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Political Assassinations and Criminal Politics in Brazil

A dissertation submitted in partial satisfaction of the
requirements for the degree
Doctor of Philosophy

in

Political Science

by

Mariana Carvalho Barbosa

Committee in charge:

Professor Simeon Nichter, Chair
Professor Eli Berman
Professor Karen Ferree
Professor Stephan Haggard
Professor Sebastian Saiegh

2022

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University of California San Diego

2022

DEDICATION

To my mother.

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Chapter 4 is coauthored with Monteiro, J. Fagundes, E. and Chaves, R. The dissertation author was a primary investigator and author of this chapter.

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ABSTRACT OF THE DISSERTATION

Political Assassinations and Criminal Politics in Brazil

by

Mariana Carvalho Barbosa

Doctor of Philosophy in Political Science

University of California San Diego, 2022

Professor Simeon Nichter, Chair

This study investigates two important types of violence, with a central focus on the case of Brazil. As in many countries, political assassinations are prevalent across Brazil, but receive minimal attention especially when involving local politicians. This study develops a typology to conceptualize political assassinations and introduces an unprecedented dataset of assassinations of municipal politicians in Brazil. To generate this dataset, I obtained official permission to cross-reference undisclosed vital statistics data on over 10 million homicides with a registry of all political candidates between 2001 and 2017. Using these data, descriptive statistics and regressions provide insights about patterns and correlates of political assassinations, at the individual as well as municipal level. Moreover, the present study elaborates and tests why corruption is a

causal determinant of political assassinations. Corruption increases political assassinations for two key reasons: (1) politicians use assassinations as a way of enforcing their corrupt agreements with other politicians, and (2) corrupt politicians kill other politicians who may subject them to prosecution by engaging in whistleblowing. The case of Brazil presents an opportunity to test this causal relationship rigorously, as random anti-corruption audits have been shown to exogenously reduce municipal corruption. Findings are consistent with the theoretical argument. Not only are fewer politicians assassinated in municipalities that recently experienced a random anti-corruption audit, but these effects are also amplified when larger government revenues render it more worthwhile to engage in this form of costly punishment. This study then shifts to examine another crucial topic: criminal violence. Using a precise definition of criminal groups, it constructs a dataset mapping the temporal and geospatial distribution of organized criminal groups in Rio de Janeiro, as well as their economic activities. Of central focus is how criminal groups' interactions with the state and other criminal groups determine their use of violence and their capacity to diversify economically. Altogether, this study advances scholarly understanding of two fundamental aspects of violence, which have important substantive consequences for Brazil and beyond.

Chapter 1

Introduction

Assassinations of politicians have long been an important phenomenon throughout the world. Benazir Bhutto in Pakistan, Park Chung-hee in South Korea, Rafiq Hariri in Lebanon, Indira Gandhi in India, John F. Kennedy in the United States, Olof Palme in Sweden, and Yitzhak Rabin in Israel are a few examples of assassinations of head of states that stunned the world. Latin America also has experienced high-profile political violence, with the executions of presidential candidates in Colombia and Mexico. In April 1948, Jorge Eliécer Gaitán, leader of a populist movement in Colombia and presidential candidate, was assassinated. He was a left-wing candidate who condemned violence and was likely to have been elected president. His assassination led to the period known as "La Violencia," a ten-year civil war in Colombia between the Conservative Party and the Liberal Party. Although the motivations for Gaitán's assassination are unclear, members of the country's oligarchy, whom he strongly denounced, are deemed likely suspects. More than forty years later, another Colombian presidential candidate was assassinated. Drug kingpin Pablo Escobar murdered presidential candidate Luis Carlos Galán in 1989 in response to Galán's extradition treaty with the United States. An investigation found that politicians played a key role in Galán's assassination and culminated in the arrest of political

leader Alberto Santofimio. Disturbingly, such assassinations are observed across Latin America. As just one example, Luis Donaldo Colosio, the Institutional Revolutionary Party (PRI)'s candidate in Mexico's 1994 presidential election, was brutally murdered at a campaign rally in Tijuana in 1994.

However, political assassinations are not just limited to presidential campaigns. According to a report published by Colombia's Misión de Observación Electoral (MOE), a civilian election observer group, a significant spike in political violence occurred between December 2017 and July 2018 in many Colombian municipalities. MOE noted that 87 local politicians had suffered some form of violence since the electoral process started in December 2017: 31 were assassinated, 23 survived violent attacks, and 32 received death threats (MOE 2018). In Mexico, 132 politicians were murdered during the electoral period from September 2017 to July 2018 (Calderón 2018). In the past year, the country experienced its most violent election, with 258 incidents of political violence, of which 101 were murders of politicians (Trujillo and Turner 2021). Despite the disturbingly high number of murders of candidates and elected politicians, few studies investigate the causes of such assassinations. In Brazil, the phenomenon did not receive much attention until the assassination of city councilor Marielle Franco in 2018. What was supposed to be just another killing of a local councilor in Brazil became worldwide news and started a series of protests. The circumstances of her case are somehow unique, and she is not a regular victim of political violence. Yet her assassination uncovered a phenomenon that is typical in Brazil and several other countries but that often goes unnoticed: the killings of local politicians.

Studying political and criminal violence often involves empirical challenges. For instance, violence against politicians receives more attention during electoral campaigns, which can contribute to inferential biases. Additionally, crimes often go unnoticed in places with weakly institutionalized criminal justice systems. As a consequence, information about cases of violence is limited, and identifying all actors involved and their motivations is not always

possible. My research strives to overcome these obstacles in order to study the determinants of assassinations of local politicians.

One common aspect across Latin America is the presence of criminal groups that fuel violence. In Mexico, drug cartels play an important role in assassinations by attacking subnational authorities to gain de facto territorial control over local jurisdictions (Trejo and Ley 2019). Furthermore, in Colombia, both paramilitary and guerrilla groups have participated in the assassination of politicians (Arjona, Chacón, and García Montoya 2016). However, nonstate armed groups are not always involved in Colombia's assassinations. For instance, other politicians can be involved, as in the case of Gaitán. In Brazil, violence against local mayors has been an important phenomenon long before the rise of organized crime. A key example is an assassination in Para, a state in the north of the country. In 1988, just after the country's transition to democracy, left-wing state deputy João Batista was killed. He was a land-reform militant who supported peasant movements. The rise of gangs in Brazil occurred mostly after its transition to democracy; nevertheless, homicide rates have been fairly constant since 1990, in both Latin America and Brazil. As this study emphasizes, it is important to disaggregate homicides, as the assassinations are a distinct phenomenon from murders of the general population. Whereas the present study explores various determinants of political assassinations, it by no means provides an exhaustive account of all determinants. As one example, it does not examine political assassinations by militias (as in the case of Marielle); By contrast, Chapter 4 — which focuses on criminal groups — explores the role of militias in other type of violence.

As described below, the present study tackles this important task by distinguishing political assassinations from other types of violence, and also elaborates the theoretical logic of why many politicians are assassinated. Assassinations of politicians are not only widely observed across the country, but also often stem from corrupt contracts between politicians. Before delving into those key points and describing the Brazilian case, I first discuss the different forms of violence and argue why political assassinations are a distinct phenomenon.

1.1 The Distinctiveness of Political Assassinations

Generations of scholars have studied political violence, with many theories exploring the causes and consequences of civil wars, terrorism, genocide, cartel-state conflict, and electoral violence. Nevertheless, some other forms of violence are relatively undertheorized. Civil wars tend to receive far more attention even though the scale of violence is considerably lower. For instance, in 2019, 415,180 people died from homicide whereas 62,985 died in civil wars. Figure 1.1 shows how homicides and conflict violence have evolved since 1990. The number of homicides has been relatively constant and is on average four times higher than the number of deaths due to civil wars. The first part of my dissertation shifts to examine an understudied subtype of homicide - murders of politicians.

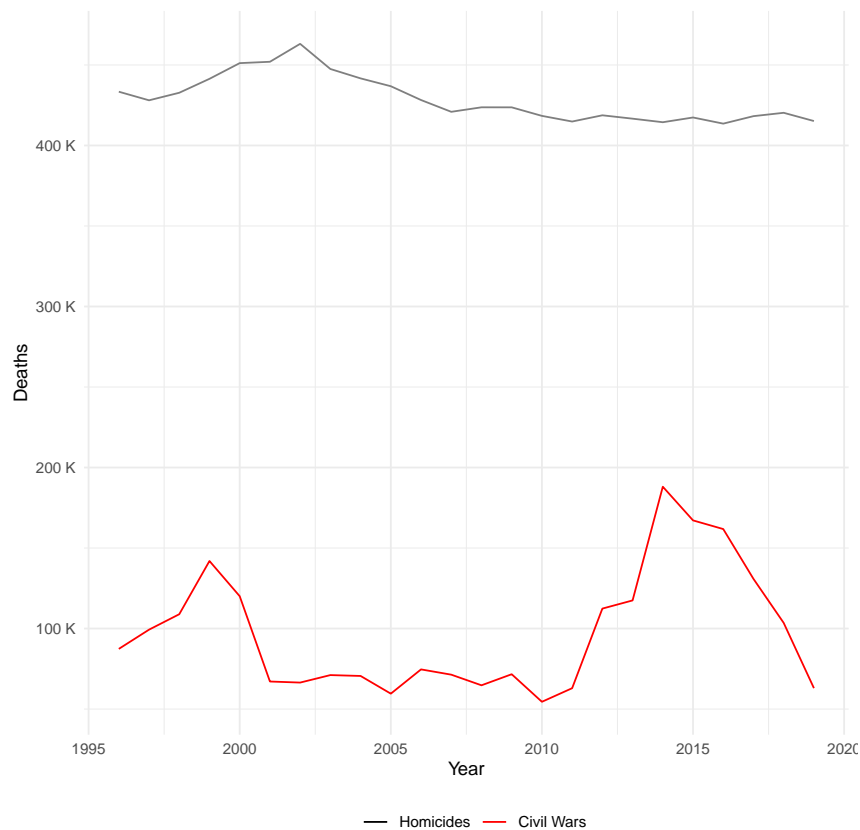


Figure 1.1: Number of Deaths by Cause (1990-2020)

Political assassinations fall largely between the cracks of three commonly studied concepts: electoral violence, civil war, and criminal violence. One might argue that political assassinations are a subtype of one or more of these concepts. But I argue that they differ crucially from these concepts, thus making the insights from the literatures about these concepts inadequate for understanding political assassinations. The extant literature largely subsumes assassinations in their analyses of other types of violence. In the scholarship on electoral violence, physical violence against politicians is a form of repressing the opposition. Assassinations are also considered to be strategies in civil wars by both state and nonstate actors, or tools for criminal actors to pressure politicians. By lumping these concepts together, scholars fail to account for distinct patterns that affect descriptive and causal analysis. I study political assassinations as a distinct concept, in order to address noteworthy gaps in the scholarship.

As examples of shortcomings when assassinations are conflated with these other concepts, first consider electoral violence. While this concept encompasses many kinds of violence, such as boycotting, riots, and intimidation, electoral violence does not account for the assassination of politicians during nonelectoral periods. Electoral violence can intersect with other forms of violence, such as armed resistance (Dunning 2011), communal conflict (Wilkinson 2004), or even criminal violence (Barnes 2017). However, what all these forms of violence have in common is the presence of elections. The electoral contest, which arguably changes the actions and goals of actors involved, is key to the manifestation of electoral violence. But as shown below, political assassinations are *not* limited to electoral periods. The electoral violence literature on its own cannot fully explain political assassinations; rather, it raises an important question: why are so many politicians murdered when elections are not imminent?

Likewise, political assassinations are related to but conceptually distinct from the phenomena of civil and criminal conflict. Independently of their goals, actors involved in these conflicts as well as political assassinations experience disagreements. State and nonstate actors have financial interests and negotiate over the allocation of resources. To do so, they invest in

gaining influence over politicians, enforcing officials, and armed nonstate actors to manipulate political decisions in their favor and win disputes over resources.

To grapple with these issues, I advance a framework for conceptualizing varieties of political violence. The goal is to distinguish political assassinations from other types of violence. I conceptualize electoral violence, civil war, criminal violence, and political assassinations as types of violence characterized by four different attributes: (1) Is the violence aimed at disrupting the political system?; (2) Is the violence used to conquer territory?; (3) Does the violence target an individual or a group?; and (4) Does the violence necessarily involve state actors? Figure 1.2 represents a typology that encompasses these four attributes. My framework then extends Staniland 2015 and Lessing 2017 by clustering types of political violence, but separates them into categories that explore more dimensions. A brief discussion of this typology emphasizes important distinctions between the focus of the present study — political assassinations — and other important types of violence that are more commonly investigated in the academic literature.

	Political Assassination	Electoral Violence	Civil War	Criminal Violence
Violence aims to overthrow political system	No	No	Yes	No
Violence used to conquer territories	No	No	Yes	Yes
Violence is targeted at an individual	Yes	No	No	Yes
Violence involves state actors	Yes	Yes	Yes	Depends
Examples of studies on the concept	<i>Iqbal and Zorn (2006, 2008)</i>	<i>Collier and Vicente (2014), Staniland (2014)</i>	<i>Kalyvas (2006)</i>	<i>Lessing (2018)</i>

Figure 1.2: Typology of Political Violence

The first row of the typology shown in Figure 1.2 examines whether the violence aims to disrupt the political system. Staniland (2015) uses a similar categorization to classify how armed

groups seek to win and maintain power. In his typology, an actor either seeks to overthrow the status quo (antisystemic) or seeks to win or maintain power within the context of the current democratic political system (intrasystemic). I similarly argue that actors in pursuit of their goals either disrupt or maintain political institutions. Actors who engage in *political assassinations* or *electoral violence* use existing institutions to achieve their objectives – maintain power and access to the political office. Consequently, these two types of political violence do not disrupt institutions in the same way a civil conflict would affect the structures of the social order. Similar to actors who engage in *political assassinations* and *electoral violence*, nonstate actors engaged in *drug wars* do not seek to change the system but instead work within it by controlling territories, providing goods and services, and running their illegal activities. Only in *civil wars* is violence used to destroy the rules of the game and overturn the system of government.

