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Why are Mexican politicians being assassinated?

The role of oil theft and narcocracy and the electoral consequences of organized crime

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Abstract: When does organized crime resort to assassinating politicians? In narcocracies, criminal groups co-opt political elites through bribery in exchange for protection to traffic illegal drugs. When criminal groups compete, they may also resort to political violence to influence which candidate wins local elections in strategic areas and retaliate when state action threatens their survival. Using new data on political assassinations in Mexico during 2000–21, we show that political candidates are more likely to be assassinated in areas close to oil pipelines used by drug trafficking organizations for oil theft. Former mayors of areas near oil pipelines remain at high risk of assassination. In municipalities where at least one mayor has already been killed, the arrest of a member of organized crime significantly increases the chance that an incumbent mayor will be killed. Political violence is directed at politicians, not voters, so it has a negligible impact on voter turnout.

Key words: organized crime, drug trafficking, political violence, voter turnout

JEL classification: D72, D74, K42, P00

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1 Introduction

Understanding how best to support peace and legitimate political authority in societies that rely for a large part of their economy on illegal activities remains one of the key challenges of international development. According to the UN, nearly 90 per cent of illegal opium cultivation takes place in Afghanistan and Myanmar; and most of the world's coca is grown in the Andean countries and trafficked through Central America and Mexico to the consumer end-markets (UNODC 2012). In these countries, organized crime engages in several other parallel illegal activities, such as oil theft, leading to substantial levels of violence, as in Mexico, and prolonged civil wars, as in Colombia (Alonso Berbotto and Chainey 2021; Jones and Sullivan 2019). Economists and political scientists have prioritized understanding the causes and economic consequences of large-scale conflicts in these countries (Andreas and Youngers 1989; Dell 2015; Rios 2015). Yet there is still a lack of understanding of the type of political violence that prevails in areas dedicated to illegal activities. This violence regularly claims the lives of hundreds of candidates competing in elections and other politicians, particularly in countries where alternative governance structures exist to facilitate the dominance of organized criminal groups. Examples of this type of criminal governance can be found in Brazil, Colombia, Mexico, and Nigeria (Arias 2006; Bratton 2008; Taylor 2009; Trejo and Ley 2020). There is also limited understanding of how these alternative criminal governance structures affect voting participation and electoral outcomes.

In this paper, we analyse the alarming increase in political violence in Mexico, which has resulted in over 500 politicians being assassinated during 2000–21. Mexico is a good case study to analyse the legacies of a prolonged and ongoing conflict among organized crime groups and the state. In the mid-2000s, the so-called Mexican war on drugs began when the government deployed the army to cartels' hotspots and arrested several drug lords. These actions triggered an unprecedented wave of violence, which has left over 300,000 casualties thus far. Instead of being dismantled, drug trafficking organizations reorganized and spread across a wider territory, going from controlling about 20 per cent of municipalities to 50 per cent within a few years, and now an estimated 70 per cent (Gutiérrez-Romero and Oviedo 2018). The number of drug trafficking organizations also increased from a mere dozen when the war on drugs began to well over 150 today, several funded by transnational drug cartels operating in the country (Reina 2011).

The fierce battle for territory among the state and drug traffickers has driven organized crime groups to diversify their business into several other crimes, including extracting natural resources (Herrera and Martinez-Alvarez 2022). Drug trafficking organizations have become heavily involved in the lucrative business of oil theft, known as *huachicol* in Mexico, by exploiting their deals with authorities and smuggling routes, known as *plazas* (Battiston et al. 2022; Coscia and Gutiérrez-Romero 2023; Jones and Sullivan 2019). These criminal organizations hire technical experts to drill holes in the oil pipelines that cross the country to extract gasoline and diesel (Alonso Berbotto and Chainey 2021). The stolen merchandise is transported in hundreds of trucks and sold daily in open black markets in nearby communities. These communities buy the stolen gasoline and diesel for approximately 60 per cent less than the official price. Ex-police officers now involved in oil theft can earn US$50,000 per month instead of their previous monthly salary of only US$270. Leaders of oil theft in each *plaza* can earn up to US$500,000 per day (Ferri 2019). Not surprisingly, drug trafficking is no longer the main source of income for many of the country's criminal organizations (Castillo 2014).

The expansion of organized crime in Mexico, as in other similar narcocracies, has only been made possible thanks to criminal groups co-opting the political elite and the armed forces through extensive bribery in exchange for information and protection to extract local resources (Gutiérrez-

Romero and Oviedo 2018; Snyder and Duran-Martinez 2009). We argue that when these criminal groups are in conflict with each other to protect their *plazas* they can also resort to political violence for two main reasons: first, to influence which candidate wins local elections to capture incoming local governments and eliminate potential competition, particularly in areas of strategic importance; and second, in retaliation whenever state actions threaten their survival. Narco-elites are unlikely to target voters with electoral violence in retaliation for state actions or to affect electoral outcomes. It is far cheaper to kill candidates or incumbent mayors using assassins, *sicarios*, than to attempt to intimidate entire local populations into voting for a specific candidate in secret-ballot elections. We hypothesize that because political violence is directed at politicians, and not voters, the violence will have a negligible effect on voter turnout.

To test our hypotheses, we use the unique database 'Political Assassinations, Intimidation and Actors in Mexico' (PAIAMEX) gathered by Gutiérrez-Romero and Iturbe (2023). This database has georeferenced records at the sub-country level on a daily basis for the period 2000–21. We find that political violence is primarily concentrated at municipality level, claiming over 500 political assassinations during 2000–21, including 69 pre-candidates and candidates, 99 incumbent mayors, and 148 former mayors. We triangulate this database with the relevant characteristics of all 2,469 municipalities from 2000 to 2021. We include information such as distance to the nearest oil pipeline, crackdowns on illegal drug production, arrests and killing of members of organized crime, and data on electoral outcomes.

We use the fixed-effects Poisson estimator combined with instrumental variables to account for any important unobserved characteristics driving political violence and where the state decides to tackle organized groups. To claim causality, we use as instruments the variation in street prices of illegal drugs in the USA, the local price of corn in Mexico, municipalities' proximity to ports, and the number of Chinese immigrants, who arrived in the 1930s and introduced the opium cultivation that still prevails today in Mexico (Murphy and Rossi 2020). These instruments help us identify which areas are more likely to be used for organized crime and when the state is more likely to see more organized crime activity because it is more profitable.

In addition to the theoretical contribution on who will be the targets of political assassinations and why, where, and when, we make four important contributions to the literature. Our first contribution is to analyse the role of organized crime and oil theft in the killing of political candidates and incumbent and former mayors in Mexico. As expected, political candidates competing in areas closer to oil pipelines face a significantly higher risk of being assassinated than those in areas further away from pipelines. Similarly, former mayors are more likely to be assassinated if they ruled in areas near oil pipelines, remained in politics, or became entrepreneurs after leaving office. These findings imply that establishing links with criminal organizations while campaigning creates commitments with these organizations that are difficult to break. The risks of these politicians being assassinated increase as gasoline and diesel prices rise, due to the increased profitability of oil theft.

Our results find support in the biggest leak of military documents that the Mexican army has ever suffered, in October 2022. In the so-called Guacamaya leaks, hackers extracted over four million reports (Dalby 2022). According to one of these reports, among the 96 municipalities examined in Michoacán's military zone, 29 mayors who had recently won local elections had links with drug trafficking organizations also dedicated to oil theft.[1] The report acknowledges that criminal

[1] These now elected mayors belong to at least nine different political parties, including the opposition and the same party as the incumbent president. Eighteen of these mayors have alleged links with the cartel Jalisco Nueva Generación, another nine with the cartel Familia Michoacana, and two with Cárteles Unidos (Vivanco 2022).

organizations were interested in capturing incoming governments in the region because of their economic importance for these groups. The state of Michoacán has a concentration of 20 per cent of the incumbent mayors assassinated in the country as criminal groups fight over their *plazas*. Independent intelligence efforts have also found that several former mayors who were assassinated were business owners with ties with organized crime (Mejía 2021).

Our second contribution is to demonstrate that the arrest and killing of members of organized crime by the state is the driving force behind the assassination of incumbent mayors. An additional arrest of a member of organized crime increases the expected number of political assassinations of incumbent mayors by a factor of 2.2 among municipalities that have experienced at least one assassination of an incumbent mayor over the last two decades. *Narcomantas*, public display banners left by organized crime, support our retribution hypothesis. Some of these messages are addressed to state governors and instruct them to stop interfering with their business or else more mayors will be killed (INFOBAE 2022).

Our third contribution is to show that criminal organizations use political violence against politicians rather than voters. We show that over the last 20 years, political assassination has had a negligible effect on voter turnout in local elections and no effect on the local incumbent party's re-election. *Narcomantas* also suggest criminal organizations target incumbent politicians for retribution for state actions and that this type of political violence is not targeted on populations. In one of these messages, a mayor is told, 'Get your police out of the streets and stop messing up with our business … The problem is not with you or the local population' (Tirado 2020).

Our fourth contribution is to put to the test the hypotheses proposed by earlier studies on political violence in Mexico, all of which focused on the years 2007–12. These studies found that municipalities with higher fiscal revenue had higher rates of political assassination, implying that criminal organizations subdue local governments to extract these resources and fund their warfare (Chacon 2018; Trejo and Ley 2021). We show that fiscal revenue is not associated with political assassinations in Mexico. It is instead criminal organizations' thirst for oil theft and associated smuggling routes that drives political assassinations. Other earlier studies found that municipalities with more ongoing conflicts among criminal organizations, proxied by higher homicide rates, have more political assassinations (Rios 2012). We find that homicide rates have a negligible impact on political assassinations. It is the state arresting and killing members of organized crime that increases the risk of retaliation against incumbent mayors. Similarly, earlier studies found that politicians belonging to the same party as the president were not the target (Blume 2017; Trejo and Ley 2021). In contrast, we show that political violence during 2000–21 has affected all parties regardless of whether they are aligned with the state's governor or president's party or the opposition. The findings overall shed light on the democratic dangers of criminal organizations infiltrating the government with such impunity.

2 Political assassinations and their electoral impact

Throughout history, political assassinations have been used to eliminate political rivals or those who threaten the status quo or the interests of extremists, terrorist groups, or organized crime (Birch 2020). The motivations for these and other types of political assassinations are multifaceted and dependent on the context in which they can manifest and go unpunished. In this section, we focus on why organized crime uses political violence in narcocracies.

A narcocracy is where non-state armed actors dominate a territory to derive wealth from cultivating and smuggling illegal drugs (Andreas and Youngers 1989). Once these criminal groups establish

pacts with local authorities to decide which territory, *plaza*, they can operate in, they can take advantage of their smuggling routes and networks to expand their web of illegal activities. These crimes expand to include extortion, prostitution, human trafficking, money laundering, kidnappings, illegal logging and mining, and oil theft (Gutiérrez-Romero 2022; Herrera and Martinez-Alvarez 2022; Jones and Sullivan 2019). Narcocracies will pursue these local and transnational crimes by extensively bribing different figures of the state, local and federal, and the armed forces (Snyder and Duran-Martinez 2009). Narcocracies operate as parallel informal 'local states' where criminal organizations establish a complex system of criminal governance and reciprocity in territories they seek to control (Gutiérrez-Romero and Oviedo 2018).

2.1 Earlier explanations

The goal of organized groups is not to fight states. According to Lessing (2015), in inter-cartel conflicts, criminal groups compete with each other to extract resources, whereas in cartel–state conflicts, criminal groups seek to constrain the behaviour of the state in order to avoid punishment. Criminal organizations can persuade the state by employing pacific strategies such as extensive bribery for non-enforcement; this is well documented in several cases, such as in Brazil and Mexico (Carvalho 2022; Snyder and Duran-Martinez 2009). If bribery fails, cartels will resort to coercive tactics, including violent corruption (characterized as 'take the bribe or take a bullet'), and violent lobbying, including narco-terrorist attacks.

There is a small but growing empirical literature testing and analysing the causes of political assassinations in countries with significant criminal presence, as in Brazil (Carvalho 2022), Colombia (Chacon 2018; Gutiérrez and Thomson 2020), Mexico (Blume 2017; Esparza and De Paz Mancera 2018; Rios 2012; Trejo and Ley 2020), and Italy (Alesina et al. 2019). Three major hypotheses have been tested in the Latin American literature: repression, competition, and rent-seeking.

The central hypothesis tested in previous studies—what Trejo and Ley (2020) call the repression hypothesis—is that in narcocracies that experience intense state–cartel and inter-cartel violence, criminal groups will resort to using violence in self-defence. The intention will be to take over local governments and control their *plazas*. Both non-elected public officials and elected politicians are hypothesized to be direct targets. For Mexico, it has been found that areas experiencing more killings of drug lords, typically measured using higher homicide rates as a proxy, also have more political assassinations (Trejo and Ley 2021). However, this positive association may obscure other factors that contribute to increased violence in these areas, such as weaker rule of law and a higher overall criminality rate. It is also unclear why and when other public officials are targeted.

