decrease up to a point at which development positively associates with

¹¹ Note that the size for all significant coefficients is much lower in the fixed-effects models due to the inclusion of a LDV that reduces the size of coefficient estimates.

¹² The coefficient for youth bulges reaches significance at the 0.10 level in Models 1, 2, and 4.

¹³ I have tested the effect of civil wars using the battle-related deaths indicator from the UCDP/PRIODATASET, and the coefficient for this item is not significant across models. See the online appendix.

¹⁴ In Model 7, the coefficient for urbanization is significant at the 0.10 level.

violence. It may well be that this stage when development encourages violence is precisely the stage that is captured in between-variation models that show that countries at middle levels of development experience higher rates of homicide than less developed and more developed countries. On the other hand, I fail to find evidence that GDP per capita growth influences homicide levels.

The results do not support the expectation of a positive association between inequality and homicide. In fact, it is striking that the coefficient for inequality is negative and significant in all models from Table II. This is an unexpected result which may be purely coincidental, reflecting recent and non-related patterns of reduction in inequality (Cornia, 2014) and the increase of homicide rates. Moreover, as a robustness check I replaced the inequality indicator from the Standardized World Income Inequality Database and instead used inequality data from the United Nations Development Program (UNDP). The coefficient for inequality is positive but it is far from being statistically significant.¹⁵ Although the results for inequality are not stable and largely depend on data choices, there is no evidence that the unequal distribution of wealth increases the rates of homicide. This non-finding is perhaps not surprising considering that despite earlier studies having shown that inequality increases homicide rates (Fajnzylber, Lederman & Loayza, 2002), recent research fails to find evidence of such a relationship (Neumayer, 2003; Pridemore, 2011).

Furthermore, it is not theoretically clear why inequality should increase homicide. Recent research demonstrates that horizontal inequalities increase the risk of civil war (Cederman, Weidmann & Gleditsch, 2011), and income inequality triggers anti-government protest (Zarate, 2015). One reason for this is that relative deprivation induces frustration and grievances, which trigger violent and nonviolent mobilization against states (Gurr, 1970). Whereas these studies contend that individuals attribute inequality to states' policies and mobilize against state-imposed inequality and discrimination, theoretical accounts of homicide fail to specify why inequality should lead to violence between private actors. If inequality generates grievances and frustration when the less advantaged individuals compare their own situation with that of the wealthy (Fajnzylber, Lederman & Loayza, 2002), most homicide victims would be distributed among the rich and middle classes, but this is clearly not the case. As in most countries, middle class and rich people in the region are typically the targets of property crime, but they are not

the main victims of violent crime, including homicide (Gaviria & Pagés, 2002).

The empirical estimates indicate that unemployment does not influence homicide levels. Although economic covariates do not have consistent effects on murder rates, I interpret these results as providing evidence that different types of crime are likely to be related to different logics, as there is evidence that economic factors often influence nonviolent criminal activity, namely crime against property (e.g. Ehrlich, 1973; Entorf & Spengler, 2002).

Turning to control theories, repression is positive and significant in Models 1–5, and it is close to statistical significance in Models 6 and 7. This is consistent with previous findings showing that repression is positively associated with homicides rates (Neumayer, 2003). In line with case studies, these results challenge common views among political actors within the region stressing that states' respect for human rights is a license for criminal actors and instead point out that iron fist strategies do not necessarily strengthen public safety. We see in Models 1–4 a negative significant coefficient for judicial independence, indicating that an effective law enforcement system can help promote peace by reducing homicide rates. This coefficient is far from statistical significance in the fixed-effects models. As noted above, however, this is not surprising since unit effects suppress the effect of partly time-invariant variables and there is indeed little variation in judicial independence within countries. According to Model 1, an increase of one standard deviation in judicial independence decreases murder rates by 3 per 100,000.