The second row of the typology considers the use of violence to conquer territory. With *political assassinations* and *electoral violence*, the nature of the conflict is competition over existing state resources. However, while *electoral violence* is generally understood to focus on changing electoral outcomes, *political assassinations* are also often used to change policy outcomes. As discussed above, *political assassinations* are not restricted to electoral periods, and they can be used to eliminate political (and economic) opposition in order to consolidate power. By contrast, actors involved in *civil wars* and *criminal wars* are fighting over state and natural resources, including territory. The main difference between these two categories is that with *civil wars*, the actors involved aim to win a competition over state-building (Kalyvas 2006), whereas in *criminal wars* actors compete over state capacity. More specifically, criminal nonstate actors typically compete over territorial control and public provision in order to increase their market share and weaken state repression (Lessing 2017).

The third row in Figure 1.2 considers aspects of targeting: is an individual or a group harmed, and is this entity explicitly targeted? I distinguish between violence that harms a large group of people and violence that harms only one individual. Collective or group violence,

such as riots and mob violence, occurs when the violent actor seeks to reach as many people as possible. *Electoral violence* aims to reach a specific group (co-ethnics, for example) or to mobilize more voters in general (e.g., threats against abstention). Likewise, *civil wars* involve collective actors who target specific groups (opposition parties, insurgents, rebel groups, etc.) By contrast, a *political assassination* typically involves the murder of a specific politician.

Regarding the way violence is targeted and organized, *political assassinations* are always deliberate and always target a specific individual – as discussed more extensively in Chapter 2 – a politician who has run for or was elected to a political office. By contrast, *electoral violence* does not always target a specific individual or a specific group of people. Within electoral violence, some riots happen spontaneously and affect people on the streets. In the same way, *civil wars* target a rival group, but they can also affect citizens during a conflict (when they are targeted through spillovers). *Criminal wars* are a particular case, since they can involve attacking a rival group or a group of residents of a specific area (group target) but also murdering explicitly targeted individuals. These murders may be of informants (traitors), police officers, and judges; anyone whose death would bring direct benefits to the drug-trafficking organization. *Criminal wars* target a level situated between the individual and the group levels, since violence can be collective when aimed toward a criminal organization or individual, targeting drug kingpins (Calderón et al. 2015). However, this violence also affects citizens who are not fighting on any side.

The involvement of state actors is the last dimension I use to classify these different types of political violence. State actors are involved in both *electoral violence* and *civil wars*. The state can deploy forces and use violence to manipulate elections. It can also fight against nonstate actors to prevent the establishment of or to overturn political systems. But with *political assassinations*, the participation of state actors is not contingent on the target. The victims are politicians in office or running for office. Elected politicians are state actors, but political candidates do not yet act on behalf of a governmental body and are thus not state actors. Finally,

criminal wars involve organized violence with armed nonstate actors. The state can be involved specifically in crackdowns on drug cartels, with cartels retaliating. Criminal organizations also fight each other to conquer mutually valuable territory and resources.

Building on these insights, I conceptualize political assassinations, electoral violence, civil wars, and criminal wars as types of violence characterized by distinct constellations of the four attributes just discussed. By emphasizing that political assassinations are a distinct phenomenon, this conceptual exercise reveals why it is crucial to understand the determinants of this understudied form of political violence.

1.2 Violence in Brazil

In order to investigate the determinants of political assassinations, the present study focuses on the case of Brazil. The Figure 1.3 below shows that Latin America has the highest homicide rates in the world, with Brazil ranking among the highest in the 6th position. For example, 30 in 100,000 Brazilians are murdered each year, compared to 48 El Salvadorians, 39 Venezuelans, 35 Colombians and Guatemalans, and 33 Hondurans. For comparison, the homicide rate in Mexico is 24 per 100,000 citizens and 4 per 100,000 Americans in the US. While 47 out of the 50 most murderous cities are located in Latin America, 25 of those are located in Brazil (Muggah and Tobón 2018). Despite the constant high level of violence, violence in Brazil is not homogenous, and there are marked differences between regions. Between 2000 and 2017, the homicide rate almost halved in the Southeast region of Brazil, which had the most violent states throughout the 1990s — it decreased from 37 per 100,000 to 19 per 100,000 people. In contrast, homicide rates in the North and Northeast regions, went from around 19 per 100,000 people in 2000 to 47 and 49 per 100,000 people in 2017, respectively.

Several factors are responsible for these striking trends. Economic conditions, high inequality, low incarceration rates, and small police forces play important roles (Soares and Narit-

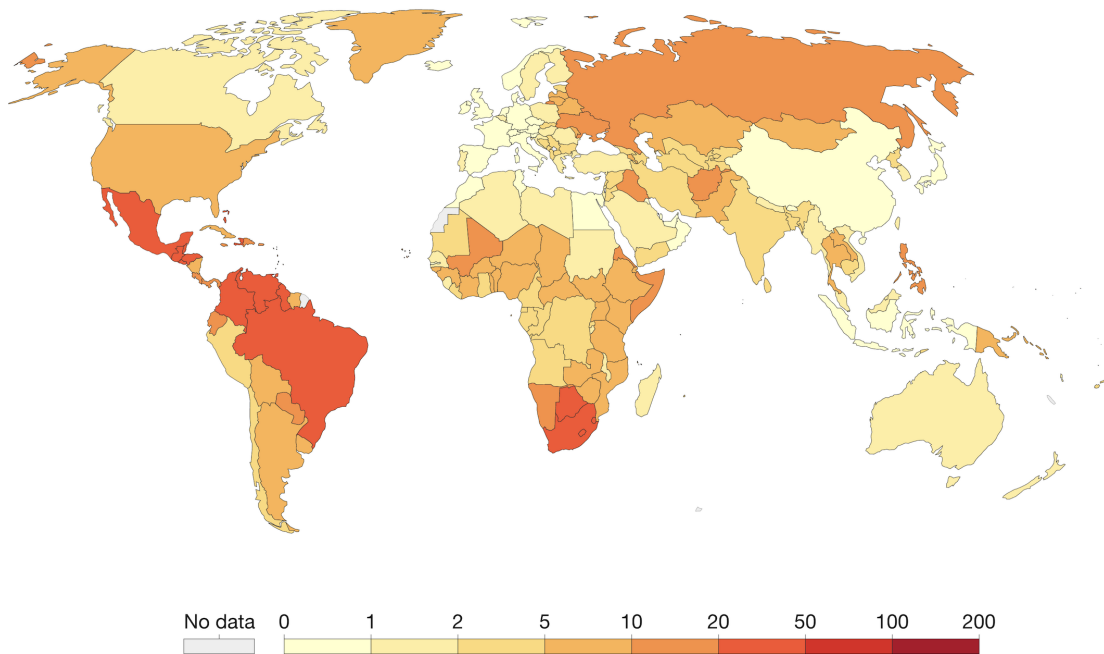


Figure 1.3: Homicide Rates, 2019

omi 2010). Also, labor market conditions affect the inclination of individuals to commit crimes (Becker 1968; World Bank 2013), while urbanization and population density (Muggah, 2015) as well as demographic factors and economic development affect the frequency of violence (Grogger 1998; Buonanno 2003). I explore such factors in detail in Chapters 2 and 3. Part of this violence is also associated with gangs and organized crime (Yashar 2018), which is explored in Chapter 4.

1.3 Overview of the Dissertation

My dissertation combines a deep understanding of political processes with new sources of data to provide novel insights about violence. The next two chapters focus on political assassinations, building on the conceptualization above. Chapter 2, entitled "Correlates of Political Assassinations," further clarifies the concept of political assassinations and presents new data

about the phenomenon in Brazil. Just as political assassinations are conflated with other forms of violence, the concept is also frequently vaguely defined in the existing literature. After precisely defining the concept, I introduce a novel dataset on political assassinations of local politicians in Brazil. My data stem from a painstaking effort to link data on over 10 million homicides over the past two decades to a registry of all political candidates between 2001 and 2017. The rich dataset enables me to present descriptive statistics about which individual characteristics render politicians more prone to being executed.

Additionally, I explore the municipal characteristics associated with more assassinations. Findings suggest that while there is some overlap in correlates between assassinations and murders in the general population, this overlap is by no means perfect — emphasizing that assassinations are indeed a distinct phenomenon. For instance, urbanization rates are highly correlated with murder rates in the general population, but not with the assassination rates of politicians.

Chapter 3, entitled "The Political Economy of Assassinations," advances our understanding of an important, understudied cause of political assassinations. I elaborate a theoretical framework to show how corruption affects political assassinations. I argue that corruption increases political assassinations for two reasons: (1) politicians use assassinations as a way of enforcing their corrupt agreements with other politicians, and (2) corrupt politicians kill other politicians who may subject them to prosecution by engaging in whistleblowing. I empirically test the causal relationship between corruption and assassinations using random anti-corruption audits that exogenously reduce municipal corruption. Consistent with the theoretical expectations, I find that politicians are less likely to be assassinated in municipalities that recently experienced a random audit. Also, I find that these effects are amplified when larger government revenues render it more worthwhile to engage in violence to enforce corrupt contracts and prevent the disclosure of information about corrupt schemes.

Chapter 4 shifts from political assassinations to another form of violence conceptualized above: criminal violence. The chapter, entitled "Territorial Criminal Enterprises," investigates

the causes of criminal violence. Whereas earlier chapters focused on all of Brazil, Chapter 4 focuses on the role of criminal gangs in a particular urban setting: Rio de Janeiro, Brazil's second largest city. Building on the conceptualization above, the chapter provides a precise definition of criminal groups. The chapter builds a model to explain how criminal groups interact with the state and other criminal groups, determining their level of investments in military capacity and economic diversification. A novel dataset is constructed to test the predictions of the model using detailed information on criminal groups. The chapter maps the temporal and geospatial distribution of groups as well as the economic activities of these criminal enterprises.

Altogether, this study advances scholarly understanding of two fundamental aspects of violence, which have important substantive consequences for Brazil and beyond.

Chapter 2

Why Kill? Correlates of Political Assassinations

2.1 Introduction

In many contexts, violence against politicians is common. From Julius Caesar to Yitzhak Rabin, political leaders have been executed throughout history.¹ Assassinations are often employed to advance political and ideological goals or solve disputes about political power and resources. At least in theory, democratic elections should reduce the strategic use of violence against politicians by enabling the nonviolent contestation of power. Yet, even democratic elections are often marred by substantial violence. Electoral violence against citizens has been emphasized by various studies that analyze its prevalence, causes, and consequences. However, violence against politicians has been relatively understudied. As the number of world democ-

1. Jones and Olken (2009) report that 59 national leaders were assassinated worldwide between 1875 and 2008 while 298 attempts at assassination were made. According to the Staff Report to the National Commission on the Causes and Prevention of Violence, up until and including 1970, eight assassination attempts were made at US presidents, which means that 23% of US presidents until then had experienced an assassination attempt. Four American presidents were assassinated in history.

racies has expanded, a growing number of local politicians have been executed, not to mention subjected to threats and physical aggression.

Attacks against local politicians receive surprisingly little attention from academia and the media. Data availability about assassinations remains a key constraint across the globe. In the case of Brazil, the central focus of this study, newspapers have reported on over 300 political assassinations over the past two decades, but analyses below show that such journalistic reports uncover only a fraction of the nation's executed politicians. Not only do many municipalities lack media outlets, but journalists also tend to focus on attacks against higher-level politicians, such as the stabbing of Brazil's president Jair Bolsonaro at a campaign rally one month before his 2018 election. Academic research on local-level political assassinations is similarly hamstrung by data constraints, but it reveals that the phenomenon is by no means limited to Brazil. To offer just a few examples, Nigeria observed 540 attempted or successful targeted attacks on politicians between 2000 and 2017 (Matfess 2018; Igbafe and Offiong 2007). South Africa witnessed 260 political assassinations between 2000 and 2017 (Pierson 2019; Haas 2016). And Mexico registered 178 deadly attacks against local officials between 2004 and 2018 (Esparza and Mancera 2018). While some scholars thus recognize the magnitude of the phenomenon, the academic literature largely fails to investigate the conditions that render assassinations of local politicians more likely, in part due to data constraints. This project seeks to tackle these constraints in the case of Brazil.

This chapter first unpacks the concept of a political assassination, clarifying what constitutes an assassination and what differentiates it from several other forms of violence in politics. As discussed below, I define a political assassination as the premeditated murder of an individual who ran for or was elected to a political office. The present study focuses on local politicians, which in the Brazilian context consist of mayors and city councilors. Second, I discuss the challenges involved in measuring political assassinations and present my approach to tackling them. Finally, I explore descriptive statistics by employing a novel dataset on the characteristics of lo-

cal politicians that render them more likely to be assassinated; whether assassinations are more likely during campaign periods; and the political, socioeconomic, and other factors correlated with the spatial and geographic variation in executions. This study advances the literature by shedding light on an understudied form of violence and unraveling patterns of physical violence against politicians.