A second related hypothesis contends that when various organized crime groups compete for territory, political assassinations will occur as these groups attempt to subdue local governments (Rios 2012). Again, evidence for this hypothesis is found in the fact that areas with higher homicide rates, which are presumably driven by conflict among criminal organizations, tend to have more political assassinations. Nonetheless, Trejo and Ley (2021) argue that this observed association does not reveal the motivations driving these killings, nor does it predict when the political assassinations will emerge.

The rent-seeking hypothesis is another explanation that sheds more light on the motivation behind political assassinations. It has been suggested that in criminal wars, criminal organizations fund their operations by extorting rents from local governments, such as their fiscal revenue (Chacon 2018). Trejo and Ley (2021) find that, as in Colombia in the 1990s, more political assassinations have occurred in Mexican municipalities with greater fiscal revenue. One limitation of this finding is that fiscal revenue may be a confounding factor that makes the area more vulnerable to political

assassination. Furthermore, while mayors are responsible for local fiscal revenue, these resources are frequently limited and not entirely at their disposal. Basic services and wages must be paid to avoid alerting auditors.

2.2 Rent-seeking and candidate selection

Based on earlier studies on political violence, we posit that in narcocracies, organized crime will indeed seek to co-opt political elites through extensive bribery in exchange for protection to extract local resources (Lessing 2015; Snyder and Duran-Martinez 2009). Our central argument is that when these criminal groups are in conflict with each other to protect their *plazas*, they can also resort to political violence for two reasons: first, to influence which political candidate wins local elections in order to capture incoming local governments and eliminate potential competition; and second, to eliminate heads of local governments, in retaliation, whenever state actions threaten their survival.

Rival organized groups must continue to capture incumbent governments in competitive elections where political actors are subject to change and the same commitments cannot be honoured. Political violence is more likely to emerge and to be directed at political candidates during electoral campaigning when bribing fails or there are too many competing groups offering the same. Violence is costly and risky. Thus, it will occur in areas where it is worthwhile. The areas at risk are those where profitable resources can be extracted and where local government capture is required to avoid detection and enable criminal operations. Capturing the current government will also help to deter unwanted competition from other criminal groups in highly sought-after *plazas*.

Even though organized crime may be involved in transatlantic crimes, their core crimes often happen in small areas, where there is illegal cultivation and where illegal drugs and the ingredients needed to produce synthetic drugs might arrive in nearby ports. Illegal goods can be moved from these strategic locations to domestic and international markets. Oil theft is an example of rent-seeking behaviour, in which multiple criminal groups compete to extract and sell local resources on the black market, and their success is dependent on capturing incoming local governments to avoid prosecution (Alonso Berbotto and Chainey 2021). In these areas, gasoline and diesel are extracted from oil pipelines and sold on black markets in broad daylight.

All of these illegal operations are more difficult for remote authorities to detect. However, for local mayors who live in the areas in which they take place and are in charge of local police, as in Mexico, it is hard not to see.

Criminal organizations can try to capture an incoming local government by recruiting political candidates for mayoral elections. But establishing connections with criminal organizations poses a significant risk for political candidates. According to intelligence reports in Mexico, mayors who at some point during their career become co-opted by organized crime often become their business partners (Mejía 2021). These ties to criminality increase their chances of being killed, even years after they have completed their administrative term. Based on our discussion, we hypothesize as follows.

Rent-seeking hypothesis

H1A: Areas with a competitive advantage for illegal rent extraction experience more political assassinations of candidates contending in local elections than other areas.

H1B: Areas with a competitive advantage for illegal rent extraction experience more political assassinations of former mayors than other areas.

2.3 Incumbent mayors

For criminal organizations pursuing rent-seeking, mayors are a valuable asset. Mayors' official salary is typically modest, around US$2,800 per month in Mexico, and despite being in charge of local police, they have limited security protection. As a result, they are an easy target for co-optation and easier to get rid of without risking prosecution, compared with other even more prominent political figures. Local mayors, unlike other prominent politicians, are also more likely to be targeted for political assassination in retaliation for state actions, despite their importance in extracting local resources. It is national policy, not local policy, that determines which criminal organizations will be targeted and where in state–cartel and inter-cartel conflicts. In decentralized systems such as Mexico, local law enforcement must abide by the governor's directives and what the federal government deems to be important and urgent in their region. The army and navy may ask mayors to facilitate enabling operations, but these armed forces only carry out orders that have first been authorized by the president. Therefore, it is possible that some local mayors may have agreements with particular criminal groups, but they might fall short in their duty to defend these criminal organizations. This could be the case if the governor or the president decide to prosecute such an organization because they have different priorities.

Due to their lack of autonomy from other authorities, mayors are also at greater risk of being at odds with criminal groups and becoming a convenient target when such groups seek to blackmail the government to stop them interfering with their business. There is an empirical question as to when local mayors are more likely to be subject to retaliation: when criminal organizations face economic losses when the state destroys their merchandise, or when members of criminal groups are arrested or killed by state authorities. For drug trafficking criminals, being arrested perhaps poses one of the biggest threats to their survival because they run the risk of being extradited to the USA, where the prospect of getting out of jail through bribery is very different from in their home countries. This discussion leads us to the following hypothesis.

Retribution hypothesis

H2: Areas where the state affects the survival of criminal organizations experience more political assassinations of incumbent mayors in retribution compared with other areas.

2.4 Electoral outcomes

In many states, electoral violence is used to dissuade the supporters of potential rivals from voting and influencing electoral outcomes (Collier and Vicente 2012). Even though organized groups can also use electoral violence to influence the electorate and who wins competitive elections, this strategy is potentially costly and risky. The vote is, after all, secret, and voters might choose to vote out candidates known to have ties with organized crime.

A more cost-effective strategy for criminal organizations seeking to extract rents is to ensure the election of their candidate, which can be done by killing or intimidating rival political candidates directly instead of citizens. These organizations have *sicarios* who can send armed envoys to kill political candidates and easily avoid prosecution due to high levels of impunity. Similarly, it is more cost-effective for such organizations to target local mayors with violence in order to blackmail the government to stop interfering with their business than to terrorize populations in retribution for state crackdowns during elections.

In conflict-afflicted areas, civilians are subjected extensively to other crimes such as extortion and kidnapping (Gutiérrez-Romero 2016). Albeit civilians are also often caught in the crossfire of the criminal organizations and the state, they are mere unintended casualties and not per se the targets

of drug-related or political violence. Thus, we hypothesize that political assassinations will result in a negligible or small reduction in voter turnout. Based on this discussion, we arrive at the following hypotheses about how political violence will influence voters and electoral outcomes.

Cost-effective hypothesis

H3A: Areas with a competitive advantage for illegal rent extraction do not experience more electoral violence targeted at voters than other areas.

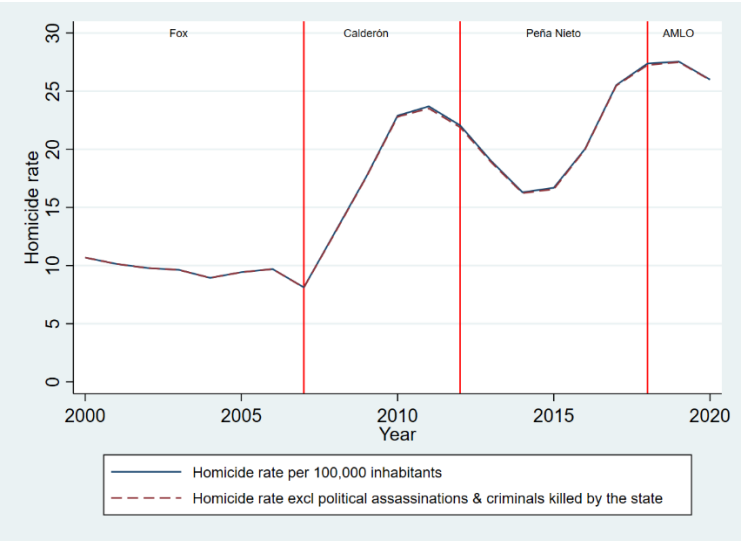
H3B: Areas where the state affects the survival of criminal organizations do not experience more electoral violence targeted at voters than other areas.

H3C: Areas that experience political assassinations see a negligible to small reduction in voter turnout compared with other areas.

3 Setting

Mexico was ruled by the same party, the Partido Revolucionario Institutional (PRI), from 1929 until 2000. During this 71-year rule, violence derived from drug trafficking was kept at relatively low levels by the state establishing alliances with drug cartels across all levels of government and security forces. After opposition parties started to win elections in the late 1990s, the PRI's hegemony, which had allowed it to punish criminal organizations for breaking agreements, was weakened (Rios 2015). Ultimately, the Partido Acción Nacional (PAN) won the presidency in 2000. This decentralization of power changed the political arena. New alliances needed to be built between the new political actors and criminal actors. Soon after this, powerful drug cartels started to fight over smuggling routes to the USA and other routes in Michoacán. Then drug-related violence began to rise. In the presidential election of 2006, the PAN won again. Its elected candidate Felipe Calderón narrowly defeated opposition leader Andrés Manuel López Obrador (AMLO) in one of the most hotly contested elections. To gain public trust, Calderón declared war on drug trafficking organizations. He sent the military to the hotspots of these cartels, where important drug lords were arrested or killed. These military operations triggered an unprecedented wave of violence and rise in homicides (Figure 1). The violence was driven by inter-cartel conflict. To illustrate this, in Figure 1, we also depict the overall homicide rate excluding political assassinations and the number of members of organized crime killed by the state.

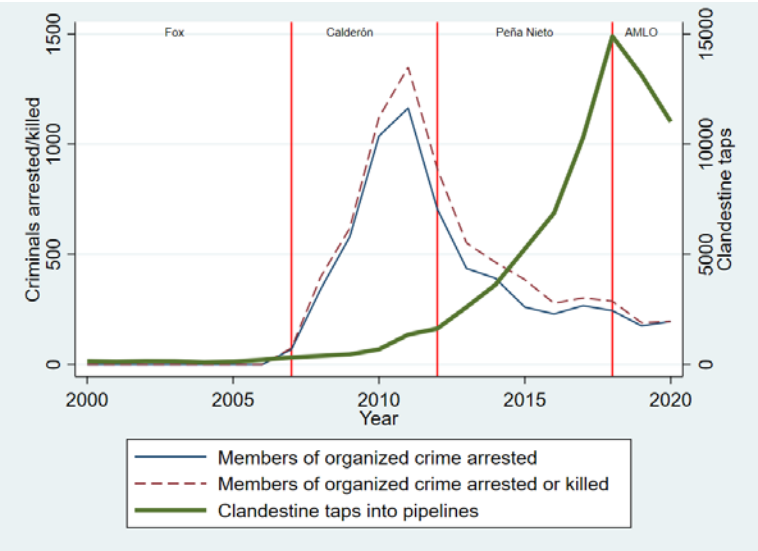
Figure 1: Annual homicide rate in Mexico, by presidential administrations



Source: authors' illustration based on data from INEGI (National Institute of Statistics and Geography), CONAPO (National Population Council, PAIAMEX (Political Assassinations, Intimidation and Actors in Mexico database; Gutiérrez-Romero and Iturbe 2023), SEDENA (Ministry of National Defense), SEMAR (Secretariat of the Navy), National Guard, and Federal Police.

Even though the number of arrests and killings of members of organized crime decreased over time (Figure 2), the conflict unleashed among cartels could not be stopped. Drug trafficking organizations quickly reorganized, often fragmenting into different cells and moving to new territory. These drug trafficking organizations also diversified their activities into over 20 other activities, including oil theft (Alonso Berbotto and Chainey 2021; Gutiérrez-Romero 2016). For instance, Figure 2 depicts the number of clandestine oil taps discovered and sealed by the government along the gasoline and diesel pipelines. These figures for sealed taps do not fully reveal how much oil was extracted by municipalities but are a proxy for the rise of the prominence of oil theft.

Figure 2: Arrests of members of organized crime and oil theft

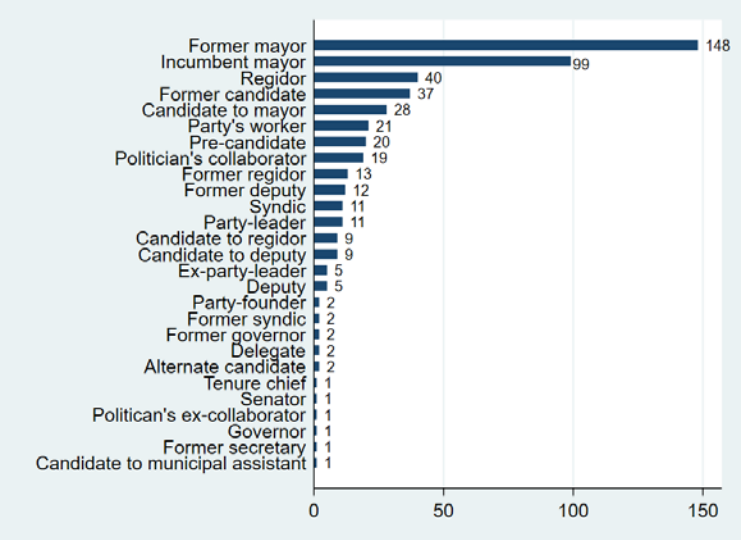


Source: authors' illustration based on data from PEMEX (Petróleos Mexicanos), SEDENA, SEMAR, National Guard, and Federal Police.