The coefficient estimates for democracy and democracy² are consistent with previous scholarship showing an inverted U-shaped relationship between democracy and murder rates (Fox & Hoelscher, 2012; Neumayer, 2003). Models 1–4 examine cross-national variation and thus we can infer from these estimates that 'anocratic' states with values in the middle range of the Polity scale experience higher homicide rates than fully autocratic and democratic regimes. Instead, the fixed-effects models examine within-country variation, and hence coefficients for democracy and democracy² suggest that movements towards democracy influence upward trends in homicide, but violence then decreases once a state is fully democratic.¹⁶ These results are similar to findings in the

¹⁵ These results are available in the online appendix.

¹⁶ The coefficient for democracy² has the expected negative sign, but it is not significant in Model 5. This lack of significance is likely to be related to missing values in the non-interpolated homicide data before the 1990s, which reduces variation in the Polity scale.

conflict literature showing that democratization increases the likelihood of interstate wars (Mansfield & Snyder, 1995).

Fajnzylber, Lederman & Loayza (2002) show a strong effect of homicide rates at time $t-1$ on contemporary homicides (however, see Neumayer, 2003). Thus, Models 5 and 6 display fixed-effects estimates with a LDV to examine this possibility. We see a significant positive coefficient for homicide rates at time $t-1$, suggesting that homicide rates tend to persist over time. Model 7 displays results from a one-step generalized methods of moments estimator (GMM), which is suitable for examining dynamic effects in homicide data and potential endogenous relationships between explanatory variables and the outcome¹⁷ (Arellano & Bond, 1991). These estimations are highly consistent with the fixed-effects estimates and do not alter the substance of the findings. The only differences are that economic growth is negative and significant, and the statistical significance for the coefficients for democracy, democracy², and urbanization drops to the 0.10 level. The coefficient for repression likewise comes close to significance at this level.

I have used a variety of model specifications to ensure the robustness and sensitivity of the results. First, some may argue that the estimates shown in Table II may be driven by observations of a few countries due to missing values in homicide data for several countries before 1990. Models 8 and 9 in Table III replicate Models 2 and 6, restricting the analysis to the period 1990–2010. The most important difference is that the coefficients for democracy and democracy² lose their significance. Yet, this is not surprising as most democratic transitions in the region took place in the 1980s, and there is little variation in the Polity scale from 1990 onwards.¹⁸ Overall, Models 8 and 9 show that the estimates from Table II are not determined by observations from a few countries, and do not depend on whether the analysis incorporates the period 1980–89.

Second, this study so far has not addressed whether drug-related activity affects murder rates. Fajnzylber, Lederman & Loayza (1998: 8) highlight that drug markets ‘involve the element of violence and official corruption required for them to carry on’. Likewise, it has been

argued that democratic transitions are associated with changes in law enforcement policies that may disrupt actors configurations, motivating rivalries between criminal organizations that can increase violence (e.g. Snyder & Duran, 2009; Vilalta, 2014). In a preliminary attempt to assess this relationship, I collected information on drug-related activity from the annual Narcotics Control Reports from the US State Department. I coded two binary variables for major drug producer and/or transit countries and major money-laundering countries.¹⁹ The coefficient for drug-producer and/or transit states is not significant in Models 10 and 11; however, the indicator for major money-laundering states is positive and significant in Model 11 and comes close to statistical significance in Model 10. As such, these results indicate that drug markets do not increase social violence per se and suggest that the effect of drugs on violence may depend on the nature of drug-related activity.