The concept of political assassinations is often broadly defined, leading to several sorts of measurement error with implications for empirical analyses. According to Staniland (2015), a key issue facing the topic of political violence is that it encompasses many different kinds of violence. In the case of electoral violence, for example, existing empirical data do not provide enough information to understand what makes violence "electoral." By lumping incidents of violence together, the study of electoral violence fails to account for variance in the targets, goals, and actors involved. Because the present study focuses on a precisely defined form of violence – namely, it is specifically defined by its target (i.e., individuals who recently ran for office) – it avoids this conceptual and empirical muddle that threatens causal explanations (Staniland 2015). The prior chapter provided a conceptual framework for understanding the distinctiveness of political assassinations in comparison to other types of violence. The microlevel data developed in this study enable me to investigate the types of politicians who experience a grave form of violence and the conditions under which this type of violence occurs.

Most existing studies on political violence rely on media reports. This approach has several limitations, leading to serious systematic measurement error (Von Borzyskowski and Wahman 2019). By contrast, a central contribution of this study is that it leverages official government data to identify political assassinations. I construct a novel dataset on political assassinations for Brazil. The country is notorious for its police violence (Willis, 2015; Desmond-Arias, 2006), but scant attention is paid to its high level of violence against politicians. In 2018, the assassination of Marielle Franco, a city councilor in Rio de Janeiro, drew international attention

to this type of violence.² Additionally, unlike most cases explored by the literature, in which ethnic fragmentation is one of the drivers of political violence (Kalyvas 2006; Wilkinson 2004), Brazil suffers from similar violence but has low levels of ethnic and linguistic fragmentation (Alesina et al. 2003). Finally, I take advantage of administrative individual-level data available in Brazil to identify murders of politicians and provide a clearer and richer understanding of the phenomenon.

The microlevel data developed in this study enable me to investigate the types of politicians who experience a grave form of violence and the conditions under which this type of violence occurs. While the scholarship on electoral violence presupposes that violence spikes around elections, I show that election years do not correlate with assassinations of politicians. Furthermore, the analysis of the individual- and municipal-level determinants of assassinations provides intriguing findings. Male politicians are more likely to be killed than female politicians — they represent 71% of candidates but 94% of murders. Older and more educated politicians are less likely to be killed. Mayors, the most important politicians at the municipal level, are far more likely to be executed than councilors. Although in general candidates from particular political parties are not more or less likely to be assassinated, there is one important exception: candidates from the left-leaning Workers' Party (PT) are significantly less likely to be executed. With regard to district-level correlates, municipalities that are poorer and more rural tend to have more political assassinations. In addition, executions are more likely in populous municipalities — and in those where a greater share of the population is black. While homicide rates in the overall population do not explain all variation in political assassinations, these two types of murders are positively correlated.

The findings presented here extend a growing body of literature that investigates the causes of violence against politicians, including individual-level work on psychological pathologies of perpetrators (Freedman 1965) and research on the effects of social and political condi-

2. International media, such as the New York Times and Washington Post reported on the assassination on March 15, 2018. The Guardian also documented protests held across the country in the days following her assassination.

tions (Iqbal and Zorn 2006; Torgler and Frey 2013). To the best of my knowledge, this is the first study to thoroughly investigate how both individual- and district-level characteristics of politicians are associated with their probability of being assassinated. By leveraging novel and granular data, I study the correlates of an important but overlooked type of political violence. Assassinations of politicians have severe consequences for democratic processes. First, killing politicians affects political stability and leadership succession (Iqbal and Zorn 2008). Second, it also affects electoral outcomes and political representation. Violence against politicians is often used to suppress the opposition (Fjelde and Hoglund 2018), threatening the maintenance of electoral integrity (Norris, 2013). Understanding potential factors that drive political assassinations is a first step toward tackling the latter, which has serious implications for political institutions.

The findings of this study underscore the importance of thoroughly investigating political assassinations in other contexts, such as South Africa, Nigeria, and Mexico. These countries experience high levels of violence against local politicians during both electoral and nonelectoral periods. The microlevel data developed in this study not only shed light on this type of violence but also highlight important correlates that help explain variation in assassinations. Therefore, the present study provides insights into the factors that are associated with violence against local politicians that can be useful for other settings that share some of Brazil's socioeconomic and demographic conditions.

2.2 Conceptualizing of Political Violence

My thorough analysis of political assassinations is situated in a framework encompassing several forms of political violence presented in the first chapter. In this chapter, I conceptualize political assassinations. Then I present how I operationalize this variable in the Brazilian context.

2.2.1 Defining Political Assassinations

Studies in political science define assassinations in various ways. Existing definitions range from a focus on motivations behind assassinations (Iqbal and Zorn 2006) to the inclusion of any public figures (Kasher and Yadlin 2005). For instance, Rowlette Jr. (2001) defines assassination in the United States as "the selective killing of a leader." Additionally, O'Brien (2001) defines the term as "the selection and deliberate killing of an individual for political purposes within the confines of conflict or peace." While these definitions are presumably broad enough to capture political assassinations, their scope is arguably too wide, as they combine many different types of victims. The inclusion of several types of actors as victims of violence leads to a lack of conceptual clarity and may distort descriptive findings. I instead focus only on *political* assassinations by increasing precision about the victim's identity. As described above, political assassinations are the premeditated murders of politicians who held office or ran for it. And in particular, this study focuses squarely on the assassinations of *local* politicians. As such, the present study eschews the use of motivations for a murder when defining political assassinations, as these are often unknown, leading to vague and surprisingly malleable definitions in the literature.

To further clarify, I elaborate on two factors that are regularly used to conceptualize political assassinations in a manner that often generates conceptual ambiguity: (1) who the victim is and (2) the motivation for the assassination. Many studies focus on the murders of prominent people while ignoring an array of murders that are political in nature. By focusing on murders of politicians, the present study's conceptualization of political assassinations provides a key source of clarity to the literature by specifying which murder victims (i.e. targets) are included in the concept of political assassinations. Additionally, not all studies agree about whether to include nonpoliticians, with some scholars instead using motivation as the main factor defining the concept. Given the difficulty of pinpointing the precise reason why politicians are murdered

— especially when examining large numbers of assassinations — I argue that the motivation for a murder is not a fruitful defining attribute of political assassinations.

Target of an Assassination

Existing definitions of assassinations in the literature tend to be limited in scope as they examine a specific set of individuals — usually top-level leaders in political, social, and religious organizations. This approach typically excludes other political actors who are often victims of assassinations while it includes murders that might not be (closely) linked to politics.

As one example, Kasher and Yadlin (2005) explain that "an assassination is an act of killing a prominent person selectively, intentionally, and for political (including religious) purposes." A definition of a "prominent person" is not provided, which is problematic, as prominence is not only vague but also context-dependent – a person can be important or famous in a given location or during a particular time but not in other locations or during other times. Another key question is why practitioners and scholars should care only about politicians who reach a certain level of "prominence." The present study avoids these concerns by not including "prominence" as a defining attribute of political assassinations. Moreover, it specifically aims to shed light on the executions of local politicians, who might be overlooked by studies narrowly focused on "prominent" leaders. Unlike various other researchers, I conceptualize political assassinations by not narrowly focusing on high-level politicians while Iqbal and Zorn (2006, 2008) and Jones and Olken (2009) and Perliger (2015) for example emphasize the assassination of national leaders only. Similarly, Igbafe and Offiong (2007) includes only high-level politicians, from presidential candidates to ministers.

As mentioned, another concern is that the criterion of prominence allows for the inclusion of murder victims who are not politicians. As a few examples, Rowlette Jr. (2001) and O'Brien (2001) define assassinations as the murders of certain types of leaders, without restricting these to political leaders. Others, such as Iqbal and Zorn (2008), suggest that the target of a killing

must be a public figure. Kasher and Yadlin (2005) even specifically include religious leaders as a subtype of political assassinations. While religious, social, and environmental leaders are important in society, combining their murders into a single definition inhibits conceptual clarity. Additionally, it ignores the specificities of each type of homicide. Incorporating the murders of such leaders may threaten the validity of descriptive and causal claims by producing different outcomes and suggesting possible explanations of little relevance to the study of politicians.

Motivation of an Assassination

Another related source of conceptual variation is that a minority of scholars evaluate *why* a victim is murdered. While such researchers' definitions of political assassinations tend to focus on the politically motivated murders of influential political figures (Iqbal and Zorn 2008), I follow other studies that do not consider a specific evaluative component to define assassinations (Rowlette Jr. 2001; O'Brien 2001).³ The focus on motivations influences measurement validity, since it directly affects the refinement of the concept. Therefore, I focus on the type of target rather than on the motivation for the killing.

Most studies that focus on the motivations of the perpetrators have two main limitations. First, they tend to ignore differences between motivations, desired results, and context (Perliger 2015). For example, assassinations that aim to change the status quo, which are usually perpetrated by the government or political elites, are distinct from assassinations carried out by ethnic or religious groups as part of a communal conflict.⁴ Second, some scholars classify motivations into categories that tend to overlap or are too imprecise. For example, Kirkham (1970) differentiate between five categories of assassinations: (1) the assassination of a political leader in order

3. See Falk for a list of motivations for assassinations. Some types of assassinations are defined by motivations while others consider targets: (a) aristocratic assassinations, which affect only the elite; (b) assassinations based on personal motives, which are triggered by personal hostility resulting from past relations or grievances; (c) assassinations motivated by power, which are tools in a political power struggle; (d) religious assassinations, which are justified by using interpretations of religious texts; (e) assassinations motivated by nationalism directed against those perceived to be unpatriotic; and finally (f) diplomatic assassinations, which target foreign political figures. This illustrates how the concept is often loosely defined.

4. See Ben-Yehuda (1990) for a discussion on the nature and scope of assassinations.

to replace her or him, with no intention of affecting the sociopolitical order; (2) assassinations carried out to destroy the legitimacy of the ruler and undermine the government, with the intention of affecting the sociopolitical order; (3) assassinations done by the government in order to suppress political change; (4) assassinations meant to promote a political or ideological agenda and attract public attention; and (5) assassinations of political leaders for nonrational political goals, executed by the mentally ill. These definitions are not mutually exclusive and can lead to inaccurate assessments. They also exclude politicians murdered for other reasons related to politics. This is why the present study does not focus on motivations when conceptualizing political assassinations.

Another source of confusion stemming from definitions that consider motivation a defining attribute of political assassinations is that their conceptualization excludes murders that have a political impact but that are not motivated by political reasons. For instance, they exclude assassinations motivated by other reasons — such as mental illness, revenge, or other personal reasons — that nevertheless have important political consequences.⁵ Following scholars such as Crotty (1972), who do not limit their definition of assassinations to specific motivations, my conceptualization does not exclude assassinations based on why a politician was executed.

Numerous other studies also face limitations due to their consideration of motivations. Iqbal and Zorn (2008) define an assassination as "the killing of a public figure for political reasons." When examining political violence in Nigeria, Igbafe and Offiong (2007) define a political assassination as the act of killing political opponents. And Hays Park (1989) emphasizes the importance of an assassination's motivation: "Assassination involves murder of a targeted individual for political purposes."⁶ He adds that the murder of a private person, who is neither prominent nor occupies political office, for political purposes is considered an assassination. The

5. Kirkham (1970) investigates politically motivated violence in the United States. Departing from existing definitions of political assassinations, they state that political assassinations in the US have occurred mostly due to individual passion and mental disorders.

6. W. Hays Parks, Memorandum on Executive Order 12333 and Assassination, Office of the Judge Advocate General of the US Army, 1989.

breadth of such conceptualizations is problematic, given the nebulous nature of what may be construed as "political purposes." In order to avoid such conceptual ambiguity, I do not consider to political assassinations the murder of individuals who were never candidates for or elected to political office. For example, I exclude murders of individuals closely associated with politicians, such as family members and campaign staff, from the definition of political assassinations.

Overall, the above discussion highlights conceptual ambiguity about political assassinations in the academic literature. By contrast, the present study employs a systematized concept: political assassinations are defined as the murder of an individual who was elected to or ran for political office. Given this conceptualization, the next section shifts to the operationalization of political assassinations.

2.3 Identifying Political Killings in Brazil

Compared to the literature on political assassinations, many studies of other forms of violence have employed far richer and more extensive sources of data. A burgeoning literature in international relations and comparative politics examines the causes and consequences of political violence using cross-national (Daxecker 2014; Hafner-Burton, Hyde, and Jablonski 2014, 2016; Birch and Muchlinski 2017) and subnational data (Wilkinson 2004; Collier and Vicente 2014; Long, Shaver, and Wright 2017). Obtaining reliable data on violence is a complex and sometimes even risky endeavor. Most work on election violence has relied on media-based event data,⁷ which suffer from systematic measurement error because they capture only reported violence, not actual violence (Von Borzyskowski and Wahman 2019). Media sources typically fail to cover a significant number of events, with media coverage displaying systematic patterns that often lead to substantial biases in datasets (Dietrich and Eck 2020).

The effort to build datasets on acts of violence is essential to the study of political vi-

7. Some have relied on surveys, including Bratton (2008), Dercon and Gutiérrez-Romero (2012), and Gutierrez-Romero and LeBas (2017).

olence. In addition to harboring systematic biases, event-based datasets do not always provide the extensive information needed to understand different forms of violence. Prominent cross-country examples include data on armed conflict, such as the Correlates of War project (Gleditsch et al. 2002), and work on electoral contention (Daxecker, Amicarelli, and Jung 2019). In addition, two new social conflict datasets are the Armed Conflict Location and Event Data Project (Raleigh et al. 2010) and the Social Conflict Analysis Database (SCAD) (Salehyan et al. 2012). Such datasets have enabled researchers to geographically situate violent events and study variation both within and across countries. Nevertheless, as shown by Von Borzyskowski and Wahman (2019), these existing event data suffer "from systematic measurement error due to the logic of reporting." Their results suggest that newspapers are relatively more effective at picking up violent events in urban areas and in those areas that have been hotspots historically. Furthermore, the media is likely to not only underreport events of political violence but also overreport dramatic events relative to more mundane and lower-scale violence, which is less sensational but often more prevalent.