Parallel to the rise in drug-related violence, there was a surge in political violence. During the late 1980s and 1990s, there were isolated clashes between members of the PRI and local opposition parties, as well as instances of local electoral violence and political assassinations (Calderón Molgóra 1994).[2] With the democratic transition and the PAN's presidential victory in 2000, these political assassinations subsided. To analyse how political assassinations have changed since the war on drugs began, we use the PAIAMEX database. Gutiérrez-Romero and Iturbe (2023) gathered this dataset using various sources, such as government reports, local media, and historical news archives. According to PAIAMEX, during our period of analysis, 2000–21, there were 503 political assassinations, mostly concentrated at the municipality level, including 19 politicians' close collaborators.

Figure 3 shows that among the politicians killed were 69 pre-candidates and candidates for different posts in these local elections. Also, 99 incumbent mayors and 148 former mayors were assassinated. The number of assassinations has steadily grown since the mid-2000s, first reaching a peak in 2010, during Felipe Calderón's administration (Figure 4). After that, the number of political assassinations steadily increased, reaching a historical maximum in 2018. Mayoral candidates and former mayors increasingly became the targets. Also, when the war on drugs began, the main targets were members of the opposition parties. In more recent presidential administrations, both incumbent and opposition parties have been targeted (Figure 5).

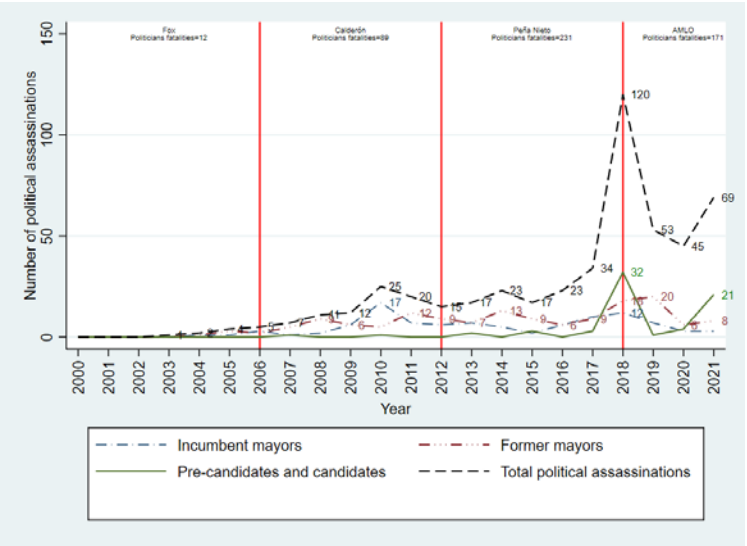
Figure 3: Targets of political assassinations in Mexico, 2000–21



Source: authors' illustration based on data from PAIAMEX (Gutiérrez-Romero and Iturbe 2023).

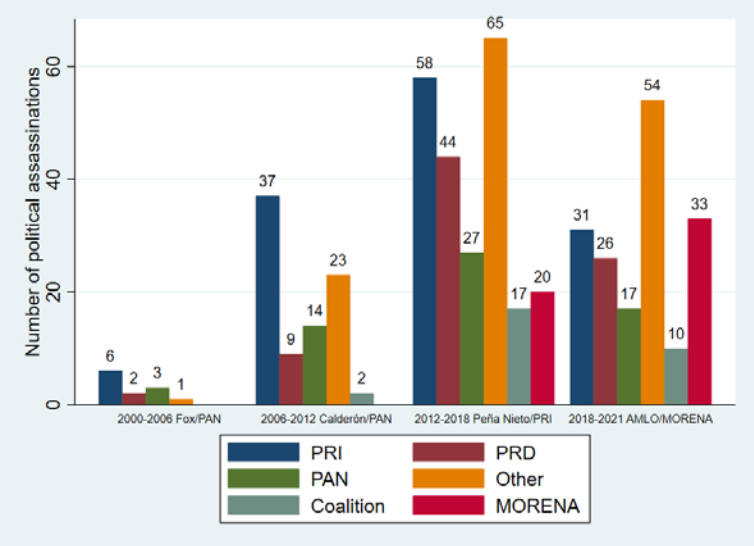
[2] Prior to the 1994 presidential election, the presidential candidate of the then-incumbent party, the PRI, was assassinated in Tijuana, a northern city known for its drug trafficking organizations.

Figure 4: Timing of political assassinations, 2000–21



Source: authors' illustration based on data from PAIAMEX (Gutiérrez-Romero and Iturbe 2023).

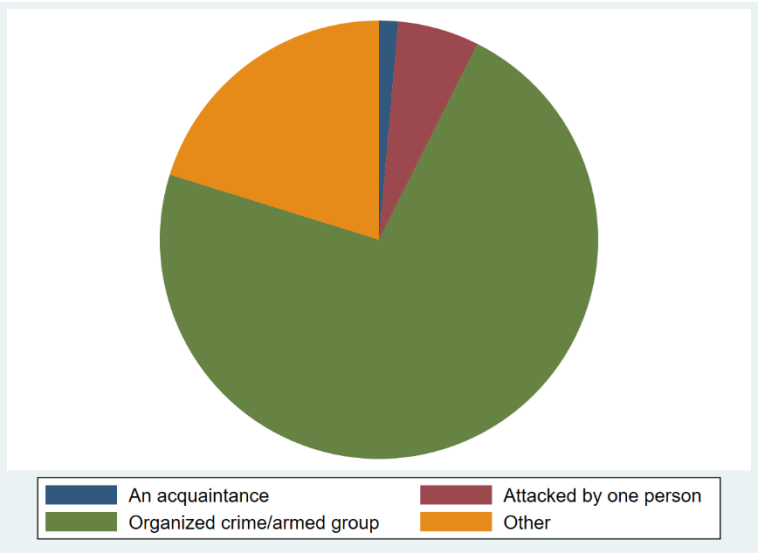
Figure 5: Political affiliation of assassinated politicians



Source: authors' illustration based on data from PAIAMEX (Gutiérrez-Romero and Iturbe 2023).

Figure A1 in the Appendix illustrates the uneven distribution of political assassination by state. Oaxaca, Guerrero, Veracruz, and Michoacán are the states that have experienced the most political assassinations, with 71, 61, 54, and 45 killings respectively. It is impossible to know with certainty the true motivations behind these assassinations because these kinds of political crimes are carried out with blatant impunity. However, media reports note that in the vast majority of cases (82 per cent), the murder was carried out by members of organized crime, frequently described as groups using high-calibre weapons (Figure 6). In 4 per cent of reports, only one assassin is mentioned; such perpetrators may have other motives but cannot be ruled out as still belonging to organized crime.

Figure 6: Assassins of politicians in Mexico, 2000–21



Source: authors' illustration based on data from PAIAMEX (Gutiérrez-Romero and Iturbe 2023).

4 Data

4.1 Dependent variables

We use the number of pre-candidates, candidates, incumbent mayors, and former mayors assassinated at the municipality and monthly levels to test the H1 (rent-seeking) and H2 (retribution) hypotheses. Our source is PAIAMEX, from January 2000 until June 2021, when the country's most recent general election was held. To test the H3 (cost-effective) hypothesis, we use data from the Armed Conflict Location and Event Data Project (ACLED) for 2018–21 only, as it is not available for earlier periods. From ACLED, we draw the number of electoral violence attacks targeted at civilians and the number of associated fatalities. Violence against civilians is defined as an armed or violent group attacking unarmed civilians who are not engaged in political violence (Raleigh and Dowd 2016). We removed any deaths or attacks directed at politicians from these occurrences. We also use the voter turnout at mayoral elections and whether the incumbent party won in each of these elections from 2000 to 2021. Each of the 32 electoral institutes in the country provided us with these electoral outcomes.

4.2 Key predictors

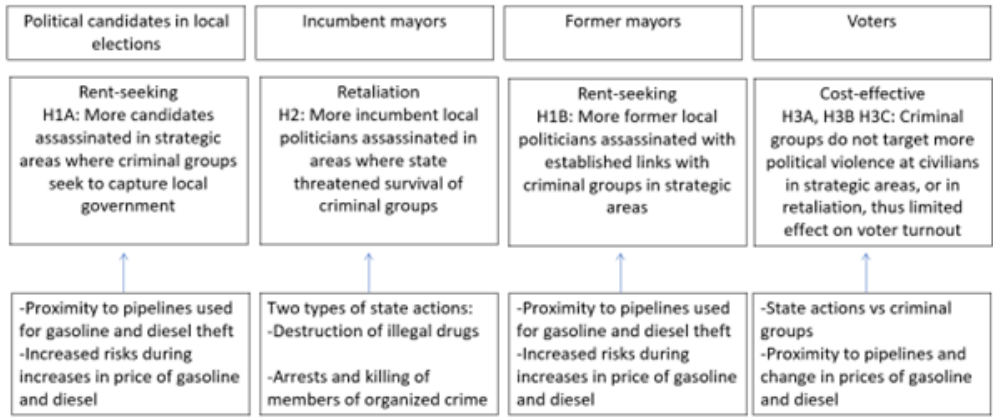
For reasons of national security, the government withholds information on the volume of oil theft that occurs in each municipality. To test H1 and H3, we instead use the proximity of municipalities to oil pipelines, which is where the vast majority of oil theft takes place. Based on the co-ordinates for these pipelines provided by PEMEX, we estimate these distances. We interact the distances with the monthly prices of gasoline and diesel, which are set and subsidized for the public by the Mexican government. Prior to 2016 these prices were uniform across the country, but since then there has been an increase in regional variation and sudden, unannounced price increases.

To test H2 and H3, we construct a dummy variable indicating whether any of the forces (army, navy, or federal police) had destroyed illegal cultivates of marihuana or opium, seized any illegal drugs from organized crime, or dismantled drug labs used to produce synthetic drugs at

municipality level on a monthly basis. We also measure the number of arrests and killings of members of organized crime.

In Figure 7, we summarize the hypotheses drawn, who the targets of political assassinations are, why and when they are targeted, and how we will empirically test the hypotheses.

Figure 7: Testing hypotheses of political violence in the electoral cycle



Source: authors' construction based on own work.

4.3 Controls

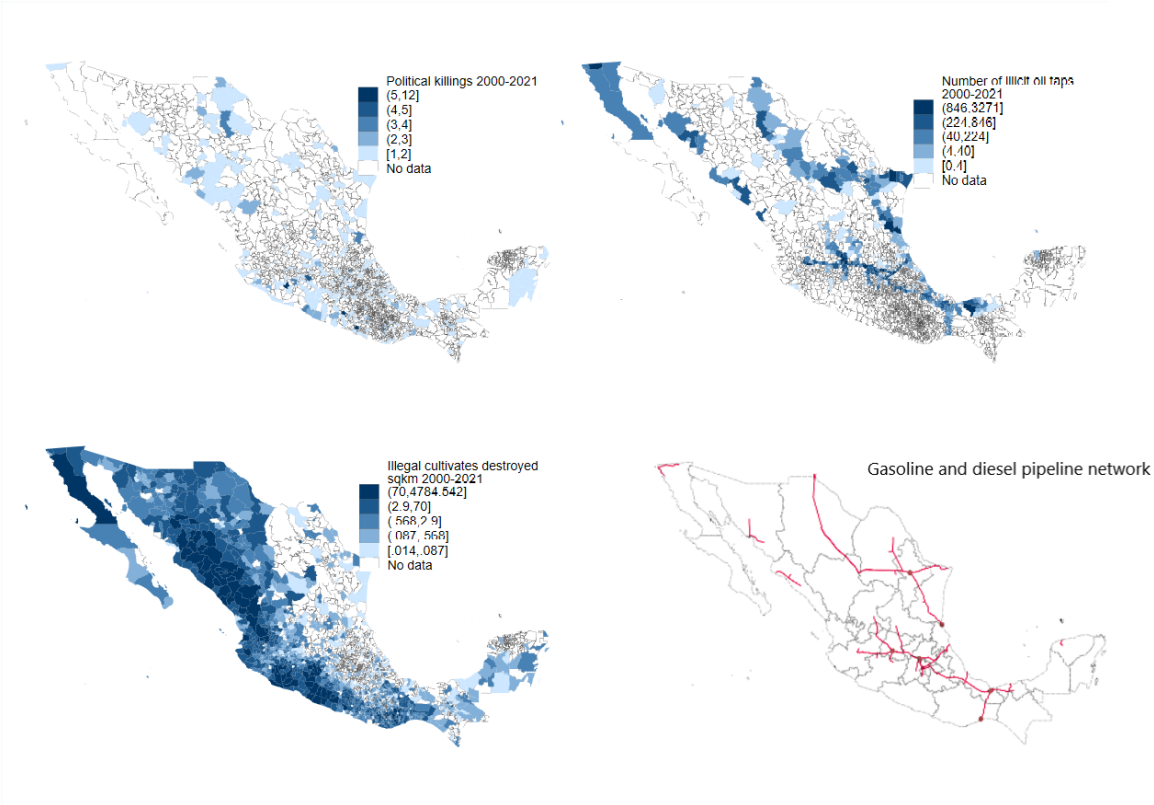
We use the fiscal revenue of municipalities between 2000 and 2021, in real terms, provided by INEGI, to control for other pertinent explanations for political assassinations. We use the monthly homicide rate per 100,000 people at the municipal level between 2000 and 2021, using data from INEGI and the National Population Council (CONAPO). We subtract the number of political assassinations and organized crime figures killed by authorities from this homicide rate to prevent double counting of crimes in our dependent and covariates.