Finally, I replaced the outcome variable using homicide data from the World Health Organization (WHO) instead of the UNCTS data. Although the results are not strictly comparable because homicide data from the WHO have a large number of missing values, the empirical estimates do not change substantively and indicate that the main findings do not depend on measurement decisions about the dependent variable. Indeed, the results revealed only minor differences, which are likely to be caused by missing values in homicide data from the WHO.²⁰

Conclusion

The study of social violence in Latin America has stood at the periphery of cross-national comparative research despite the region being one of the most violent in the world. This article assessed a large battery of explanations to better understand this salient phenomenon. Whereas scholars often emphasize one theoretical perspective over others and existing explanations are seen as competitive rather than additive, the article’s findings support different perspectives and illustrate how considering different theoretical approaches helps improve our knowledge of social violence. Specifically, the results support explanations highlighting the role of state and social constraints, as well as opportunities facilitating the commission of crimes. With regards to social-based constraints, educational attainment has a negative effect on homicide rates, while the size of the female workforce is related to fewer

¹⁷ Urbanization and female labor force are considered exogenous variables, and all other independent variables are seen as weakly exogenous, and thus may be influenced by past and present murder rates.

¹⁸ In Model 8, the coefficient for post-conflict states comes close to significance at the 0.05 level. This is also the case for female labor force, which is nearly significant in Model 9.

¹⁹ The online appendix provides definitions of these categories.

²⁰ These results are reported in the online appendix.

Table III. Robustness checks

		8	9	10	11
Motives	GDP pc	56.992*** (14.345)	-40.339 (35.042)	-223.644*** (51.783)	-188.276** (61.113)
	GDP pc ²	-3.296*** (0.822)	2.192 (1.955)	13.550*** (3.045)	11.439*** (3.406)
	GDP pc Growth	-0.005 (0.066)	-0.120* (0.055)	0.009 (0.079)	0.024 (0.068)
	Inequality	-0.780** (0.288)	-0.397* (0.201)	-1.520*** (0.343)	-1.174** (0.386)
	Unemployment	-0.085 (0.169)	-0.123 (0.104)	-0.005 (0.164)	0.040 (0.179)
Control	Repression	1.340* (0.627)	0.548 (0.388)	1.118 (0.699)	1.351* (0.620)
	Judicial independence	-19.443** (6.908)	6.691 (5.189)	5.160 (7.952)	3.252 (8.046)
	Democracy	0.519 (0.493)	0.544 (0.353)	0.016 (0.926)	-0.060 (0.655)
	Democracy ²	-0.068 (0.056)	-0.062 (0.037)	-0.007 (0.080)	0.004 (0.059)
Opportunity	Urbanization	-0.088 (0.066)	0.367** (0.128)	0.526* (0.249)	0.536 (0.314)
	Youth bulges	2.524* (1.279)	1.474*** (0.404)	0.438 (0.694)	0.696 (1.155)
	Post-conflict state	7.277 (4.116)			
Constraints	Educational attainment	-5.326*** (0.895)	-0.659 (0.817)	-10.795*** (1.680)	-9.085*** (1.300)
	Female workforce	0.253*** (0.061)	0.089 (0.050)	0.318*** (0.094)	0.302*** (0.077)
	Civil war	0.155 (1.584)			
	Drug producer and/or transit state			-5.641 (3.687)	-5.623 (3.350)
	Money-laundering state			1.472 (0.868)	1.821* (0.821)
	LDV		0.794*** (0.050)		
	Constant	-195.850** (68.343)	147.700 (149.368)	938.563*** (207.297)	768.944** (263.412)
	N	348	341	275	298
	R-sq	0.341	0.970	0.773	0.764

* $p < .05$, ** $p < .01$, *** $p < .001$. All explanatory variables are lagged one year.

informal controls and higher violence. In relation to state-based constraints, this work shows that states' judicial system capacity decreases violence. Beyond state and social controls, the results support arguments stressing the role of opportunities, as urbanization and youth bulges are positively related to violence. Moreover, the evidence is consistent with case studies illustrating how post-conflict states experience more violence.

While many studies emphasize the economic determinants of violence, the results are less supportive of motivation theories underlying the influence of structural economic factors on social violence. This is perhaps not surprising as earlier studies supporting motivation theories relied on samples biased towards industrialized democracies and hence may exclude poor and/or middle income countries without high homicide rates. Furthermore,

although we can expect that adverse economic conditions are likely to influence nonviolent criminal activities such as theft and assault, it is not entirely clear why unfavorable economic conditions would influence individuals' propensity to commit violent acts against other people. Finally, it is noteworthy that the analysis suggests that other factors associated with economic development, such as educational attainment, reduce homicide rates, and thus economic development may exert indirect effects on crime.