If the present study were to employ media reports, its dataset on political assassinations would suffer from similar issues. While most assassinations of national leaders are likely to be reported by the media, assassinations of local politicians are frequently unreported. Another bias in measuring political assassinations involves the period during which media outlets are more likely to report on violence against politicians. For instance, there is often a surge in journalism on politicians and parties during election years. Consequently, actual violence that happens in other years may receive comparatively little attention. Some NGOs and activists keep track of physical attacks on politicians, such as Avviso Pubblico in Italy and Misión de Observación Electoral in Colombia. While only a subset track assassinations of local politicians (e.g., Assassination Witness in South Africa and Folha de São Paulo in Brazil), even these entities tend to pay close attention only to those local politicians who have reached some level of national prominence.

Despite such problems, most existing studies on violence against local politicians use media coverage. For instance, Daniele and Dipoppa (2017), Alesina, Piccolo, and Pinotti (2019), Trejo and Ley (2019), and Blume (2017) employ newspaper coverage to study violence against Italian and Mexican politicians. Likewise, Harish and Toha (2017) use data from media sources to measure several forms of violence in Indonesia, including violence against political candidates. In Brazil, a prominent national newspaper collected information about political assassinations from around the country (Nossa 2013).⁸ Moreover, during Brazil's 2020 municipal election year, the Electoral Research Group of the Federal University of the State of Rio de Janeiro published a report indicating that 91 candidates had been killed between January and October 2020. Beyond the aforementioned problems surrounding media reports of political assassinations, these two Brazilian studies are limited in geographical and temporal scope.

In addition to the issue of general underreporting of local assassinations by media outlets, there is potential bias in what is covered in those localities that are reported on. Small, poor municipalities are not only unlikely to have assassinations covered by newspapers but are also unlikely to have competitive, independent media sources, even if assassinations are publicized. Many newspapers in Brazil are believed to have political biases, which may influence coverage (Miguel 1999; Schudson 2002). Biased media coverage is a major concern, emphasized by academic studies on a broad range of topics (DellaVigna and Kaplan 2007; Di Tella and Franceschelli 2011; Gilens and Hertzman 2000).

Given various problems with media reporting of assassinations — the predominant data source for the extant literature — I instead use a novel approach to identify political assassinations. Unlike in the context of Colombia, for example, an official dataset on political assassinations in Brazil does not exist. This means that the innovative steps described below needed to be taken. The present study's use of official statistics provides an exhaustive dataset that includes

8. Employing a broad definition of assassinations, Nossa considers motivations behind homicides. He includes cases of staff and family members being killed in order to threaten politicians, cases of vengeance, and indigenous conflict, among others. For example, he includes the assassination of the municipal first lady of Batalha in the state of Alagoas.

all assassinations of local politicians in Brazil (as described below). Government data covers the entire country and is impartial, improving the identification and analysis of executions. The use of official government data avoids media biases and greatly advances the study of political assassinations in Brazil.

I identify the universe of assassinations of local politicians in Brazil over the last two decades by merging two independent government datasets. Local politicians are defined as mayors and city councilors, the only two offices elected at the municipal level in Brazil.⁹ As described in the previous section, I focus specifically on the assassinations of local politicians, an understudied type of political assassinations. The process makes it possible to identify both the timing and the location of these assassinations while avoiding the biases present in media reporting. Following the conceptualization in Section 2.1, this study defines assassinations by focusing on the targets of homicides, rather than on the various motivations underlying them. This step facilitates a quantitative analysis by enabling the systematic identification of assassinations.

2.3.1 Matching Health Data to Political Data

This chapter develops a novel dataset on political violence using a new technique. In order to identify all political assassinations in Brazil since 2001, I cross-reference independent government databases on all 1.3 million candidates in recent elections with vital statistics on 57.3 million deaths in the overall Brazilian population. This dataset provides — for the first time for any country — a complete overview of all political assassinations of municipal politicians in Brazil, based on official administrative data.

As a first step, this dataset incorporated extensive information about politicians collected by the Superior Electoral Court (*TSE*). Brazil's electoral law confers executive and legislative

9. Mayors are elected by a plurality system and serve for four years with the possibility of a second term. In municipalities with more than 200,000 voters, if none of the candidates obtain an absolute majority of votes, there is a runoff between the top two candidates. City councilors are elected by proportional representation to serve for four years and for as many terms as they want.

powers on the *TSE*, which is the highest electoral governance institution in the nation. The *TSE* records and publicly provides information about every political candidate registered to compete in any election. This information includes personal characteristics (e.g., name, date of birth, and gender) and political information (e.g., party affiliation, district where the person ran for office, whether they won or lost, and votes received). All individuals who registered to run for office are captured by the *TSE* dataset. As is typical for electoral governance bodies worldwide, the *TSE* does not monitor any forms of violence against politicians. And, crucial for my analysis, the *TSE* does not keep track of political assassinations, either during or after electoral periods. Thus, the present study identifies which candidates were murdered by cross-referencing the *TSE*'s information on candidates with data from other Brazilian government institutions.

To identify victims of political assassinations, I obtained detailed mortality data from the Ministry of Health. Although obtaining *anonymized* data would not be particularly difficult, identifying assassinations requires linking *specific* political candidates from the TSE data just described to their death records in Ministry of Health's Mortality Information System (*SIM*), a highly protected source of information to which researchers are rarely granted full access. The *SIM* was developed in 1975 in order to build an epidemiological surveillance system for the country. In the case of a violent death, cadavers receive additional investigative scrutiny, and the forensic medicine facility ("*Instituto Medico Legal*") fills out information on the death certificate and reports the deceased's medical records to the Ministry. The *SIM* includes individual-level data about every death in Brazil. For example, it includes the date of death, the municipality where the death occurred, the municipality where the deceased resided, and a doctor's evaluation of the cause of death (including whether it was from natural causes, suicide, or homicide). Until 2001, the data was anonymized, even within the Ministry's closely held database: it did not contain names of the deceased but only other, more general characteristics (e.g., date of birth, gender, marital status, and educational level). Such information is insufficient for ascertaining, via cross-referencing, to an adequate level of accuracy whether politicians were among those

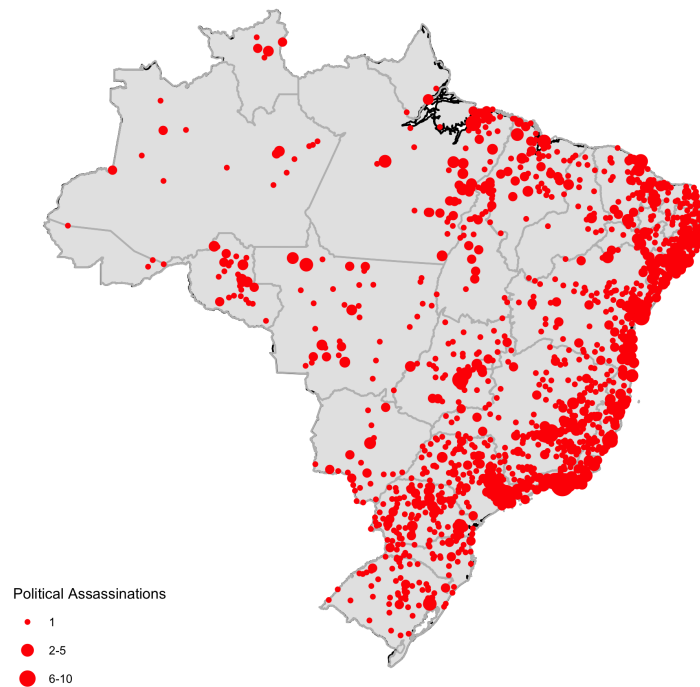
murdered. Fortunately, the Ministry of Health also started collecting the names of decedents in the *SIM* database in 2001, although privacy restrictions prevented any public release of such individually identifiable information. Through an arduous process, I obtained official authorization to use this newly collected, sensitive information in order to identify murdered politicians, as described below.

Before elaborating, it is important to emphasize a key aspect of the *SIM* database: it codes the causes of deaths, enabling the identification of politicians' violent deaths. The database follows the codes and classifications of mortality causes defined by the International Statistical Classification of Diseases and Related Health Problems (ICD-WHO). As explained by the World Health Organization, these include "all illnesses, morbid conditions or injuries that either produced or contributed to death, and the circumstances of the accident or violence that produced any such injuries." Brazil's Ministry of Health has staff members whose primary responsibility is to confirm the accuracy of these mortality data. To capture political assassinations, the present study examines only violent deaths associated with homicides. I employ the same codes that the government and other researchers use to measure homicides in Brazil (Cerqueira and Lobão 2005; Cerqueira 2012; Cerqueira et al. 2019). This approach ensures that my dataset captures only politicians who were murdered.

With respect to data, a key innovation of this chapter is that it merges these Ministry of Health data on homicides with the aforementioned *TSE* data on political candidates, thanks to the official authorization obtained to access these data. The matching algorithm implements a similarity score based on politicians' names, municipalities, and dates of birth.¹⁰ Cross-referencing such databases — a novel methodological step that no prior study has ever taken for political assassinations — identifies all Brazilian politicians killed between 2001 and 2017. It compares the 1,329,567 candidates to over 10 million homicides during that period. The matching proce-

10. More specifically, I employ a standard procedure to generate the propensity score matching. Matches had similarity scores of at least 9,500 (out of 10,000); I verified that this threshold matches individuals accurately through a qualitative investigation using random selection.

ture between the Ministry of Health and *TSE* datasets reveals that 2,241 local politicians (i.e., individuals who ran for mayor or city councilor in any prior election) were assassinated between 2001 to 2017.¹¹ The dataset suggests that politicians are executed in many areas of Brazil but also points to substantial geographic heterogeneity. Figure 2.1 maps the locations of assassinations of local-level politicians in Brazil between 2001 and 2017; the size of the dots corresponds to the number of executions per municipality.



Note: This map shows the locations of assassinations of local-level politicians between 2001 and 2017. The size of dots corresponds to the number of executions per municipality. Data on assassinations are from the author’s analysis, based on officially authorized cross-referencing of the *TSE*’s candidate databases and the Ministry of Health’s *SIM* mortality database.

Figure 2.1: Political Assassinations in Brazil

Political assassinations in Brazil are dispersed geographically, and strikingly, local politicians were executed in 25% of municipalities during the 17-year period. More specifically, 1,419

11. For higher-level politicians, it is only possible to match on names and dates of birth; they are not elected at the municipal level, inhibiting the use of the municipality variable for matching. Given the high false positive rate for higher-level officials, I report data on the assassinations of mayors and city councilors only.

of Brazil's 5,565 municipalities experienced a political assassination between 2001 and 2017. Figure 2.2 plots the distribution of the number of cases across municipalities. Across Brazil, 996 localities suffered a single assassination during the period in question. In addition, 395 municipalities had between two to five assassinations, and another 18 had six to nine assassinations. Eleven municipalities experienced at least 10 political assassinations, of which six are located in the state of Rio de Janeiro. That state's eponymous capital, Rio de Janeiro, is an outlier, with 26 political assassinations.¹² Three capitals of other states also exceeded 10 assassinations (São Paulo, Goiania and Salvador), as well as Guarulhos in São Paulo state. Potential reasons for differences in the prevalence of political assassinations —including but by no means limited to population size — are explored in Section 2.6.

The novel dataset employed in this study captures politicians elected during five municipal elections between 2001 and 2017: those elected in 2000, 2004, 2008, 2012, and 2016.¹³ Given that the Ministry of Health did not collect the names of homicide victims before 2001, this study ignores earlier elections.¹⁴ In addition, although there are several notable executions of deputies, senators, and even some governors, this study focuses on assassinations of local politicians.¹⁵ As discussed above, this focus is not only a substantive contribution — given the literature's minimal attention for executions of local politicians — but also heightens the precision of the matching procedure.

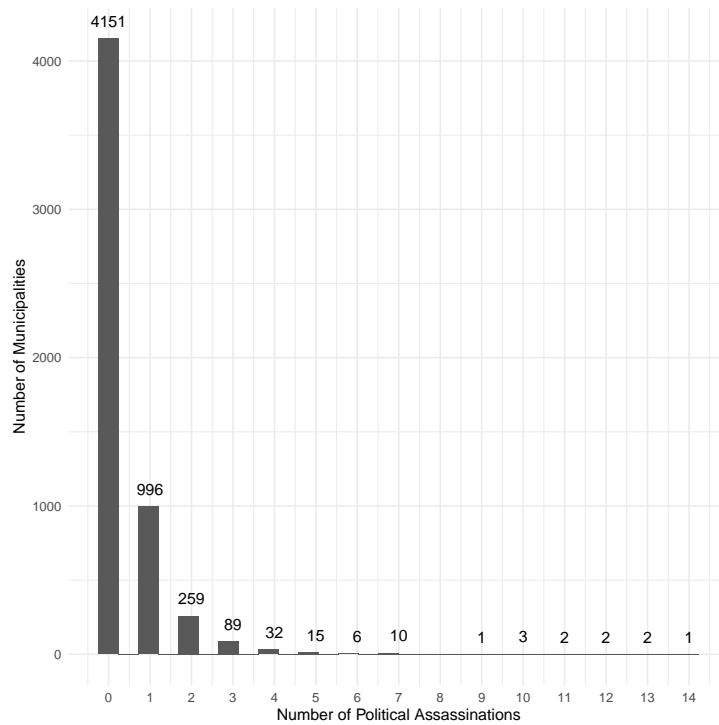
As a robustness check in the analyses below, I created an alternative measure of political

12. Other cities in Rio de Janeiro state with more than 10 murders are Nova Iguaçu, Duque de Caxias, São João de Meriti, Belford Roxo, and São Gonçalo.