As for other relevant controls, we include a dummy variable indicating whether the party of the mayor is the same as the ruling party at the governor and presidential levels. This been found to be influential in co-ordination among authorities and in potentially providing more protection to municipalities from attacks (Trejo and Ley 2021). We also use the population's average educational attainment at the municipality level, taken from the census. We use satellite data on night light per capita as a proxy of wealth. This indicator is measured at the municipality level annually, gathered by the Earth Observation Group, Payne Institute for Public Policy (Elvidge et al. 2017).

4.4 Spatial relationship: crime and political violence

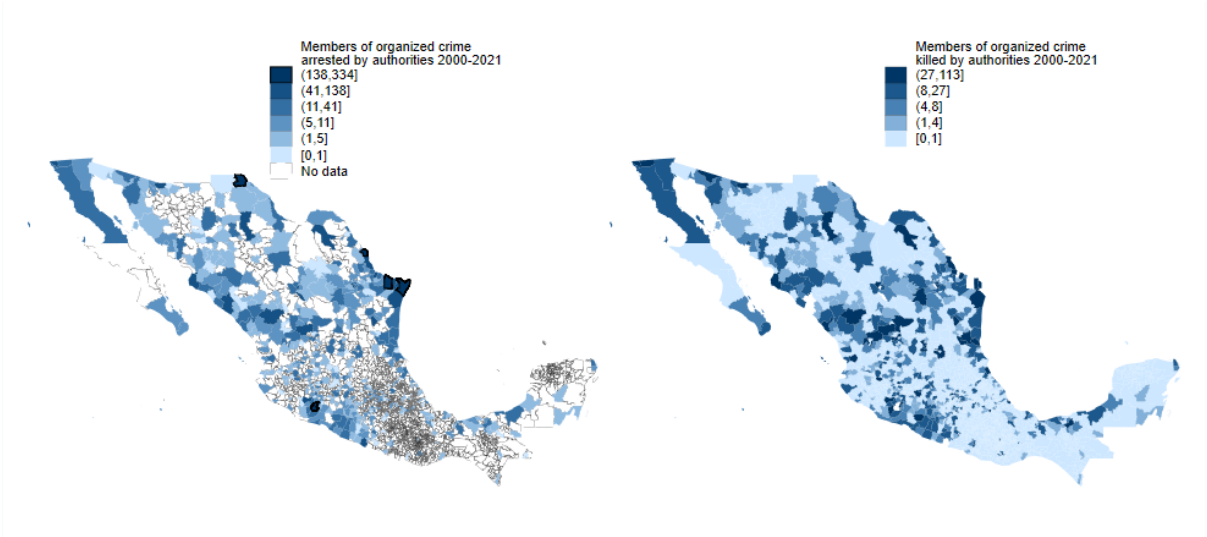
Next, in Figure 8, we show the spatial relationship between political assassinations and marihuana and opium cultivates destroyed by armed forces. In the figure we also show the gasoline and diesel pipeline network and the number of clandestine oil pipe taps detected and sealed by the government. Figure 9 shows the number of arrests and killings of members of organized crime. These figures illustrate the similarity in spatial distribution of political assassinations and areas with criminal presence, including oil theft.

Figure 8: Political assassinations, oil theft, and destruction of illegal cultivates, 2000–21



Source: authors' illustration based on data from PAIAMEX (Gutiérrez-Romero and Iturbe 2023), PEMEX, SEDENA, and SEMAR.

Figure 9: Members of organized crime arrested or killed by the state, 2000–21



Source: authors' illustration based on data from SEDENA, SEMAR, Federal Police, and National Guard.

Table 1: Summary statistics

	All municipalities in the country					
	Observations	Municipalities	Months	%	Average	Standard deviation
Whether state took action against illegal drugs (destroyed cultivates, seized drugs, dismantled labs) in past month	633,648	2,456	258	9.55		
Number of members of organized crime arrested or killed in past month	633,648	2,456	258		0.001	0.33
Number of members of organized crime arrested in past month	633,648	2,456	258		0.001	0.29
Distance to nearest oil pipeline	633,648	2,456	258		87.91	71.96
Average price of gasoline and diesel, in real terms, in part month	633,648	2,456	258		13.84	3.00
Monthly homicide rate (excl. criminals and political assassinations)	633,060	2,456	257		1.30	8.08
Monthly fiscal revenue, real terms, in million pesos	549,864	2,440	225		170.00	500.00
Annual night light per capita	539,184	2,092	257		0.08	0.13
Political co-ordination: municipality was ruled by same party as its respective state and presidency	633,648	2,456	258	11.67		
Average educational attainment of municipality's population	632,688	2,456	257		4.96	1.60
Chinese population in area in 1930s	633,648	2,456	258		137.72	256.51
Average price of corn, previous quarter, pesos per ton	623,564	2,456	253		3,044.57	1,056.40
Annual street price of cocaine adjusted for purity per 0.001 gram in USA	633,648	2,456	258		0.16	0.04
Street price of heroin adjusted for purity and inflation per gram in USA	633,648	2,456	258		990.45	134.48
Percentage of mountainous territory	539,736	2,092	258		14.16	22.22
Distance to nearest port	633,648	2,456	258		148.88	89.20

Source: authors' construction based on sources listed in Table A2.

Table 1 displays the summary statistics for our key variables for all municipalities in the country. We have data for up to 258 months from January 2000 until June 2021. As explained below, we use the fixed-effects Poisson estimator to test our hypotheses. This method discards municipalities where the dependent variable is zero across the period, meaning that no political assassination occurred, as this does not contribute to the estimation of the likelihood function. So, for those municipalities that had at least one political assassination of a pre-candidate/candidate, an incumbent mayor, or a former mayor, we present the summary statistics in Table A1 in the Appendix. Table A2 provides more information about each of the variables used, including the data source.

5 Method

To test the role of organized crime in political assassinations, we use the fixed-effects Poisson estimator as expressed in Equation 1.

$$E(y_{it}|\, a_{it-1},\, d_{it-1}, x_{it-1};\, \beta_i) = \beta_i exp\,(a_{it-1}\beta_1 + \, d_{it-1}\beta_2 + \, x_{it-1}\beta_3) + \, u_{it} \qquad (1)$$

where y_{it} denotes the dependent variable, the number of politicians assassinated in municipality i at month t during 2000–21. We separately analyse the assassination of pre-candidates/candidates, incumbent mayors, and former mayors. u_{it} denotes the error term. Two of the key covariates of interest are denoted by a_{it-1}, which is a dummy variable indicating whether the state destroyed any illegal cultivates, seized illegal drugs from organized crime, or dismantled labs used to produce synthetic drugs in the previous month. Vector d_{it-1} represents the number of arrests or killings of members of organized crime by the state at municipality level during the last month. We lag both variables, since organized crime might take a few days or weeks to carry out retribution attacks, and to prevent reverse causality where the state might increase crackdown against organized crime after the execution of politicians.[3]

Vector x_{it-1} denotes municipalities' characteristics, also in the previous month. This vector contains the interaction between the distance to the nearest pipeline and the average price of gasoline and diesel; homicide rate; annual fiscal revenue in real terms; annual night light per capita in logarithm; average educational attainment of the population; and whether the same party ruled the municipality as held the state's governorship and the presidency. The homicide rate excludes political assassinations and numbers of members of organized crime killed by authorities, to prevent the double counting of crimes. As shown in Figure 1, this deduction has a negligible effect on the magnitude of the homicide rate.

We cluster the standard errors at the municipality level. No assumptions are made on the individual fixed effect, β_i, as these effects are treated as unknown nuisance parameters in the fixed-effects Poisson specification. Maximum likelihood is used to estimate the other relevant parameters by conditioning on the count total of the dependent variable $\sum y_{it}$. For municipalities where the count of the dependent variable $\sum y_{it}$ is equal to zero for the analysed period, its estimated probability will not contribute to the likelihood function. Thus, municipalities that did not experience a single political assassination during the entire period of analysis are automatically removed from the analysis by statistical packages because they are not informative about the parameters to be estimated.

The fixed-effects Poisson estimator is suitable for handling rare events and has several advantages over other traditional estimators. It assumes that the dependent variable is independent over time, conditional on covariates and on the conditional distribution of y_{it} for municipality i in time period t, given strictly exogenous regressors. Unlike negative binomial, the fixed-effects Poisson estimator is robust to any distributional failure and serial correlation in y_{it}. This estimator also

[3] We have daily data on political assassinations and arrests of members of organized crime. In only one incident was a member of an organized criminal group arrested on same day that a political assassination occurred in same municipality, and it is unclear whether the arrest had any link to the killing. Since we do not have daily data on destruction of illegal drugs or killing of members of organized criminal groups, we prefer to use these lagged variables to prevent reverse causality.

allows for any variance–mean relationship, allowing some units to be over-dispersed or under-dispersed, depending on the covariate values (Wooldridge 1999).

Despite the robustness of the fixed-effects Poisson estimator, it can suffer from endogeneity. This issue might arise in our case if important unobserved characteristics affect where the state chooses to combat criminal organizations and which areas experience political violence. As Mullahy (1997) describes, several methods have been proposed to combine instrumental variables with count data models. We use one such method here, the two-stage quasi maximum likelihood fixed-effects Poisson estimator, referred to as 2SQML FE Poisson by Mullahy (1997). This estimator first fits a reduced-form model for the suspected endogenous variables, a_{it-1} and d_{it-1}, which are regressed on the vector of excluded instruments z. Given that these suspected endogenous variables are rare events, we use fixed-effects Poisson to estimate this first-stage regression.

$$a_{it-1} = \pi_i \, exp(z_{it-1}\pi_1 + x_{it-1}\pi_2) + e_{1it-1} \tag{2}$$

$$d_{it-1} = \varphi_1 \, exp(z_{it-1}\varphi_2 + x_{it-1}\varphi_i) + e_{1it-1} \tag{3}$$

Then in a second stage, the predictions of the suspected endogenous variables are used as the regressors of the main dependent variable, as shown in Equation 4.

$$y_{it} = \delta_i \, exp(\hat{a}_{it-1}\delta_1 + \hat{d}_{it-1}\delta_2 + x_{it-1}\delta_3) + v_{it} \tag{4}$$

where v_{it} denotes the error term and vector $\hat{\delta}$ the parameters of interest of the second stage of the 2SQML FE Poisson estimator. The standard errors are estimated via bootstrapping and clustered at the municipality level to account for the sample variation introduced from the two-stage estimation. To test for evidence of endogeneity, we use a Wu–Hausman-like test, where y_{it} is regressed on the error terms from Equations 2 and 3 and vectors a_{it-1} and d_{it-1} and x_{it-1}. If these error terms are statistically significant then there is evidence that unobserved characteristics simultaneously affect the dependent variable y_{it} and the suspected endogenous variables.

We use three instruments for the two potential endogenous variables a_{it-1} and d_{it-1}. First, we use the ratio of the Chinese population that arrived in Mexico during the 1930s, which varies by state, to the average price of corn in the previous quarter in the municipality. Murphy and Rossi (2020) show compelling evidence that the current location of drug cartels in Mexico strongly correlates with the areas to which the Chinese migrated at the beginning of the twentieth century. These authors explain that during the nineteenth century the USA attracted Chinese migrants, but after migration restrictions were introduced during the 1880s these migration flows were diverted to Mexico. Chinese migrants introduced the raw material, poppy seeds, and the knowledge of how to produce and consume opium. Using their social networks on the other side of the border, members of the Chinese community also developed networks to smuggle illegal goods to the USA. Murphy and Rossi (2020) show that, to date, the Mexican areas that received more Chinese migrants are also those more likely to have drug trafficking organizations. We also use the contemporaneous price of corn as it is a good indicator for farmers dedicated to illegal drug cultivation regarding whether they should diversify their production (Dube et al. 2016). We expect that for a municipality with a given number of previous Chinese immigrants, the lower the price of corn, the more illegal cultivates and related drugs there will be. Since corn is a major staple and source of income for poor farmers, the government will risk upheaval by destroying illegal cultivates when corn prices are low. Thus, these price shocks should directly affect the state's probability of implementing actions against producers of illegal drugs and related organized crime.

We also use as instruments the interaction between municipalities' distance to the nearest port and the average annual retail price of cocaine in the USA, as well as the interaction between municipalities' percentage of mountainous territory and the yearly average retail price of heroin in the USA. These instruments help to explain which areas are more likely to be dedicated to cultivating drugs, smuggling drugs from South America, or distributing drugs to other markets, and during which periods. The retail prices of these drugs are affected by a wide range of international factors, including actions against the supply production of cocaine in Colombia and consumer demand and drug policies in the USA.