The high rates of homicide in Colombia and Mexico have fostered the impression that drug-related activities increase social violence significantly. However, the state-level analysis in this article suggests this is not always the case as drug activities are not invariably linked with high homicide rates, suggesting there are substantive differences that deserve further attention. On the one hand, drug producer and/or transit countries are not systematically related to violence. This finding may be striking in light of the cases of Colombia and Mexico, but it is compatible with trends in other countries where homicide rates are relatively low despite being major drug producer and/or transit countries (i.e. Bolivia). On the other hand, the estimates show that major money-laundering states on average experience more violence. Taken together, the present analysis and extant anecdotal evidence suggest that drug production and trafficking lead to violence only under certain conditions that are linked with governments' policies and competition among drug-trafficking organizations.

The findings of this study are of significant policy relevance. The results indicate that both educational attainment and the proxy for state's judicial system capacity (i.e. judicial independence) help reduce homicide rates. Although violence phenomena will remain difficult to solve, strengthening judicial system capacity and increasing school attendance are likely to improve public security in the region. Although political actors tend to see these strategies as substitutes and emphasize law enforcement over welfare policies, we can infer from the results that tandem strategies may be helpful instruments that governments can deploy to promote peace. Second, the increasing role of women in the workforce constitutes a remarkable trend in contemporary societies. The positive effect of the size of the female workforce on homicide does not imply that female labor participation is undesirable. As modernization theories suggest, changes in the structure of social organization may increase homicide rates, but then violence declines once new forms of social organization and control are reached. Thus, it is plausible that the relevance of the female

workforce may diminish over time once a new social mode of organization is established. In the short term, however, the results stress the need for alternative strategies that help to build and strengthen social bonds that mitigate incentives for criminal activity.

While attentive to the strengths of this article, there are some limitations that can be tackled in future research. For instance, efforts of data collection on non-violent types of crime are needed to improve our knowledge on the broad subject of citizen security in Latin America, and developing countries in general. These efforts can be helpful to perform disaggregated tests of extant explanations, depending on the nature of criminal activity. Related efforts of data collection on different dimensions of police capacity constitute a fruitful way to test propositions emerging from control explanations. As noted above, the results for judicial independence suggest that the strength of the judicial system matters and improving law enforcement institutions can reduce social violence. However, more disaggregated analyses are needed to identify specific aspects of the judicial system that promote security. Specifically, cross-national data on police organizations will help to carry out more systematic assessments regarding the effect of law enforcement tactics on both nonviolent and violent crime.

Finally, subnational analyses can improve our knowledge on the causes of violence. Despite their usefulness, state-level analyses do not capture spatial variation in murder rates within countries. In Brazil, for example, southeast states have experienced an important decline in homicide, yet violence has steadily increased in northern states over the past 20 years (World Bank, 2013). Also, spatial heterogeneity is seen in Central American states, where crime victimizations are extremely high in some regions but relatively low in others (World Bank, 2011). Thus, spatial disaggregation within countries is promising to perform more context-sensitive investigations and assess specific mechanisms regarding homicide.

Replication data

The dataset, codebook, and do-files for the empirical analysis in this article can be found at <http://www.prio.org/jpr/datasets>.

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- MAURICIO RIVERA, b. 1983, PhD in Government (University of Essex, 2013); Post-doctoral Research Associate, University of Southern California (2013–14); Assistant Professor, Centro de Investigación y Docencia Económicas (CIDE) (2014–); research interests include political regimes and regime change, state repression, and protest; recent articles in *International Interactions*, *Journal of Conflict Resolution*, and *Journal of Peace Research*.