13. Politicians elected in the October 2000 municipal elections were inaugurated into office on January 1st, 2001.

14. I do not claim that political assassinations are a recent phenomenon. For example, assassinations related to land reform were common in the 1980s in the northern region of Brazil. One famous case is the assassination of Congressman João Batista in 1988, who was a militant for workers' and land rights.

15. For instance, in 1992, the governor of the state of Acre, Edmundo Pinto, was murdered. The assassination occurred in São Paulo, where Governor Pinto was about to testify for the Congress's investigation committee (CPI) about the misuse of funds for the construction of maternity hospitals. He had accused a former minister, whose involvement was not confirmed. His assassination was deemed to be a robbery that resulted in murder. Another notable case was in 1963, when a senator from Alagoas, Arnon de Mello, shot his political and personal rival, Silvestre Pericles, another senator by Alagoas, inside the Senate. He missed and shot another senator instead, who died five hours later. Both surviving senators were arrested but later acquitted.



Note: This histogram shows the distribution of the number of assassinations of local-level politicians that occurred in municipalities between 2001 and 2017. Data on assassinations are from the author’s analysis, based on officially authorized cross-referencing of the *TSE*’s candidate databases and the Ministry of Health’s *SIM* mortality database.

Figure 2.2: Distribution of Political Assassinations by Municipality

assassinations. Given that the Ministry of Health captured the names of murder victims starting in 2001 only, there are more candidates who could be identified as murder victims in year $t + 1$ than in year t . For instance, candidates who last ran in 2004 could be paired with homicides in the SIM dataset for 13 years (between 2004 and 2017), while candidates who ran in 2012 have only five years (between 2012 and 2017). Whenever possible, I include time fixed effects in analyses, which addresses this aspect of the dataset. As another robustness check, the additional measure of assassinations considers executions of *active politicians* only; that is, politicians murdered within four years of running for office. The reason for the four-year period is that this is the length of the electoral cycle in Brazil. This alternative measure identifies 1,571 assassinations (i.e., 78% of assassinations in the primary measure). This alternative measure is employed to test robustness only: even after their mandate ends, politicians may be killed for actions undertaken while in office, and they often continue to be involved in politics.

2.4 When are Politicians Killed?

The scholarship on electoral violence presupposes that elections are violent affairs, with violence spiking around these events (Aksoy 2014; Hafner-Burton, Hyde, and Jablonski 2014; Newman 2013; Alesina, Piccolo, and Pinotti 2019). Yet, actors often have incentives to use violence for political reasons not only during campaign periods but also at other times (Harish and Little 2017). One might expect that assassinations are electoral in nature. However, as shown below, assassinations of local politicians are no more likely during election years than during nonelection years.

Table 2.1 presents the results of multivariate regressions by municipality and year. The variables "Municipal Election Year" and "National Election Year" are coded as "1" for the respective election years and "0" for all others. Columns 1–3 control for the homicide rate of the overall population, municipal GDP per capita (logged), population size (logged), urbanization

rate, and the percentage of the population that is black. In columns 4–6, I add three political covariates: whether the incumbent mayor ran in the last election, the vote share of the victorious mayoral candidate, and the number of candidates in the last local election (logged). I also add time trends to control for the growth in assassinations over time. Some specifications also account for municipal fixed effects that absorb idiosyncratic differences between municipalities. Across all specifications, election year variables are not statistically significant.¹⁶ Various findings for control variables are discussed later in the chapter.

In short, Table 2.1 suggests that assassinations are no more likely during election years than during nonelection years. This finding contradicts the possibility that executions are carried out only to influence electoral outcomes. Moreover, it is consistent with the typology presented in Chapter 1, which suggests that political assassinations are different from electoral violence. In Chapter 3, I argue that corruption is a key determinant of assassinations.

2.5 Who are the Victims?

In Brazil, securing a position as mayor or local councilor represents not only a profitable and promising career but also access to and discretionary control over local public funds. In a highly unequal country, being a politician can improve a citizen's economic situation through a significant salary and benefits for private businesses. It can also serve as a first step toward a career in politics, leading to the occupation of higher political ranks. In addition, it gives politicians power to control appointments to office, an important source of favoritism and political support (Colonnelli, Prem, and Teso 2019). However, as this study emphasizes, being a politician can also be dangerous. In this section, I investigate which characteristics of local politicians increase the likelihood of assassination. I begin by presenting descriptive analyses that — unlike regressions — do not control for other variables but nevertheless provide insight into who is

16. Appendix B shows comparable results using logit regressions, as well as specifications that consider the alternative measure discussed above (i.e., using assassinations of only active politicians as dependent variable).

Table 2.1: Electoral Cycles and Political Assassinations (2001–2017)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Municipal Election Year	0.00118 (0.00138)	0.00113 (0.00137)	0.00127 (0.00133)	0.00039 (0.00139)	0.00040 (0.00138)	0.00072 (0.00134)
National Election Year	-0.00112 (0.00129)	-0.00105 (0.00129)	-0.00134 (0.00128)	-0.00175 (0.00130)	-0.00171 (0.00129)	-0.00191 (0.00128)
GDP per capita (Ln)	0.00232*** (0.00088)	-0.00196 (0.00133)	-0.00774** (0.00352)	-0.00015 (0.00089)	-0.00306** (0.00133)	-0.00781** (0.00352)
Population (Ln)	0.01757*** (0.00098)	0.01807*** (0.00110)	0.01867** (0.00746)	0.00922*** (0.00095)	0.00993*** (0.00114)	0.01785** (0.00753)
Homicides Rate	0.00082*** (0.00004)	0.00084*** (0.00004)	0.00060*** (0.00005)	0.00080*** (0.00004)	0.00080*** (0.00004)	0.00060*** (0.00005)
Urban (% of Population)	-0.00382 (0.00265)	-0.01322*** (0.00323)	0.00867 (0.01794)	-0.01421*** (0.00279)	-0.01786*** (0.00330)	0.00658 (0.01811)
Black (% of Population)	0.06731*** (0.01199)	0.03419*** (0.01265)	0.04277* (0.02277)	0.03569*** (0.01214)	0.00873 (0.01271)	0.04770** (0.02285)
Second-term mayor ran				0.00044 (0.00110)	0.00037 (0.00110)	0.00016 (0.00115)
Share Votes Mayor				0.01371*** (0.00431)	0.01118** (0.00437)	0.00409 (0.00506)
Number of Candidates (Ln)				0.02269*** (0.00168)	0.02110*** (0.00197)	0.01229*** (0.00315)
Observations	83,004	83,004	83,004	81,228	81,228	81,228
Time Trends	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	No	Yes	No
Municipal FE	No	No	Yes	No	No	Yes

Notes: This table illustrates the effect of election years on political assassinations. I use a municipal-year level dataset. The table reports the coefficients of OLS regressions with controls. The dependent variable is the total number of assassinations of local politicians between 2001 and 2017. Municipal and national election year variables are coded 1 for years with those respective elections; 0 otherwise. Data on assassinations are from the author's analysis, based on officially authorized cross-referencing of the TSE's candidate databases and the Ministry of Health's SIM mortality database. All specifications include time trends. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

most likely to be assassinated. Then, I present the findings from multivariate regressions.

2.5.1 Descriptive Analysis

Politician Characteristics

Of the 1.3 million individuals who ran in municipal elections between 2001 and 2017, 2,241 were assassinated — corresponding to a rate of 1.7 per 1,000 politicians. Both elected and unelected politicians were killed. However, elected politicians were far more likely to be killed than those who were never elected: whereas elected candidates' assassination rate is 2.7 per 1,000, the corresponding rate for unelected candidates is 1.6. Table 2.2 disaggregates these indicators by personal characteristics and election status. Women represent only 6% of all political assassinations, even though they represent nearly a third of all candidates. Their assassination rate is 0.09 per 1,000, versus 1.6 for men.¹⁷

Regarding age, higher assassination rates are observed for politicians between 30 and 50 years old. Most politicians are indeed in this age range: the mean and median age of local politicians in Brazil is 44 years. The most vulnerable group in this category is elected politicians between 40 and 49 years old, of which 0.65 per 1,000 were murdered.

Finally, less-educated politicians were more likely to be assassinated. Politicians who had not completed high school represented 44% of political candidates but 67% of those assassinated. Table 2.2 shows that elected politicians with incomplete basic education were the most likely to be killed — their assassination rate is 0.758 per 1,000 candidates, versus 0.487 for high school graduates and 0.236 for college graduates. On the other hand, only one politician who was illiterate was killed.

17. Law 9504/1997 reserves 30% of candidacies of parties or coalitions for each sex in proportional elections (that is, for local councilor and state and federal deputy).

Table 2.2: Political Assassination Rate (per 1,000 Politicians)

	Elected	Unelected	Overall
<i>Gender</i>			
Male	0.24	1.35	1.59
Female	0.005	0.088	0.093
<i>Age</i>			
18-29	0.007	0.112	0.12
30-39	0.067	0.386	0.45
40-49	0.095	0.556	0.65
50+	0.069	0.34	0.40
<i>Instruction</i>			
Illiterate	0.001	0	0.001
Incomplete Basic Education	0.075	0.017	0.092
Basic Education	0.665	0.093	0.758
High School	0.419	0.068	0.487
Bachelor's Degree	0.184	0.052	0.236

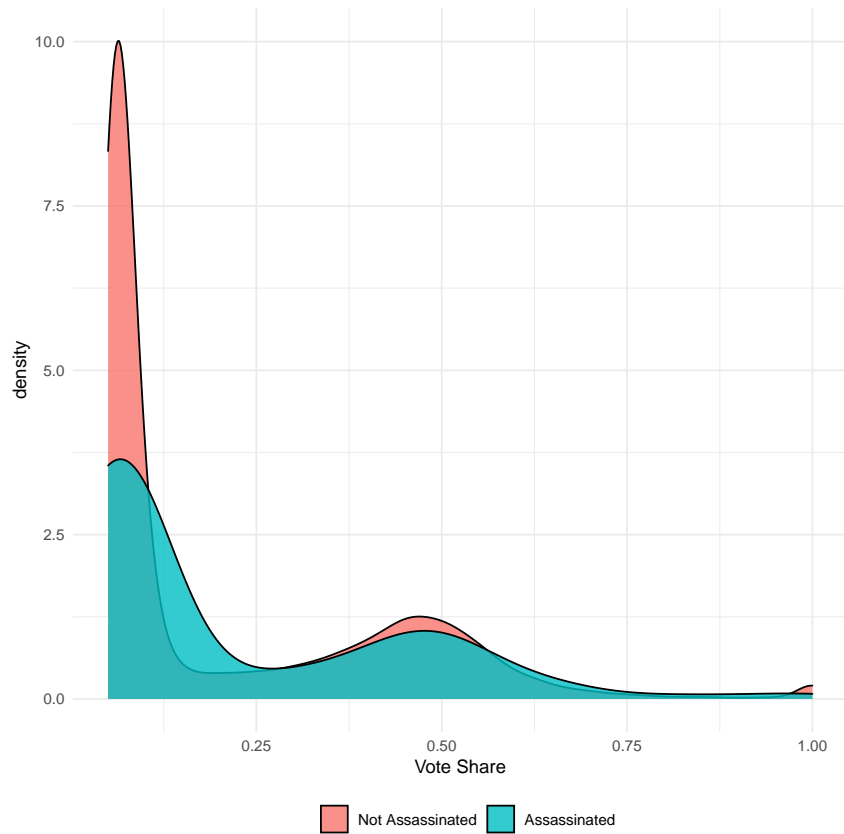
Note: The assassination rate is the number of local politicians murdered, divided by the number of local of politicians who ran for office between 2001 and 2017. Elected Candidate refers to a candidate who ran for and won a local office between 2001-17. Unelected Candidate refers to a candidate who ran local office, but never won between 2001-17. Data on assassinations are from the author's analysis, based on officially authorized cross-referencing of the *TSE*'s candidate databases and the Ministry of Health's *SIM* mortality database.

Votes and Money

The *TSE* also provides data on candidates' vote shares, campaign donations, declared wealth, and political parties. In terms of these political characteristics, assassinated politicians received slightly more votes on average than non-assassinated candidates in the election preceding their deaths (494 vs. 372), had less declared wealth in their candidate registration documents (R\$ 119,402 vs. R\$ 285,449) and had received less in campaign donations (R\$ 6,205 vs. R\$ 8,683). Figure 2.3 presents the distribution of vote shares for assassinated vs. non-assassinated politicians. Note that most politicians received very few votes, so the distribution is skewed to the left. When examining candidates who earned more than 5% of votes, I observe that the distribution for the two groups is similar in the middle and only slightly higher in the tail for the group of non-assassinated politicians. This evidence suggests that there is no strong relationship between vote shares and assassinations. This point is corroborated by Figure 2.4, which plots vote share by the probability of a politician's assassination.