6 Results

6.1 Political violence

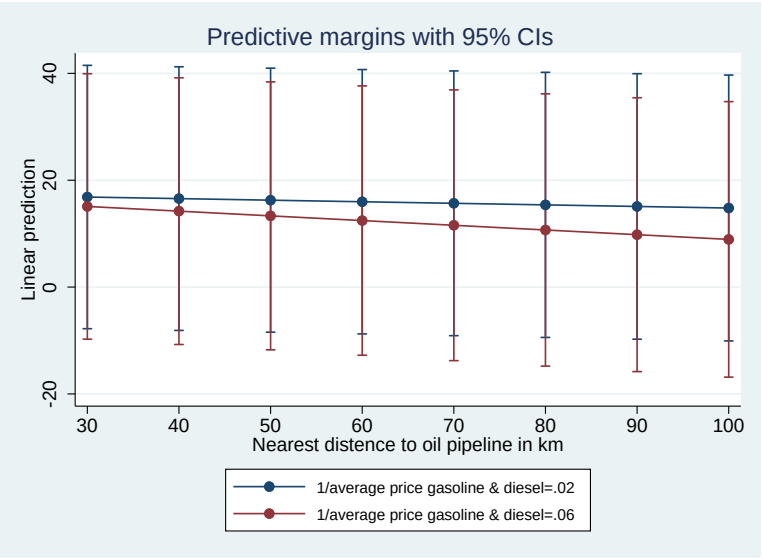
To assess the potential role of organized crime in the killings of pre-candidates, candidates, and incumbent mayors, two model specifications are presented in Table 2. The first model includes every covariate and control mentioned earlier. The second model includes the number of members of organized crime arrested but not the number of criminals killed by law enforcement, as their deaths may have different effects. We employ the fixed-effects Poisson with and without instrumental variables due to the potential for endogeneity. We present the exponentiated coefficients of all the Poisson models as incidence rate ratios (IRRs).

Table A3 shows the first-stage regression of the two instrumental variable (IV) model specifications considered. This table shows that all instruments are statistically significant. We present the equivalent F-test, a Wald Chi^2 statistic for the excluded instruments, indicating that the instruments are strongly correlated with the endogenous variables. Table 2, bottom rows, shows there is evidence of endogeneity. Thus, the fixed-effects Poisson with IV specifications should be preferred (Table 2, columns 5–8).

Rent-seeking hypothesis

To assess the role of oil theft, we use the ratio of the municipalities' distance to the nearest oil pipeline to the average price of gasoline and diesel in the previous month. Table 2 confirms our expectations. The number of pre-candidates and candidates in local elections being assassinated is reduced the further away municipalities are from oil pipelines and the lower the price of gasoline/diesel, making oil theft less profitable. For example, for a unit increase in this ratio (i.e. for municipalities further away from pipelines), the expected number of political assassinations of pre-/candidates falls by 23 per cent. Thus, this evidence suggests that the presence of criminal groups in areas dedicated to oil theft increases the chances of candidates being eliminated, and presumably this is a strategy used by criminal organizations to capture incoming governments and eliminate unwanted competition. Figure 10 illustrates how the predicted number of assassinations of political candidates decreases the further away from oil pipelines an area is and when the average price of gasoline is lower.

Figure 10: Political assassinations and distance to oil pipelines



Note: marginal effects of the linear prediction derived from the variable distance to nearest oil pipeline divided by average price of gasoline in past month; estimates include 95% confidence intervals (CIs); these margins are based on the coefficients presented in Table 2, column 5.

Source: authors' illustration based on sources listed in Table A2.

For incumbent mayors, the ratio of the proximity to oil pipelines to the average price of gasoline and diesel is not statistically significant in the IV specifications (Table 2, columns 7–8). As we will see later on, for these incumbent mayors the risk of assassination, as hypothesized, is instead driven by retribution for the state's actions.

But we now turn the focus onto the role of oil pipelines in the assassination of former mayors. We analyse those former mayors that were killed regardless of when they left their mayoral post. We focus on those for whom there is a record that at the time of their assassination they remained in politics in other posts (36 per cent) or who had a prominent economic position at the time of their assassination, such as being an entrepreneur or having another profession (43 per cent). Table 3 shows that considering all of these former mayors together, the risk of being assassinated is lower if they ruled in municipalities further away from oil pipelines and the lower the price of gasoline and diesel (Table 3).

Overall, we find support for H1A, which states that criminal groups are more likely to kill candidates in strategic areas. There is also support for H1B, which states that former mayors are also more likely to be killed in these places. Independent intelligence reports have found that some of the former mayors who were killed had ties to criminal groups. This could explain our results, especially in areas near oil pipelines (Mejía 2021).

Table 2: Political assassinations of candidates and incumbent mayors, 2000–21; IRRs

	(1) Pre- and candidates	(2) Pre- and candidates	(3) Incumbent mayor	(4) Incumbent mayor	(5) Pre- and candidates	(6) Pre- and candidates	(7) Incumbent mayor	(8) Incumbent mayor
	Fixed-effects Poisson				Second-stage fixed-effects Poisson IV			
Whether state took action against illegal drugs (destroyed cultivates, seized drugs, dismantled labs) in past month	2.120* (0.904)	2.113* (0.905)	0.812 (0.339)	0.809 (0.339)	3.727 (10.111)	4.366 (10.748)	1.147 (2.368)	1.818 (3.523)
Number of members of organized crime arrested or killed in past month	1.102 (0.099)		1.060 (0.041)	1.060 (0.041)	1.459 (0.827)		2.361*** (0.726)	
Number of members of organized crime arrested in past month	-	1.107 (0.099)				1.146 (0.771)		2.241*** (0.642)
Distance to nearest oil pipeline divided by average price of gasoline in past month	0.307*** (0.062)	0.307*** (0.063)	0.832** (0.062)	0.832** (0.063)	0.230*** (0.105)	0.231*** (0.105)	0.868 (0.120)	0.863 (0.118)
Homicide rate in past month (excl. criminals and political assassinations)	1.044*** (0.012)	1.044*** (0.012)	1.006 (0.005)	1.006 (0.005)	1.044 (0.031)	1.043 (0.031)	0.998 (0.012)	0.998 (0.012)
Annual fiscal revenue, in real terms	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)
Annual night light per capita in logarithm	0.467** (0.175)	0.467** (0.175)	1.095 (0.275)	1.093 (0.273)	0.337 (0.238)	0.324 (0.223)	2.078* (0.806)	1.831* (0.662)
Political co-ordination: municipality was ruled by same party as its respective state and presidency in past month	0.513 (0.326)	0.512 (0.325)	0.574 (0.243)	0.575 (0.243)	0.846 (2.497)	0.834 (2.490)	0.888 (0.492)	0.845 (0.466)
Average educational attainment of municipality's population	1.209* (0.133)	1.209* (0.133)	1.167* (0.105)	1.166* (0.105)	1.150 (0.190)	1.143 (0.188)	0.870 (0.131)	0.867 (0.131)
Observations	12,038	12,038	15,569	15,569	8,737	8,737	12,305	12,305
Wald Chi^2	103.8	103.6	28.20	27.70	47.82	47.93	31.05	31.19
Log pseudolikelihood	−238.6	−238.6	−385.8	−385.7	−162.8	−162.8	−295.9	−295.8
Endogeneity test	-				2.740	3.930	14.530	23.020
p-value	-				0.098	0.140	0.000	0.000

Note: robust standard errors, clustered at the municipality level, in parentheses; IV specifications also have bootstrapped standard errors; first-stage-regression for columns 5–8 in Table A3; significance levels *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on sources listed in Table A2.

Table 3: Political assassinations of former mayors, 2000–21; IRRs

	(1) Former mayor in politics, business, or other profession	(2) Former mayor in politics, business, or other profession	(3) Former mayor in politics, business, or other profession	(4) Former mayor in politics, business, or other profession
	Fixed-effects Poisson		Second-stage fixed-effects Poisson IV	
Whether state took action against illegal drugs (destroyed cultivates, seized drugs, dismantled labs) in past month	0.777 (0.272)	0.775 (0.272)	68.891 (200.608)	57.273 (153.708)
Number of members of organized crime arrested or killed in past month	0.000*** (0.000)		0.673 (0.416)	
Number of members of organized crime arrested in past month		0.000*** (0.000)		0.685 (0.392)
Distance to nearest oil pipeline divided by average price of gasoline in past month	0.754*** (0.068)	0.753*** (0.068)	0.538** (0.131)	0.539** (0.130)
Homicide rate in past month (excl. criminals and political assassinations)	1.015*** (0.005)	1.015*** (0.005)	1.009 (0.019)	1.010 (0.019)
Annual fiscal revenue, in real terms	1.000* (0.000)	1.000* (0.000)	1.000 (0.000)	1.000 (0.000)
Annual night light per capita in logarithm	0.992 (0.264)	0.993 (0.264)	0.514 (0.345)	0.542 (0.327)
Political co-ordination: municipality was ruled by same party as its respective state and presidency in past month	0.605 (0.299)	0.605) (0.298)	0.662 (0.379)	0.676 (0.381)
Average educational attainment of municipality's population	1.222** (0.121)	1.222** (0.121)	1.140 (0.219)	1.143 (0.220)
Observations	14,886	14,886	9,004	9,004
Wald Chi^2	883.6	802.1	26.61	26.58
Log pseudolikelihood	−323.3	−328.4	−193.0	−193.0
Endogeneity test			1.020	3.500
p-value			3.116	0.174

Note: robust standard errors, clustered at the municipality level, in parentheses; IV specifications also have bootstrapped standard errors; first-stage-regression for columns 3–4 in Table A3; significance levels *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on sources listed in Table A2.

Retribution hypothesis

We move to testing whether incumbent mayors are at risk of being assassinated in retribution for state actions that threaten the survival of criminal groups. Table 2, columns 5–8, shows that the association between state actions against illegal drugs in the previous month and political assassinations is not statistically significant. In contrast, for every additional member of an organized crime arrested or killed, the expected number of political assassinations of incumbent mayors increases rises by a factor of 2.36. The risk of just arresting members of organized crime is slightly lower, at 2.241. Table 2 also shows that arresting or killing members of organized crime has no effect on the likelihood of pre-candidates or candidates being killed. After all, these candidates are still not members of the government.

Table 3 displays the findings of analysing former mayors, regardless of when they left office but who are still active in politics or other professions. They have a lower risk of being killed if the authorities in the area they ruled arrested and killed organized crime members in the previous month with an incident rate of 0.00, corresponding to a significant reduction in the expected number of former mayors killed ($100 \times (0.00 - 1) = -100$ per cent). However, we recognize that former mayors may have been killed in retaliation for actions taken during their administration rather than actions taken by the current local government. On average, the former mayors assassinated had left their post seven years before the assassination, 25 per cent had left their post a decade before, and an outlier case had left 34 years before the assassination. It is highly unlikely that these mayors were assassinated several years or even decades later in retaliation for actions taken by the state while they were in office. Thus, we analyse only those former mayors who left their posts in the previous administration less than four years ago. To investigate this possibility, we re-analyse the data aggregating all organized crime members killed and arrested during the former mayor's administration. We also include a dummy variable that indicates whether the state destroyed any illegal drugs during the tenure of the former mayor.

Since we are aggregating the data per administration term, instead of monthly, we use a slightly revised version of the same instruments as before to ensure strong instruments (Table A4).[4] The second-stage fixed-effects Poisson IV results are shown in Table A5, which shows there is no evidence of endogeneity. The fixed-effects Poisson estimator reveals that actions taken by the previous administration against criminal organizations less than four years ago do not increase the likelihood of that mayor being killed later. Given the lack of evidence, we re-run our analysis. We concentrate on the actions of former mayors, including those who were assassinated and whose terms extended all the way back to 2000. Oil theft was not as prevalent back then as it is now. Furthermore, as shown in Table A6, column 1, there is no evidence that actions taken against criminal organizations during the former mayor's administration increase the likelihood of that politician being assassinated after their term ends.

[4] To analyse the administration of former mayors, Tables A4–A6, we aggregate information on the administration term of the former mayor. For this reason, we slightly amend our instruments. As instruments we use the interaction between the distance to the nearest port and the retail price of cocaine in the USA, and the interaction between the retail price of heroin and municipalities' percentage of mountainous territory. The instruments are statistically significant. Nonetheless, the endogeneity test, shown in Tables A5 and A6, shows that there is no evidence of endogeneity.

Other variables of interest

We also examine earlier studies' hypotheses that criminal organizations assassinate local politicians who refuse to hand over tax revenue (Trejo and Ley 2021). According to our findings, there is no link between fiscal revenue and political assassinations. This holds true for local candidates as well as incumbent and former mayors (Tables 2, 3, A5, and A6). This result is robust regardless of whether or not instrumental variables are considered.

Earlier studies had used the homicide rate as a proxy for ongoing competition and conflict among criminal organizations, which has been suggested to be associated with political assassinations risk (Rios 2012). To test this hypothesis and prevent double counting, we subtract the number of assassinated politicians and killed members of organized crime from the overall homicide rate. As shown in Figure 1, removing these crimes has a negligible impact on the overall homicide rate. Table 2 shows that the correlation between the previous month's homicide rates and political assassinations is statistically insignificant (columns 5–8). This evidence suggests that political assassinations of incumbent mayors are directly motivated by other factors, such as retaliation for the state's actions against criminal organizations. Similarly, Table 3 shows a weak association between the homicide rate and the assassination of former mayors. For a point increase in this homicide rate, the risk of former mayors being assassinated increases by 1.5 per cent (columns 1–2).

Another important earlier hypothesis is whether certain political parties are at greater risk of suffering political assassinations, such as those belonging to opposition parties. To test this, we include a dummy indicating whether the local incumbent belongs to the same party as the governor and president. This type of political co-ordination is statistically insignificant, according to our findings. That is, the risk of assassination for candidates, incumbent mayors, or former mayors is not directly related to whether the local incumbent belongs to the ruling party or the opposition. This is the case regardless of whether instrumental variables are used (Table 2, 3, A5, and A6). This result makes sense: as shown in Figure 5, over the 2000–21 period, members of all political parties have suffered casualties, regardless of belonging to the incumbent presidential government or not.

6.2 Political violence targeted towards voters

An important aspect that has received little attention in the literature is how political violence produced by organized crime in Mexico has affected regular voters. Unfortunately, no single database of electoral violence exists for our entire analysis period, 2000–21. However, ACLED has been systematically collecting data on electoral violence in Mexico since 2018. Since then, political violence in the country has skyrocketed, making it an ideal period for our analysis. To concentrate solely on voter-targeted violence, we subtract from ACLED the number of violent acts directed at politicians reported in the same dataset. Since electoral violence and in which areas the government decides to go after organized crime could be endogenous, we also combine fixed-effects Poisson with IV. We use the same main IV specification we used in our main analysis, as shown in Table A3 in the first-stage regression (Columns 1–4).

Cost-effective hypothesis

Table 4 shows the fixed-effects Poisson with and without IV. At the bottom of this table, we show that there is no evidence of endogeneity. Thus, the panel fixed-effects Poisson specifications should be used instead of the IV.

In line with the H3A hypothesis, the association between the ratio of the distance to the nearest oil pipeline to the past month's average price of gasoline and diesel and the number of electoral violence events against civilians is statistically insignificant. That is, there is no evidence that organized crime use more electoral violence to mobilize voters in areas near these oil pipelines than in those further away. Earlier studies had used the size of fiscal revenue as the rent-seeking value for criminal organizations. But our results reveal that fiscal revenue is unrelated to electoral violence against civilians. That is, there is no evidence that voters will be the targets of political violence in municipalities where criminals could potentially extort mayors for fiscal revenue or other natural resources, such as illegal cultivates or oil, compared with other areas.

Similarly, supporting the H3B hypothesis, there is no statistically significant evidence that criminal organizations retaliate against civilians in retribution for the state's action of destroying illegal drugs and arresting or killing members of organized crime.

Recognizing that a variety of factors influence electoral violence, we investigate whether opposition parties or incumbent parties face a higher risk of electoral violence. We find that municipalities governed by the same political party as the respective state and the president do not have a different risk of suffering electoral violence from those where this is not the case (Table 4, columns 1–4). We also find that areas with higher homicide rates have a slightly higher risk of electoral violence, but the increase is small. The expected number of instances of electoral violence increases by at most 1.4 per cent for every point increase in the homicide rate (excluding killings of politicians and criminals by authorities).

Table 4: Electoral violence against civilians, 2018–21; IRRs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Incidents of electoral violence	Incidents of electoral violence	Fatalaties of civilians	Fatalaties of civilians	Incidents of electoral violence	Incidents of electoral violence	Fatalaties of civilians	Fatalaties of civilians
	Fixed-effects Poisson				Second-stage fixed-effects Poisson IV			
Whether state took action against illegal drugs (destroyed cultivates, seized drugs, dismantled labs) in past month	0.999 (0.036)	0.999 (0.036)	0.962 (0.050)	0.962 (0.050)	0.514* (0.199)	0.484** (0.165)	0.846 (0.381)	0.741 (0.301)
Number of members of organized crime arrested or killed in past month	1.019 (0.029)		1.033 (0.039)		0.913 (0.115)		0.804* (0.107)	
Number of members of organized crime arrested in past month		1.018 (0.027)		1.038 (0.040)		0.923 (0.109)		0.820 (0.102)
Distance to nearest oil pipeline divided by average price of gasoline in past month	0.960 (0.037)	0.960 (0.037)	0.979 (0.045)	0.979 (0.045)	1.007 (0.062)	1.008 (0.062)	1.015 (0.076)	1.017 (0.076)
Homicide rate in past month (excl. criminals and political assassinations)	1.014*** (0.004)	1.014*** (0.004)	1.007*** (0.002)	1.007*** (0.002)	1.016*** (0.005)	1.016*** (0.005)	1.009 (0.007)	1.010 (0.007)
Annual fiscal revenue, in real terms	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)	1.000* (0.000)	1.000 (0.000)	1.000 (0.000)
Annual night light per capita in logarithm	1.414 (0.321)	1.414 (0.321)	1.832** (0.494)	1.834** (0.494)	1.418 (0.527)	1.449 (0.520)	2.225* (0.944)	2.316** (0.956)
Political co-ordination: municipality was ruled by same party as its respective state and presidency in past month	0.910 (0.111)	0.910 (0.111)	0.855 (0.113)	0.855 (0.113)	0.929 (0.086)	0.936 (0.083)	0.851 (0.094)	0.866 (0.092)
Average educational attainment of municipality's population	1.000 (0.011)	1.000 (0.011)	0.985 (0.013)	0.985 (0.013)	1.033 (0.031)	1.032 (0.031)	1.050 (0.034)	1.048 (0.034)
Observations	34,395	34,395	32,269	32,269	26,455	26,455	24,713	24,713
Wald Chi^2	15.19	15.19	19.30	19.58	12.66	12.66	14.86	14.85
Log pseudolikelihood	−17,585	−17,585	−23,586	−23,585	−13,433	−13,433	−18,229	−18,229
Endogeneity test					4.500	4.100	3.920	2.210
P-value					0.106	0.129	0.141	0.332

Note: robust standard errors, clustered at the municipality level, in parentheses; IV specifications also have bootstrapped standard errors; first-stage-regression for columns 5–8 in Table A3; significance levels *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on sources listed in Table A2.

6.3 Effect on electoral outcomes

We now focus on the potential effects of political assassinations on electoral outcomes. We concentrate on voter turnout and the likelihood that the mayor's incumbent party is re-elected.[5] We aggregate our municipalities' characteristics by electoral term to analyse these aspects. We use panel fixed-effects specifications instead of Poisson because electoral outcomes are not rare events.

$$\mu_{ie} = \rho_{1i} + \rho_2 x_{ie} + v_{ie} \quad (5)$$

where μ_{ie} is our dependent variable. It separately measures our two variables of interest, voter turnout (which in theory can range from 0 up to 100 per cent) and whether the ruling party was re-elected in the municipality (which takes the value of zero or one) i and electoral term e. Vector x_{ie} measures our covariates. ρ_{1i} is the unobserved time-invariant individual effect and v_{ie} the error term. The standard errors are clustered at the municipality level. We run two model specifications. In the first model, we add the same controls as before, except that we now add how many incumbent mayors, pre-candidates, and candidates were assassinated prior to the election day. In the second model specification, we add only the total number of pre-candidates and candidates assassinated prior to the election day. Since we are measuring voter turnout, we keep the important controls of night light and average educational attainment, a proxy for income and potential civil engagement, at the municipality level.

Unobserved characteristics may influence state actions against criminal organizations and electoral outcomes. Thus, we address this concern with panel fixed-effects IV. Table A7 shows the first-stage regression, in which we instrument whether the state took any action to destroy illegal drugs, as well as the number of members of organized crime who were killed or arrested during the administration before election day. Because our covariates are now much aggregated, referring to the characteristics of the municipality per electoral cycle, we use a slightly different IV specification to that used in our main analysis. As instruments, we use the interaction between the distance to the municipality's nearest port and the price of cocaine in the USA and the interaction between the retail price of heroin in the USA and the municipality's percentage of mountainous territory. The intuition is the same as before: increases in retail prices in the USA are shocks that might increase profitability in the Mexican markets and affect the probability that cartels are tackled by the state, particularly in municipalities with relevant geospatial characteristics. As previously stated, because state actions against criminal organizations are statistically rare and sparse, we employ fixed-effects Poisson to estimate the first-stage IV regression. According to Table A7, all instruments are statistically significant and highly correlated with the instrumented variables. The panel fixed effects, with and without IV, are shown in Table A8. The bottom rows show evidence of endogeneity. Thus the instrumented specifications should be preferred to the panel fixed effects without instruments. We illustrate the coefficients in Figures 11 and 12. These figures show the panel fixed IV estimates as dots and the 95 per cent confidence intervals as lines.

Figure 11 shows that voter turnout falls slightly (2 points) when political assassinations of mayors and candidates occur in the municipality during the electoral cycle preceding election day. Thus, in line with H3C, municipalities that experience political assassinations see a negligible to small reduction in voter turnout compared with other areas. Perhaps more surprisingly, the assassination of mayors or candidates has no impact on the likelihood that the incumbent party will be re-

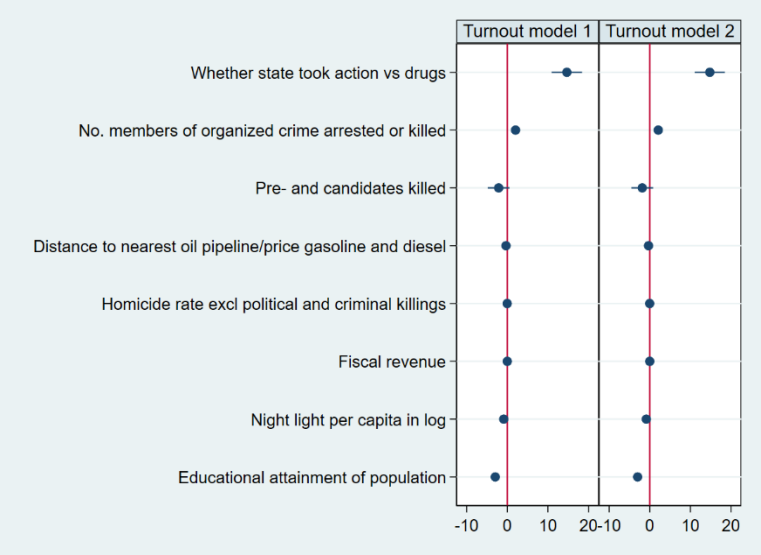
[5] Mayors in some states are allowed to be re-elected for consecutive terms. Unfortunately, it is not possible to determine whether the same mayor ran for re-election, because available election data do not include the names of contending candidates.

elected, as shown in Figure 12. This finding suggests that political assassinations are directed not always at a specific political party but rather at specific candidates to capture incumbent governments.

We also consider the effect of other types of violence, proxied by homicide rates. To avoid double counting casualties, as before, we deduct from this homicide rate the number of political assassinations and criminals killed by authorities. Despite the country's generally high levels of violence, we find that homicide rates have a minor impact on voter turnout. Voter turnout falls by 0.019 points for every point increase in the homicide rate.

Figure 11 also helps us to substantiate the evidence that criminal organizations do not target violence towards the electorate. As such, voter turnout is not affected by the state's crackdowns against criminal organizations. In fact, voter turnout increases by nearly 15 points in municipalities where the government destroyed illegal drugs during the election cycle before the election day. The destruction of illegal drugs also boosts the probability that the local incumbent party will be re-elected (by 50 percentage points). The increase in turnout in these areas, of course, can be interpreted in a variety of ways. More rigging could occur in these areas, where fake votes could be stuffed into ballot boxes. Several other findings, however, suggest that this potential electoral malpractice does not explain why areas with crackdowns on criminal organizations have higher voter turnout.

Figure 11: Political violence and voter turnout in mayoral elections, 2000–21



Note: the left and right panels show the panel fixed-effects IV shown in Table A8, columns 5 and 6 respectively; estimates include 95% confidence intervals.

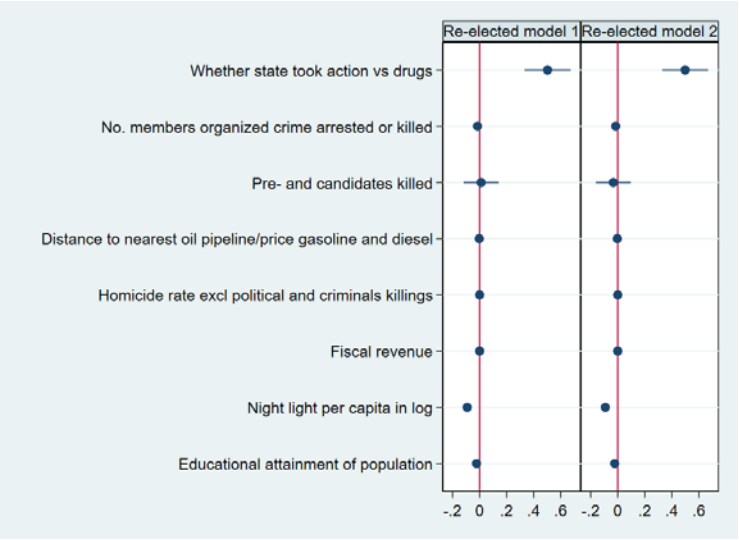
Source: authors' illustration based on sources listed in Table A2.