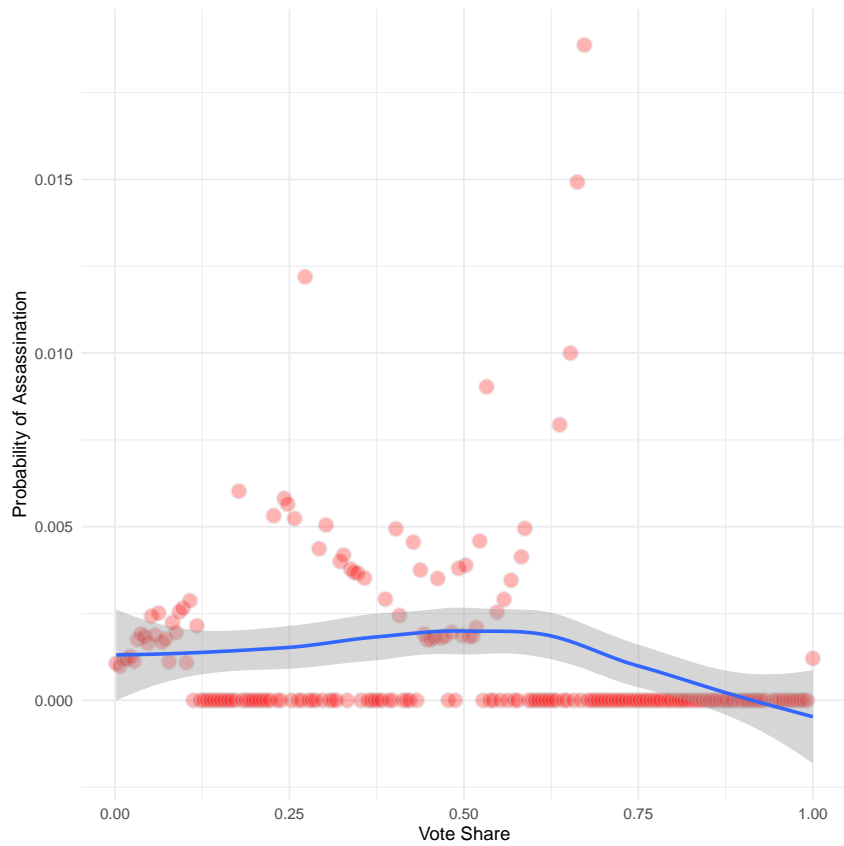
Given that campaign financing is closely linked to political entry and selection in Brazil (Avis, Ferraz, and Finan 2018), an investigation into whether candidates who received private donations are more likely to be assassinated once they win or lose an election is merited. Additionally, campaigns are likely to influence electoral outcomes and the allocation of public contracts (Boas, Hidalgo, and Richardson 2014). For example, one might expect that politicians who make agreements with corrupt donors are more likely to face pressure to pay back the campaign donations (Samuels, 2001).

Looking at the data on campaign donations and wealth declared by politicians, we see similarities and differences across wealth and campaign contributions. The distribution of declared wealth for assassinated politicians is similar to that for non-assassinated politicians, as shown in Figure 2.5. However, non-assassinated politicians are slightly richer on average. The same pattern is observed for campaign contributions. The distributions depicted in Figure 2.5



Note: This figure illustrates the distribution of vote share by politicians assassinated and those not assassinated. Data on assassinations are from the author’s analysis, based on officially authorized cross-referencing of the *TSE*’s candidate databases and the Ministry of Health’s *SIM* mortality database. Data on vote share come from *TSE*.

Figure 2.3: Vote Share in Last Election, Assassinated vs. Non-Assassinated Mayoral Candidates



Note: The chart displays the data points in 200 bins, and each bin computes the mean of the variables. Data on assassinations are from the author’s analysis, based on officially authorized cross-referencing of the *TSE*’s candidate databases and the Ministry of Health’s *SIM* mortality database. Data on vote share come from *TSE*.

Figure 2.4: Vote Share vs. Political Assassinations

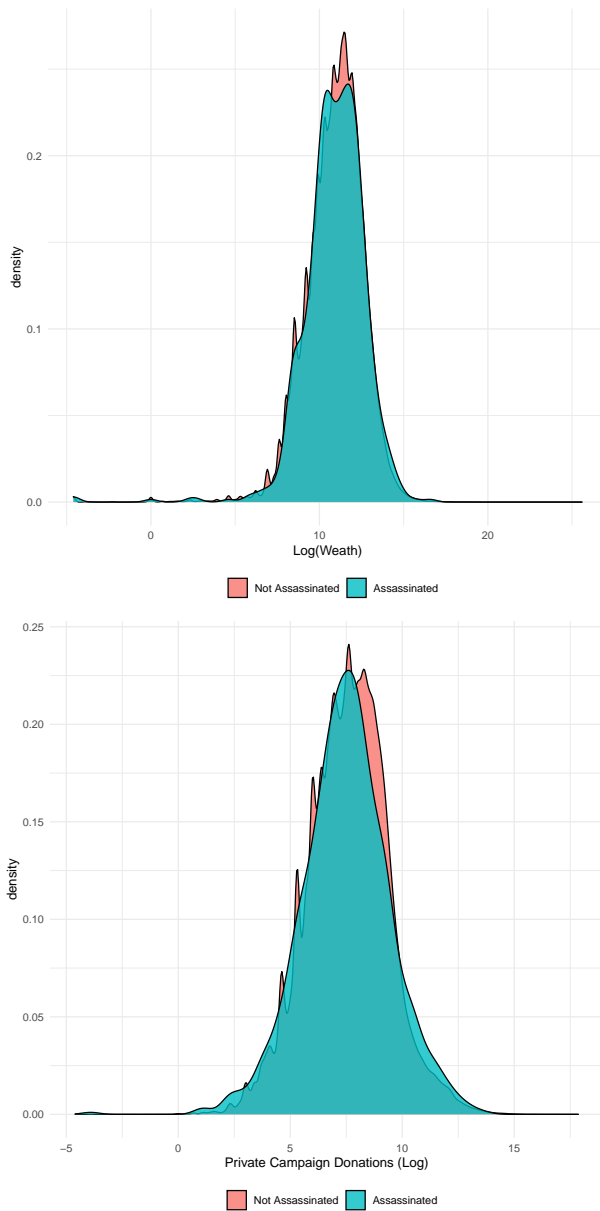
overlap considerably and are concentrated around R\$ 22,000 (10 in log terms). This measure of campaign donations includes money from both private and public sources. To analyze the composition of politicians' campaign donations, I calculate the share of private donations in comparison to the total revenue. Politicians who were murdered depend on average only slightly more on private donations: 83% of their campaign donations came from private sources, versus 80% for other politicians. However, when analyzing whether the politician was elected, the differences become larger. For politicians who were both elected and killed, the share of private donations was 92%, compared to 80% for politicians who were never elected but were also killed.

In summary, I do not find evidence that wealth is associated with assassinations. However, I find some interesting patterns with respect to campaign donations, especially donations that are private, i.e., donated by individuals directly to political campaigns. This descriptive analysis is important because it shows the role of money in assassinations.

Political Parties

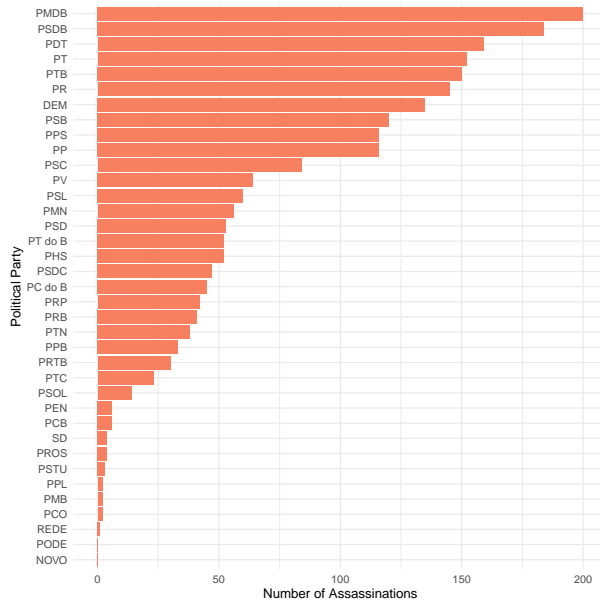
One of the reasons corporate campaign contributions are so important is that party loyalties and partisan cues are weak in Brazil. Brazil's party system is highly fragmented, despite the lack of ethnic or linguistic cleavages in the country (Samuels and Zucco 2014; Alesina et al. 2003). The effective number of parties in Brazil is one of the highest in the world (Gallagher and Mitchell 2008). There are currently 33 parties in the country, of which 30 are represented in Congress. In comparison, the number of parties in Congress in 2010 was 22. Recently, studies have pointed out a skewed distribution of partisanship toward one party, the Workers' Party (PT, and a growing sentiment of antipartisanship in the country (Samuels and Zucco Jr 2018). Given the recent polarization, it is important to analyze whether assassinations have disproportionately affected politicians from specific parties.

In Figure 2.7, the top panel shows the number of assassinations per party, while the bot-

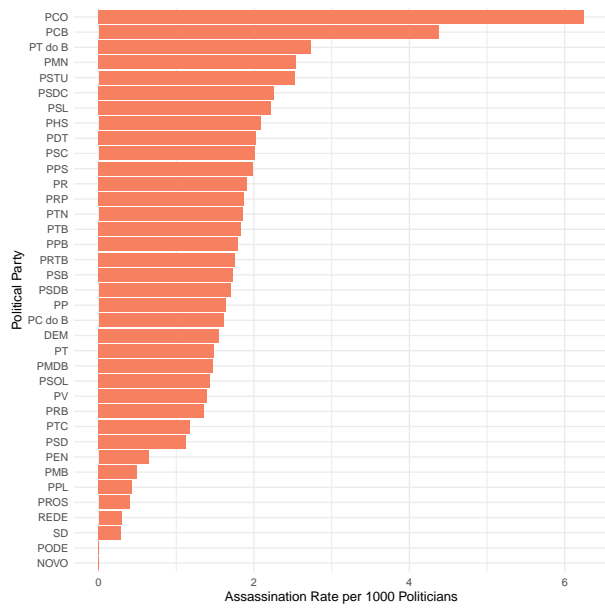


Note: This figure illustrates the distributions of declared wealth and campaign donations received by political candidates using data from *TSE*. Panel A shows the log of wealth declared by politicians assassinated and those not assassinated. Panel B shows the log of campaign donations by politicians assassinated and those not assassinated.

Figure 2.5: Campaign Donations and Wealth Declared



(a) Total Number



(b) Rate per 1,000 politicians

Note: This figure illustrates the distribution of political assassinations by political parties using data from *TSE*. Panel A shows the total number of assassinations by all political parties. Panel B shows the assassination rate per 1,000 politicians by all political parties. Data on assassinations are from the author’s analysis, based on officially authorized cross-referencing of the *TSE*’s candidate databases and the Ministry of Health’s *SIM* mortality database. Data on vote share come from *TSE*.

Figure 2.7: Political Assassinations Distributed by Party

tom panel shows the assassination rate per 1,000 politicians. Given the large number of mergers and name changes parties have undergone over time, these figures aggregate assassinations according to parties currently existing in Brazil.¹⁸ As shown in the top panel, the largest parties unsurprisingly have the greatest number of assassinations.

Historically, in postdictatorship Brazil, left-wing politicians were more likely to be targets of violence, mostly due to their actions linked to land occupations and support for agrarian reform (Hammond, 2009). To what extent are local politicians from the PT, the main left-wing party in the country known for its activism, victims of political assassinations? One of the most notable cases of an assassinated PT mayor is Celso Daniel, the mayor of Santo André, an industrial city in the state of São Paulo. Celso Daniel was one of the founders of the PT in 1979 and had a promising career in the government when Luis Inacio Lula da Silva was elected as president in 2002. His murder remains unsolved, and several related assassinations occurred in subsequent years. His family believes he was killed because he held a dossier on corruption in the municipal government. Other people say that he was murdered because he actually headed a corruption scheme. Regardless of the reason for his assassination, the case is one of the most infamous cases of political assassination in Brazil.

The descriptive data in Figure 6 show that politicians of all political stripes were victims of assassination — politicians from both the right (e.g., Brazilian Social Democracy Party known as PSDB) and the left (e.g., PT) of the political spectrum were murdered. Panel B adjusts for the size of the party, showing that the assassination rate is higher for politicians from smaller

18. For example, Workers' General Party (PGT) and Social Labor Party (PST) merged in 2003, creating the Liberal Party (PL). The decision to merge was made mainly to guarantee longer free electoral advertising time on Brazilian TV, which is limited for small parties because of the barrier clause. In 2006, the PL merged with the conservative Party of Reconstruction of the National Order (PRONO), and Republican Party (PR) was created. The PR is now known as PL, a right-wing party and part of the group of political parties that ensures proximity to the federal government without having a clear ideological position. This group is known as *Centrão*. The Brazilian Labor Renewal Party (PRTB), Christian Labor Party (PTC), Brazilian Labor Party (PTB), and Democrats (DEM) also incorporated other parties: Reform Labor Party (PTR), National Reconstruction Party (PRN), Nation's Retirees Party (PAN), and Social Liberal Party (PFL), respectively. DEM and PFL changed their name to Brazil Union Party; a rebranding meant to capture the center-right electorate.

parties on the left of the political spectrum.¹⁹ However, soon after, as of the sixth place, they are followed by center-right to right-wing parties in the ranking.²⁰

2.5.2 Multivariate Analyses

The descriptive analysis above does not account for covariates. To hold constant other predictors, I employ a regression analysis with controls to study politicians' characteristics that render them more likely to be assassinated. For this analysis, I use an individual-level dataset on whether a politician was assassinated. This dataset is distinct from — but based on the same underlying data as — the dataset employed for Table 1, which aggregates assassinations at the municipal-year level. Here, I regress an indicator variable that the politician was murdered on personal and political variables, corresponding to the descriptive analysis above. Table 2.3 presents the results of the regression analysis. The first four columns examine all politicians who ran for office between 2001-2017, regardless of whether they were elected. Whereas Columns 1-2 code any murders of those politicians as assassinations, Columns 3-4 only code their murders as assassinations if they were killed within four years of running for office. The next four columns examine only politicians who were elected between 2001-2017. Whereas Columns 5-6 code any murders of those politicians as assassinations, Columns 7-8 only code their murders as assassinations if they were killed within four years of being elected.