For instance, we also find that for every additional member of organized crime who is arrested or killed during the administration, voter turnout increases by 2 points (Figure 11). Similarly, Figure 11 shows that areas with likely presence of organized crime do not experience substantially higher voter turnout. Specifically, for every unit increase in the ratio of the distance to the nearest oil pipeline to the average price of gasoline, there is a decrease in municipal voter turnout in more distant municipalities. This result is equivalent to saying that areas closer to pipelines have higher turnout, but the effect is small, as seen in Figure 11.

We also obtained from UNODC and the Government of Mexico information on the presence of opium poppy in $10 \times 10\text{km}^2$ sample locations that have been monitored by these institutions by

analysing satellite data between 2014 and 2019 (UNODC and GOM 2021). Using this dataset, we re-run our panel fixed-effects analysis with and without IV. We find that the municipalities where there is an indication of opium cultivates have no statistically significant difference in turnout compared with other areas.[6] This finding suggests, then, that municipalities can boost their voter turnout with more crackdowns against criminal organizations, and that the associated increased voter turnout is not merely driven by stuffing ballot boxes in areas dedicated to drug trafficking.

Figure 12: Probability of incumbent local party winning elections, 2000–21



Note: the left and right panels show the panel fixed-effects IV shown in Table A8, columns 7 and 8 respectively; estimates include 95% confidence intervals.

Source: authors' construction based on sources listed in Table A2..

7 Conclusion

We analysed the political assassinations that Mexico experienced during the period 2000–21. While members of criminal groups rely on extensive bribery to secure the co-operation of authorities at all levels, these criminal groups can also resort to political assassinations. We developed a theory on which areas criminal organizations are more likely to target with political violence, who will be the likely victims, and when. To test this theory, we developed three key hypotheses: rent-seeking, retribution, and cost-effective.

We found support for the rent-seeking hypothesis, which states that political candidates are more likely to be assassinated in areas of value to criminal groups, in our case study near oil pipelines. This evidence is supported by several reports that important violent drug trafficking organizations, such as Cartel Jalisco Nueva Generación and Santa Rosa de Lima, have expanded their operations in these areas (Jones and Sullivan 2019). Former mayors in these areas are also more likely to be

[6] Using this information, we created a dummy variable identifying which municipalities have poppy cultivation in the sampling locations monitored. This information is unavailable outside of the sampled locations; therefore, any interpolation might not reflect the actual density of poppy cultivation in non-sampled areas. Due to the confidential nature of these data we do not present these results in Table A8. Findings using confidential data can be made available upon request.

assassinated by criminal groups after their terms end, possibly because some of them still have connections to organized crime.

We also found evidence to support the retribution hypothesis. That is, the arrest or assassination of members of organized crime is the driving force behind the assassination of incumbent mayors. We also suggest that for criminal organizations, it is cheaper and more effective to use violence to remove unwanted politicians and influence who governs at the local level than it is to use violence to persuade entire populations. In line with this cost-effective hypothesis, we did not find that areas with proximity to oil pipelines are at increased risk of suffering electoral violence compared with other areas. This evidence does not rule out the possibility of criminal organizations using electoral violence against civilians. Instead, our findings suggest that areas with criminal organizations are not necessarily more likely to experience electoral violence. We also demonstrated that crackdowns on organized crime do not increase the likelihood of criminal organizations retaliating against voters with electoral violence.

The paper also demonstrated that the recent wave of political violence has not affected voter turnout, an important robustness test for our theory. We showed that because the targets of political violence are politicians rather than the electorate, the violence has had little effect on voter turnout (a reduction of 2 points for every political assassination per electoral cycle). Furthermore, areas where the state destroys illegal drugs have higher voter turnout (by nearly 15 percentage points), increasing the likelihood that the incumbent local government will be re-elected. This evidence is consistent with experimental studies indicating that citizens support punishments for crimes and may support extreme levels of violence as long as they perceive that its targets are criminals (García-Ponce et al. 2022).

Our findings contrast with those from other countries where organized crime is prevalent, such as Italy, where fear and resignation have led to lower trust and political participation (Rolla and Justino 2022). Although trust in institutions has generally declined in Mexico, elections are still important for voters to elect their leaders. Our case study has demonstrated how criminal organizations can dictate who competes for and stays in power with a single bullet, jeopardizing the country's democratic future.

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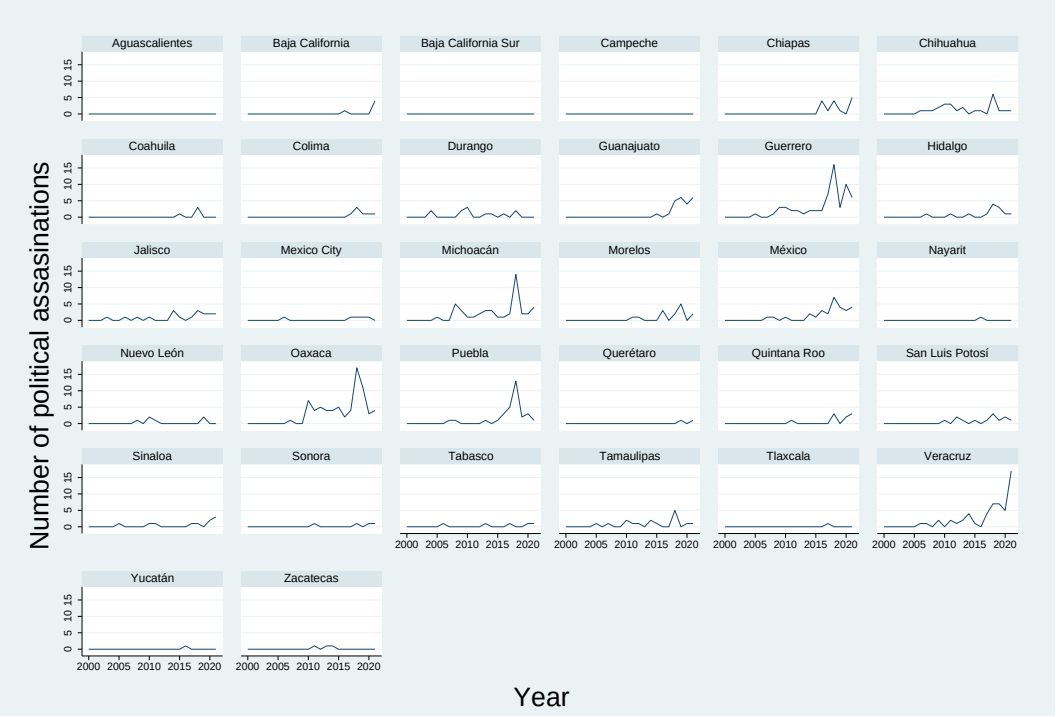
Appendix

Figure A1: Political assassinations by state, 2000–21



Source: authors' illustration based on data from PAIAMEX (Gutiérrez-Romero and Iturbe 2023).

Table A1: Summary statistics by political violence experienced

	Experienced killing of pre-candidate or candidate						Experienced killing of incumbent mayor					Experienced killing of former mayor				
	Obs.	Municipalities	Months	%	Average	Std dev.	Municipalities	Months	%	Average	Std dev.	Municipalities	Months	%	Average	Std dev.
Whether state took action against illegal drugs (destroyed cultivates, seized drugs, dismantled labs) in past month	12,038	50	241	24.68			65	240	17.33			102	239	19.80		
Number of members of organized crime arrested or killed in past month	12,038	50	241		0.04	0.54	65	240		0.02	0.49	102	239		0.04	0.81
Number of members of organized crime arrested in past month	12,038	50	241		0.04	0.51	65	240		0.02	0.29	102	239		0.04	0.75
Distance to nearest oil pipeline	12,038	50	241		92.72	77.94	65	240		95.23	74.16	102	239		87.68	74.34
Average price of gasoline and diesel, in real terms, in past month	12,038	50	241		13.81	2.99	65	240		13.85	3.01	102	239		13.86	3.00
Monthly homicide rate (excl. criminals and political assassinations)	12,038	50	241		2.21	4.75	65	240		2.59	9.42	102	239		2.45	9.46
Annual fiscal revenue, in real terms and in million pesos	11,997	50	239		479.00	929.00	65	239		159.00	378.00	102	239		182.00	376.00
Annual night light per capita	12,038	50	241		0.07	0.07	65	240		0.08	0.12	102	239		0.07	0.08
Political co-ordination: municipality was ruled by same party as its respective state and presidency in past month	12,038	50	241	9.92			65	240	14.90			102	239	12.44		
Average educational attainment of municipality's population	12,038	50	241		5.11	1.54	65	240		4.82	1.55	102	239		4.78	1.50
Chinese population in area in 1930s	12,038	50	241		200.24	368.52	65	240		144.45	213.43	102	239		209.34	350.23

Average price of corn in previous quarter in pesos, per ton	11,893	50	241	3,009.27	1,086.82	65	240	3,009.75	1,064.41	102	239	2,971.02	1,078.36
Annual street prices of cocaine adjusted for purity per 0.001 gram in USA	12,038	50	238	0.16	0.04	65	240	0.16	0.04	102	239	0.16	0.04
Street price of heroine adjusted for purity and inflation per gram in USA	12,038	50	241	990.65	133.81	65	240	991.56	133.89	102	239	989.65	133.47
Percentage of mountainous territory	12,038	50	241	4.47	6.98	65	240	9.88	16.92	102	239	8.22	16.71
Distance to nearest port	12,038	50	241	133.58	106.40	65	240	167.63	132.27	102	239	144.76	108.31

Source: authors' construction based on sources listed in Table A2.

Table A2: Data sources

Variable	Description	Level	Term	Source
Pre-candidates and candidates killed in political violence	Politicians killed in political violence	Municipality	Monthly 2000–21	PAIAMEX, Gutiérrez-Romero and Iturbe (2023)
Incumbent mayor killed in political violence	Politicians killed in political violence	Municipality	Monthly 2000–21	PAIAMEX, Gutiérrez-Romero and Iturbe (2023)
Former mayor killed in political violence	Politicians killed in political violence	Municipality	Monthly 2000–21	PAIAMEX, Gutiérrez-Romero and Iturbe (2023)
Incidents of electoral violence	Number of events of electoral violence	Municipality	Monthly 2018–21	ACLED, 2022
Fatalities of civilians	Number of civilian fatalities	Municipality	Monthly 2018–21	ACLED, 2022
Voter turnout	Voter participation rate	Municipality	Yearly 2000–21	Electoral office in each of 32 states
Incumbent party gets re-elected	Dummy variable = 1 when the same political party remains in power	Municipality	Yearly 2000–21	Electoral office in each of 32 states
Monthly homicide rate (excl. criminals and political assassinations)	Homicide rate excl. political assassinations and members of organized crime that the state killed per 100,000 inhabitants	Municipality	Monthly 2000–21	INEGI, CONAPO, SEDENA, SEMAR, National Guard, Federal Police, and PAIAMEX, Gutiérrez-Romero and Iturbe (2023)
Destruction of illegal drug cultivates	Number of km^2 of illegal crops of marihuana and poppy destroyed by government state forces	Municipality	Monthly 2000–21	SEDENA and SEMAR
Seized drugs	Total kg of drugs (cocaine, fentanyl, heroine, methamphetamine, opium, and marihuana) seized by government state forces	Municipality	Monthly 2000–21	SEDENA, SEMAR, National Guard, and Federal Police
Drug labs seized	Number of drug laboratories confiscated by government state forces	Municipality	Monthly 2000–21	SEDENA, SEMAR, National Guard, and Federal Police
Number of members of organized crime arrested or killed by authorities	Criminals involved in organized crime as typified by authorities, such as drug trafficking, fraud, extortion	Municipality	Monthly 2000–21	SEDENA, SEMAR, National Guard, and Federal Police
Clandestine oil tapping	Number of illegal oil taps in pipelines: a proxy for oil theft but does not give quantity of gasoline or diesel stolen	Municipality	Monthly 2000–21	PAIAMEX, Gutiérrez-Romero and Iturbe (2023)
Distance to nearest gasoline and diesel pipelines	Distance to nearest pipeline	Municipality	Yearly 2000–21	PEMEX, own calculation
Fiscal revenue	Fiscal revenue in real terms	Municipality	Yearly 2000–20	INEGI
Night light per capita	Satellite night light per capita	Municipality	Yearly 2000–20	Earth Observation Group, Payne Institute for Public Policy
Political co-ordination	Dummy variable = 1 when municipality was ruled by the same party as its respective state and presidency	Municipality	Yearly 2000–21	Electoral Office in each of 32 states

Average educational attainment	Average education level	Municipality	Yearly 2000-20	INEGI
Chinese population in 1930	Chinese population by area in 1930	State	Yearly, 1930	INEGI
Percentage of mountainous territory	Percentage of territory with mountains within municipality	Municipality	Constant	INEGI
Average price of gasoline and diesel	Average price of gasoline and diesel	Municipality	Monthly 2000–021	INEGI
Price of corn	Average price of green corn	Municipality	Quarterly 2000–20	INEGI
Distance to ports	Distance to nearest port	Municipality	Constant	Own estimations based on INEGI's geospatial files
Annual price of cocaine adjusted for purity and inflation in USA	Retail price in USA	USA	Annual	Office of National Drug Control Policy (ONDCP) and UNODC
Price of heroine adjusted for purity and inflation in 2019 USA	Retail price in USA	USA	Annual	Office of National Drug Control Policy (ONDCP) and UNODC

Source: authors' illustration based on sources identified in column 5.

Table A3: First-stage regression of Tables 2, 3, and 4—panel fixed-effects Poisson; IRRs

	(1)	(2)	(3)	(4)
	State action against drugs	Number of members of organized crime arrested or killed	State action against drugs	Number of members of organized crime arrested or killed
	Model 1		Model 2	
Log Chinese population in area in 1930s divided by average price of corn in previous quarter	0.767*** (0.035)	0.505** (0.153)	0.7666*** (0.035)	0.5555* (0.170)
Distance to nearest port × annual price of cocaine in USA	1.011*** (0.002)	1.099*** (0.015)	1.0112*** (0.002)	1.0983*** (0.015)
Log percentage of mountainous territory × annual price of heroin in USA	0.918* (0.047)	24.459*** (11.674)	0.9182* (0.047)	32.7395*** (15.948)
Distance to nearest oil pipeline divided by average price of gasoline in previous month	1.077*** (0.011)	1.057 (0.050)	1.0773*** (0.011)	1.0256 (0.049)
Homicide rate in past month (excl. criminals and political assassinations)	1.002*** (0.000)	1.005 (0.003)	1.0019*** (0.000)	1.0048 (0.003)
Fiscal revenue, in real terms	1.000*** (0.000)	1.000 (0.000)	1.0000*** (0.000)	1.0000 (0.000)
Annual night light per capita in logarithm	1.181*** (0.028)	0.603*** (0.118)	1.1809*** (0.028)	0.6172** (0.118)
Political co-ordination: municipality was ruled by same party as its respective state and presidency in previous month	0.967 (0.029)	0.584** (0.149)	0.9672 (0.029)	0.6124* (0.162)
Average educational attainment of municipality's population	0.997 (0.007)	1.270*** (0.044)	0.9973 (0.007)	1.2958*** (0.044)
Observations	302,858	90,704	302,858	85,921
Log pseudolikelihood	−89409	−16833	−89409	−14751
Wald Chi^2	238.1	237.5	238.1	206.1
Excluded instruments				
Log pseudolikelihood	−99,007	−17,953	−99,007	−15,739
Wald Chi^2	21.89	124.5	21.89	118.2

Note: robust standard errors, clustered at the municipality level, in parentheses; significance levels *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on sources listed in Table A2.

Table A4: First-stage regression of Tables A5 and A6—panel fixed-effects Poisson; IRRs

	(1)	(2)
	Whether state took action against illegal drugs (destroyed cultivates, seized drugs, dismantled labs) in administration where assassination took place	Number of members of organized crime arrested or killed in administration where assassination took place
Distance to nearest port × price of cocaine in USA per kg	1.006***	1.084***
	(0.001)	(0.029)
Log percentage of mountainous territory × annual price of heroin in USA	0.596***	26.146***
	(0.053)	(25.146)
Distance to nearest oil pipeline divided by average price of gasoline in administration term	1.019***	1.022
	(0.006)	(0.050)
Homicide rate in administration term (excl. criminals and political assassinations)	1.000***	1.005***
	(0.000)	(0.001)
Fiscal revenue, in real terms	1.000***	1.000***
	(0.000)	(0.000)
Political co-ordination: municipality was ruled by same party as its respective state and presidency	0.958*	1.016
	(0.021)	(0.206)
Annual night light per capita in logarithm	1.131***	0.552***
	(0.023)	(0.096)
Average educational attainment of municipality's population	1.059***	2.134***
	(0.011)	(0.206)
Observations	7,900	2,964
Wald Chi^2	183.0	155.2
Log pseudolikelihood	−4,837	−4,898
Excluded instruments		
Wald Chi^2	62.93	15.97
Log pseudolikelihood	−5,639	−6,309

Note: robust standard errors, clustered at the municipality level, in parentheses; significance levels *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on sources listed in Table A2.

Table A5: Political assassinations of former mayors, 2000–21—characteristics of municipalities during previous three-year term; IRRs

	(1)	(2)	(3)	(4)
	Former mayor who left office less than four years ago	Former mayor who left office less than four years ago and was still in politics, business, or other profession	Former mayor who left office less than four years ago	Former mayor who left office less than four years ago and was still in politics, business, or other profession
Whether state took action against illegal drugs (destroyed cultivates, seized drugs, dismantled labs) in administration where assassination took place	1.071	0.837	0.001	0.001
	(0.497)	(0.601)	(0.012)	(0.009)
Number of members of organized crime arrested or killed in administration where assassination took place	1.010	1.004	−0.000	−0.001
	(0.016)	(0.013)	(0.002)	(0.001)
Distance to nearest oil pipeline divided by average price of gasoline in admin term	0.716**	0.682**	−0.001	−0.001
	(0.103)	(0.131)	(0.001)	(0.000)
Homicide rate in administration term (excl. criminals and political assassinations)	1.001	1.000	0.000	0.000
	(0.001)	(0.002)	(0.000)	(0.000)
Fiscal revenue, in real terms	1.000*	1.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Political co-ordination: municipality was ruled by same party as its respective state and presidency	1.063	1.094	0.000	0.000
	(0.570)	(0.773)	(0.002)	(0.001)
Annual night light per capita in logarithm	0.849	0.773	−0.002	−0.001
	(0.326)	(0.383)	(0.002)	(0.002)
Average educational attainment of municipality's population	1.722**	1.805	0.001	0.002
	(0.443)	(0.705)	(0.002)	(0.001)
Observations	275	167	212	117
Wald Chi^2	25.82	19.34	16.53	15.71
Log pseudolikelihood	−70.24	−39.42	−54.29	−26.18
Endogeneity test			0.060	2.750
P-value			0.971	0.253

Note: robust standard errors, clustered at the municipality level, in parentheses; IV specifications also have bootstrapped standard errors; first-stage-regression in Table A4; significance levels *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on sources listed in Table A2.

Table A6: Political assassinations of former mayors, 2000–21—characteristics of municipalities at time former mayor ruled; IRRs

	(1)	(2)
	Former mayor	Former mayor
	Fixed-effects Poisson	Second-stage fixed-effects Poisson IV
Whether the municipality had state actions against illegal drugs (destroyed cultivates, seized drugs, dismantled labs) during the administration of the mayor	0.964	0.005
	(0.327)	(0.016)
Number of members of organized crime arrested or killed during the administration of the mayor	1.032	−0.005**
	(0.020)	(0.003)
Distance to nearest oil pipeline divided by average price of gasoline in admin term	2.083***	0.002***
	(0.420)	(0.001)
Homicide rate in administration term (excl. criminals and political assassinations)	0.995	−0.000
	(0.003)	(0.000)
Fiscal revenue, in real terms	1.000	0.000
	(0.000)	(0.000)
Political co-ordination: municipality was ruled by same party as its respective state and presidency during the administration of the mayor	0.483	−0.000
	(0.284)	(0.002)
Annual night light per capita in logarithm	1.453	0.000
	(0.589)	(0.002)
Average educational attainment of municipality's population	1.753***	0.004
	(0.239)	(0.003)
Observations	510	430
Wald Chi2	40.87	38.46
Log pseudolikelihood	−116.8	−97.50
Endogeneity test		4.630
P-value		0.987

Note: robust standard errors, clustered at the municipality level, in parentheses; IV specifications also have bootstrapped standard errors; first-stage-regression in Table A4; significance levels *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on sources listed in Table A2.

Table A7: First-stage regression of Table A8—panel fixed-effects Poisson; IRRs

	(1)	(2)	(3)	(4)
	Whether state had any actions against illegal drugs	Number of members of organized crime arrested or killed	Whether state had any actions against illegal drugs	Number of members of organized crime arrested or killed
	Model 1		Model 2	
Distance to nearest port × price of cocaine in USA per kilo	1.006***	1.085***	1.006***	1.084***
	(0.001)	(0.028)	(0.001)	(0.027)
Log percentage of mountainous territory × annual price of heroin in USA	0.599***	26.281***	0.597***	26.124***
	(0.053)	(25.373)	(0.053)	(25.222)
Mayors, pre-candidates and candidates assassinated in administration term prior to the election	1.054	1.904*		
	(0.043)	(0.661)		
Pre-candidates and candidates assassinated in administration term prior to the election			1.129**	1.006
			(0.063)	(0.501)
Distance to nearest oil pipeline divided by average price of gasoline in administration	1.019***	1.029	1.019***	1.023
	(0.006)	(0.050)	(0.006)	(0.049)
Homicide rate in administration (excl. criminals and political assassinations)	1.000***	1.004***	1.000***	1.005***
	(0.000)	(0.001)	(0.000)	(0.001)
Fiscal revenue, in real terms	1.000***	1.000***	1.000***	1.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Annual night light per capita in logarithm	1.131***	0.554***	1.132***	0.552***
	(0.023)	(0.095)	(0.023)	(0.096)
Average educational attainment of municipality's population	1.059***	2.166***	1.059***	2.136***
	(0.011)	(0.221)	(0.011)	(0.214)
Observations	7,900	2,964	7,900	2,964
Wald Chi^2	184.3	131.1	184.6	145.0
Log pseudolikelihood	−4,837	−4,870	−4,837	−4,898
Excluded instruments				
Wald Chi^2	62.93	15.97	62.93	15.97
Log pseudolikelihood	−5639	−6309	−5639	−6309

Note: robust standard errors, clustered at municipality level, in parentheses; significance levels *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on sources listed in Table A2.

Table A8: Turnout and re-election of incumbent party, 2000–21—panel fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Turnout	Turnout	Incumbent party re-elected	Incumbent party re-elected	Turnout	Turnout	Incumbent party re-elected	Incumbent party re-elected
		Panel fixed effects				Second-stage panel fixed-effects IV		
Whether the state had actions against illegal drugs (destroyed cultivates, seized drugs, dismantled labs) during administration before the election	0.431*	0.430*	0.042***	0.042***	14.774***	14.790***	0.502***	0.499***
	(0.254)	(0.254)	(0.013)	(0.013)	(1.670)	(1.656)	(0.103)	(0.103)
Number of members of organized crime arrested or killed during administration before the election	0.077***	0.077***	0.001	0.001	2.082***		−0.016	
	(0.019)	(0.019)	(0.001)	(0.001)	(0.212)		(0.011)	
Mayors, pre-candidates and candidates assassinated in administration term before election	−0.805		0.024		−2.276**	2.097***	0.011	−0.016
	(1.046)		(0.045)		(1.038)	(0.214)	(0.055)	(0.012)
Pre-candidates and candidates assassinated in administration term prior to the election		−0.766		0.019		−1.851		−0.033
		(1.362)		(0.063)		(1.471)		(0.074)
Distance to nearest oil pipeline divided by average price of gasoline in administration	−0.238***	−0.236***	0.003	0.003	−0.316***	−0.306***	−0.003	−0.003
	(0.089)	(0.090)	(0.004)	(0.004)	(0.097)	(0.097)	(0.005)	(0.005)
Homicide rate in administration (excl. criminals and political assassinations)	-0.002	-0.002	0.000***	0.000***	-0.019***	-0.020***	0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)	(0.002)	(0.000)	(0.000)
Annual fiscal revenue, in real terms	0.000	0.000	0.000***	0.000***	−0.000***	−0.000***	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Annual night light per capita in logarithm	−1.027***	−1.026***	−0.059***	−0.059***	−0.852***	−0.847***	−0.092***	−0.092***
	(0.216)	(0.216)	(0.010)	(0.010)	(0.260)	(0.260)	(0.014)	(0.014)
Average educational attainment of municipality's population	−0.362***	−0.362***	0.003	0.003	−3.010***	−2.994***	−0.023*	−0.023*
	(0.105)	(0.105)	(0.005)	(0.005)	(0.207)	(0.206)	(0.012)	(0.012)
Observations	10,578	10,578	10,913	10,913	8,952	8,952	9,210	9,210
Log pseudolikelihood	−37,463	−37,464	−5,999	−6,000	−31,631	−31,631	−5,082	−5,082
Endogeneity test					119.850	122.380	15.300	15.280
P-value					0.000	0.000	0.000	0.000

Note: robust standard errors, clustered at the municipality level, in parentheses; IV specifications also have bootstrapped standard errors; first-stage-regression in Table A7 for columns 5–8; significance levels *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' construction based on sources listed in Table A2.