Most findings corroborate the descriptive findings discussed above. It shows that men are more likely to be killed: the effect is 0.0017 for the full sample, 0.0012 when examining only active politicians (i.e., those who ran for office in the last electoral cycle). In terms of the assassination rates discussed above, the effect increases the rate by 1.7 (1.2) per 1,000 politicians in the full (active) sample. The effect doubles when examining only elected politicians: a 0.24

19. The Workers' Cause Party (PCO), Brazilian Communist Party (PCB), Labor Party of Brazil (PT do B), Party of National Mobilization (PNM), and United Socialist Workers' Party (PSTU) are all center-left to left-wing.

20. Such parties include Christian Social Democratic Party (PSDC), Social Liberal Party (PSL), and Humanist Party of Solidarity (PHS).

percentage point increase for the full sample and 0.21 for active politicians.

Another correlate that is significant across all specifications is educational attainment. One year of education reduces the probability of being assassinated by approximately 0.15 percentage points (column 1) for all politicians, and 0.40 for elected politicians (column 1 and 5, respectively). This finding is potentially driven by several factors. Education is often correlated to income and ability, which are used as a proxy for politicians' quality (Dal Bó, Dal Bó, and Di Tella 2006; Ferraz and Finan 2008). Thus, the expectation is that higher-quality politicians are less likely to suffer violence.²¹

Marital status is only significant using the sample of all politicians (elected and non-elected at any time). Being married reduces the chance of being killed by 0.04 percentage points on average. When I reduce the sample to only elected politicians, marital status is not statistically significant. I find similar results for the variable that indicates whether the politician won a mayoral office. Winning an election for mayor increases one's chances of assassination by 0.15 percentage points, which is statistically significant for the full sample only.

In terms of political parties, effects are less consistent. Contrary to the expectation discussed in the descriptive analysis that left-wing politicians are more likely to be targeted, politicians from PT are not more likely to be killed. Assassinations are negatively correlated with political affiliation with PT, using both samples and controlling for personal characteristics; however, the effect is not statistically significant when controlling for wealth and donations. Conversely, affiliation with the center-right party PSDB — PT's main opposition during the period analyzed — increases the likelihood of murder for the restricted sample of elected politicians.

In sum, this section shows that important correlates of political assassinations at the individual level include gender, education level, and being elected mayor. Surprisingly, there is no evidence that someone's personal level of income or campaign donations impact the likelihood of being assassinated. Finally, with respect to political parties, the more robust finding is that

21. This finding corroborates the analysis in the next chapter, where I show how corruption fuels violence among politicians.

Table 2.3: Individual-Level Determinants of Assassinations

	All Politicians				Elected Politicians			
	All		Active Only		All		Active Only	
Male	0.00178*** (0.00006)	0.00115*** (0.00008)	0.00125*** (0.00005)	0.00092*** (0.00007)	0.00238*** (0.00026)	0.00146*** (0.00030)	0.00212*** (0.00022)	0.00137*** (0.00025)
Age	-0.00001*** (0.00000)	-0.00000 (0.00000)	-0.00000 (0.00000)	-0.00000 (0.00000)	0.00001 (0.00001)	0.00001 (0.00002)	0.00001 (0.00001)	0.00002 (0.00001)
Years of Education	-0.00149*** (0.00006)	-0.00172*** (0.00017)	-0.00074*** (0.00005)	-0.00093*** (0.00013)	-0.00406*** (0.00037)	-0.00374*** (0.00064)	-0.00332*** (0.00034)	-0.00252*** (0.00055)
Married	-0.00057*** (0.00008)	-0.00044*** (0.00012)	-0.00038*** (0.00007)	-0.00040*** (0.00010)	-0.00057 (0.00037)	-0.00051 (0.00038)	-0.00035 (0.00034)	-0.00036 (0.00035)
Won Mayoral Election	0.00146*** (0.00047)	0.00119** (0.00051)	0.00133*** (0.00042)	0.00074* (0.00044)	-0.00016 (0.00049)	0.00095 (0.00074)	-0.00026 (0.00044)	0.00061 (0.00067)
Party DEM	-0.00035** (0.00014)	-0.00008 (0.00024)	-0.00015 (0.00012)	-0.00002 (0.00021)	-0.00093 (0.00064)	-0.00012 (0.00077)	-0.00078 (0.00060)	0.00002 (0.00072)
Party PMDB	-0.00014 (0.00012)	0.00003 (0.00016)	-0.00003 (0.00010)	-0.00002 (0.00014)	-0.00014 (0.00046)	0.00022 (0.00046)	-0.00042 (0.00042)	-0.00012 (0.00040)
Party PSDB	0.00002 (0.00013)	0.00009 (0.00019)	0.00006 (0.00011)	-0.00003 (0.00016)	0.00030 (0.00058)	0.00133** (0.00067)	-0.00005 (0.00052)	0.00104* (0.00062)
Party PT	-0.00027** (0.00013)	0.00014 (0.00020)	-0.00030*** (0.00010)	0.00000 (0.00017)	-0.00117* (0.00062)	-0.00038 (0.00060)	-0.00109* (0.00058)	-0.00039 (0.00055)
Declared Wealth (Log)		0.00002 (0.00004)		0.00000 (0.00003)		-0.00011 (0.00013)		-0.00014 (0.00012)
Private Donations (Log)		0.00003 (0.00004)		0.00004 (0.00004)		-0.00016 (0.00021)		-0.00015 (0.00020)
Observations	1,327,133	449,208	1,327,133	449,208	117,517	76,811	117,517	76,811
Municipal FE	✓	✓	✓	✓	✓	✓	✓	✓
Mean Dep Var	0.00168	0.00168	0.00118	0.00118	0.00168	0.00168	0.00118	0.00118

Notes: This table illustrates the effects of politicians’ personal and political characteristics on assassinations. I use an individual-level dataset on whether a politician was assassinated. The table reports the coefficients of OLS regressions with controls. In columns 1–4, the sample includes all politicians who ran for office and were elected between 2001 and 2017. In columns 5–8, the sample includes only elected politicians. All specifications include municipal fixed effects. Robust standard errors are clustered at the politician level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

being from the left-wing PT is negatively associated with assassinations.

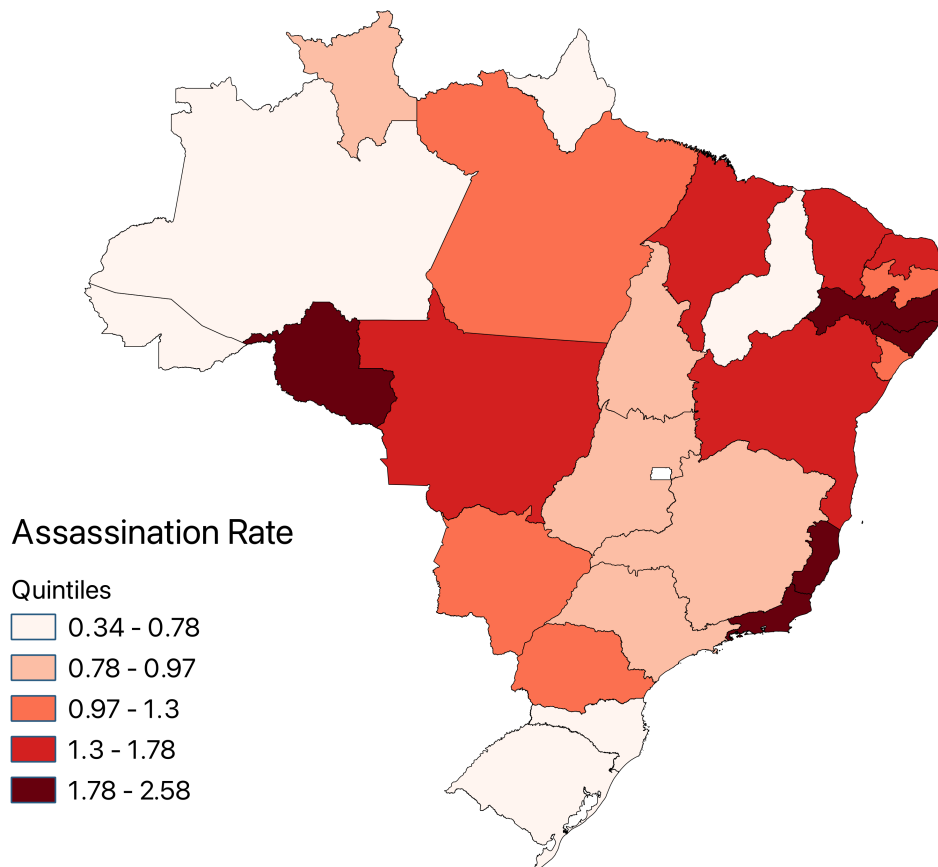
2.6 Where Do Assassinations Occur?

While the previous analyses indicate which politicians were more likely to be targeted, I now turn to exploring district-level determinants of assassinations. Violent crime is a complex and multifaceted phenomenon (World Bank 2013). In this section, I present evidence on some of the factors correlated with assassinations of local politicians between 2001 and 2017. I begin by presenting an overview at the state level and then estimate the correlation between several factors and assassination trends at the municipal level. The results indicate characteristics that make municipalities more dangerous to politicians.

2.6.1 Most Violent States in Brazil

Where are political assassinations more likely to occur? According to the *Atlas da Violência*, the northeastern, northern, and central-western regions have the highest levels of homicides in the general population. These regions are also the country's poorest. One question is whether this pattern for overall homicides is also observed for political assassinations. Given that murders in general are more common in poorer places, one might expect that political assassinations would be more likely in such environments as well. Figure 2.9 provides the assassination rates per 1,000 politicians across Brazilian states. It divides these rates into quintiles varying from 0.34 to 2.58 assassinations per 1,000 politicians. Most states in the northeastern region present high rates, with the exception of Piauí. In other regions, the states of Rondônia, Rio de Janeiro, Espírito Santo, and Pará are also in the top quintile in terms of assassination rates.

Illustrating this differently, Figure 2.10 shows the assassination rates per 100,000 politicians for each state in Brazil. States with the highest rates are Rio de Janeiro (2.6), Alagoas (2.2), Pernambuco (2.1), and Rondônia (1.9). Rio de Janeiro is not just an outlier for assassina-



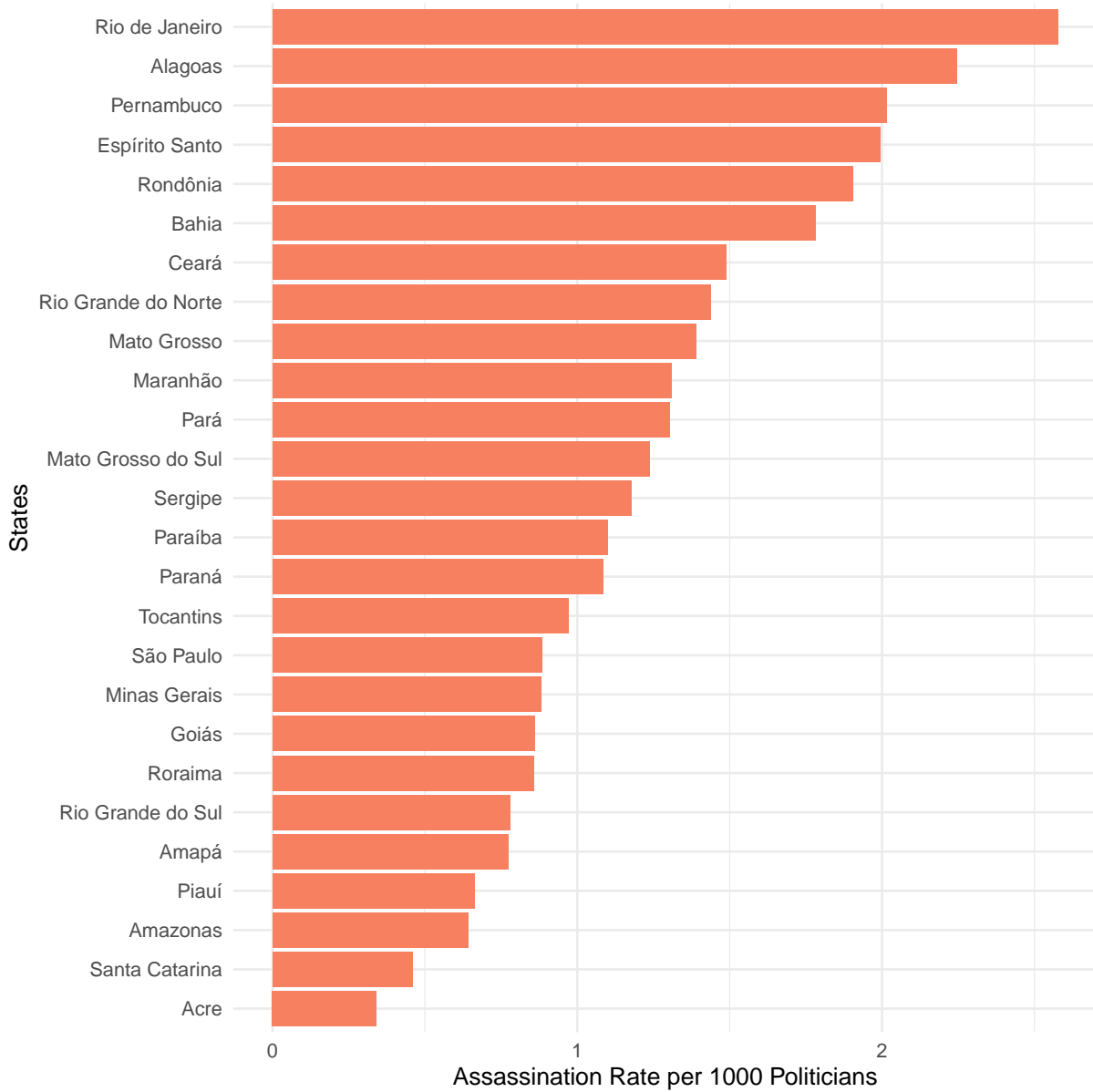
Note: Assassination rates per 1,000 politicians in Brazilian states. Data on assassinations are from the author's analysis, based on officially authorized cross-referencing of the *TSE's* candidate databases and the Ministry of Health's *SIM* mortality database.

Figure 2.9: Political Assassinations in Brazilian States

tions; it is renowned more broadly for its high level of violence. Political assassinations are in part a consequence of the criminal dynamics of the capital city and its surrounding periphery, which involve politicians, drug traffickers, and paramilitaries (Lessing 2017; Albarracín 2018). To provide a brief background, Rio de Janeiro is the state where the first prison-based criminal organizations began to rule over some neighborhoods (Lessing and Denyer Willis 2018). Other, similar criminal organizations started to emerge in other parts of Brazil, such as São Paulo, Ceará, and Amazonas. These criminal organizations have similarities in their modus operandi: they project power from within the prison system to the streets and display territorial control over poor neighborhoods in big cities (Lessing 2020; Lessing and Denyer Willis 2018). Until recently, these gangs did not influence politics directly and operated mostly within the prison system, with the exception of the militias in Rio de Janeiro. After 2016, they expanded their activities, and signs that they were operating within politics began to emerge. For the purposes of this study, it is crucial to emphasize that in the majority of municipalities in Brazil, such groups are less likely to influence municipal politics (G. Feltran 2018). Moreover, the data below show that whereas murder rates for the overall population are far higher in urbanized municipalities — where gang activity tends to be most intense (Muggah 2015) — no such relationship exists for political assassinations.

2.6.2 Municipal-Level Correlates

To evaluate where assassinations are more likely to happen, I examine several municipal characteristics potentially associated with violence against politicians. The literature on homicides considers different perspectives when studying potential drivers of change. Possible explanations can be classified into macrofactors, such as economic cycles and income inequality, contextual factors, such as urbanization and population density, and microfactors or demographic factors, such as age and sex (World Bank 2013). I evaluate whether these factors affect assassinations as well.



Note: Assassination rates per 1,000 politicians in Brazilian states. Data on assassinations are from the author’s analysis, based on officially authorized cross-referencing of the *TSE*’s candidate databases and the Ministry of Health’s *SIM* mortality database.

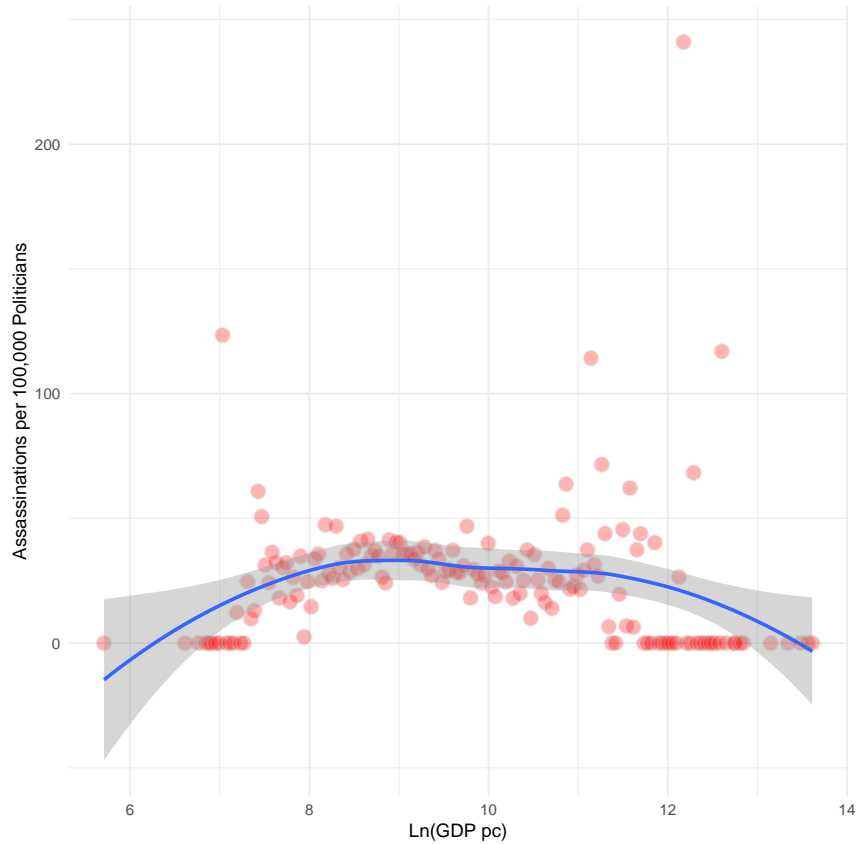
Figure 2.10: Assassination Rates in Brazilian States

Income

First, I analyze the association between income and political assassinations. In general, income and poverty are important predictors of violence. Duarte et al. (2012) find that the relationship between income and homicide rates in the general population is not linear: municipalities in the intermediate range for income tend to have higher homicide rates. I examine the correlation between municipalities' GDP per capita and political assassinations. The level of economic development is measured by GDP per capita, which is correlated with other factors that influence violence.

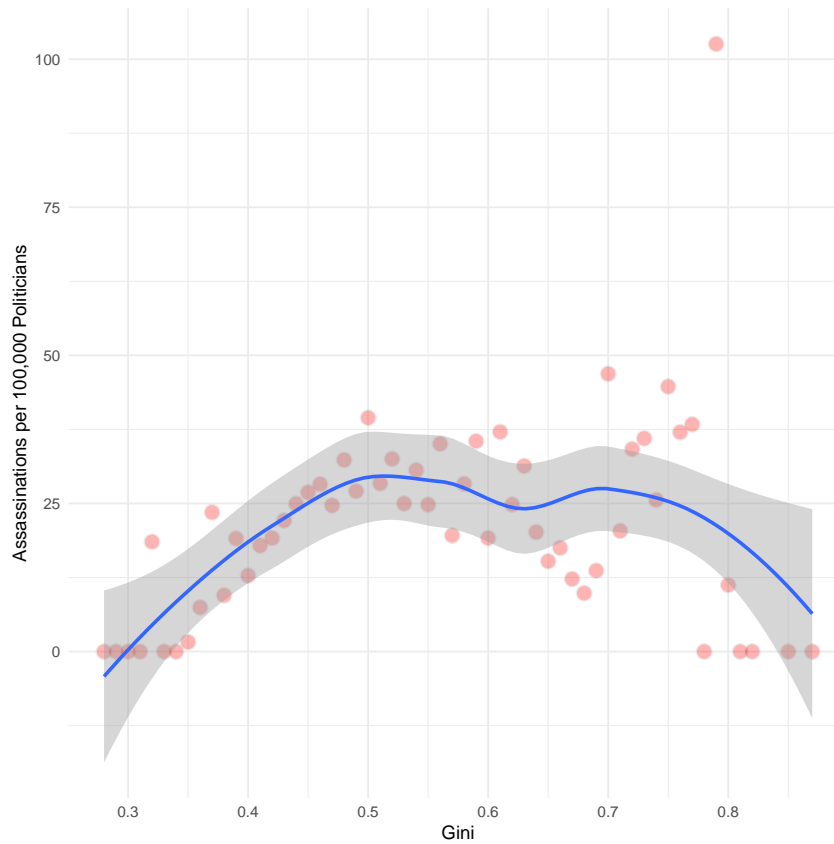
Figure 2.11 depicts the relationship between political assassinations and level of income in a binned scatterplot. The binned scatterplot groups municipal data points into 200 bins and computes the mean of the assassination rate within each bin. The blue line indicates the smoothed conditional mean, with gray-shaded areas showing 95% confidence intervals. As shown, it resembles an inverse U-shaped pattern in which assassinations are less common in poor and rich municipalities than in municipalities in the middle of the income distribution. While the data are cross-sectional, they may suggest that as municipalities develop, political assassinations first increase and then decrease after development reaches its peak. This result highlights the multifaceted pattern of political assassinations.

Additionally, I look at the relationship between income inequality and political assassinations. Greater inequality is often associated with higher rates of violence (Fajnzylber, Lederman, and Loayza 2002; World Bank 2013). Indeed, Andrade et al. (2001) analyze the homicide rates in the general population of the state of Paraná in the south of Brazil and find a statistically significant correlation between municipalities' Gini index of income inequality and the homicide rate for men aged 15 to 29. For assassinations, the pattern is more nuanced, similar to my findings for GDP per capita above. Figure 2.12 shows a similar nonmonotonic and concave down relationship between the Gini index and political assassinations for Brazilian municipalities.



Note: The figure illustrates the relationship between political assassinations and log of GDP per capita. The binned scatterplot groups the data points into 200 bins and computes the mean of the variables within each bin. The blue line indicates the smoothed conditional mean, with gray-shaded areas showing confidence intervals. Data on assassinations are from the author's analysis, based on officially authorized cross-referencing of the *TSE*'s candidate databases and the Ministry of Health's *SIM* mortality database.

Figure 2.11: Political Assassinations and Income Levels



Note: The figure illustrates the relationship between political assassinations and the Gini coefficient of income inequality. The binned scatterplot groups the data points into 200 bins and computes the mean of the variables within each bin. The blue line indicates the smoothed conditional mean, with gray-shaded areas showing confidence intervals. Data on assassinations are from the author's analysis, based on officially authorized cross-referencing of the *TSE*'s candidate databases and the Ministry of Health's *SIM* mortality database.

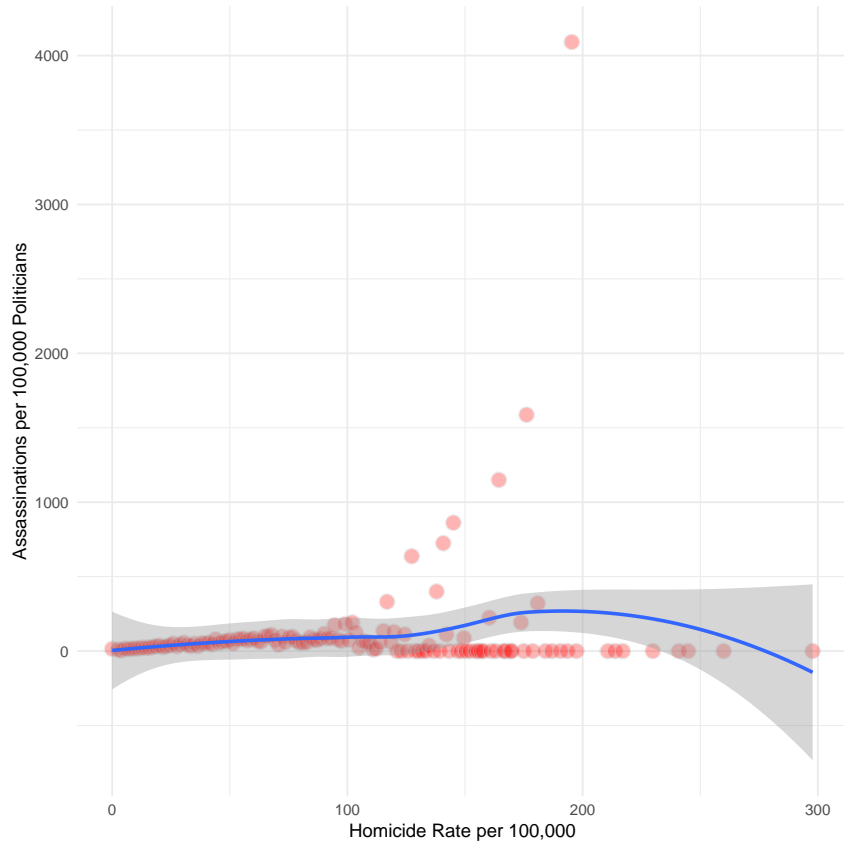
Figure 2.12: Political Assassinations and Income Inequality

Overall Violence

Second, I analyze whether violent places are more likely to have political assassinations. If the rate of political assassinations is perfectly correlated with the rate of homicides more generally, one might be concerned that studying patterns in assassinations is less interesting as a distinct phenomenon. However, closer examination suggests that municipalities with the highest rates of political assassinations are not those with the highest murder rates. In fact, the relationship between the murder rates of citizens and those of politicians is weak. Figure 2.13 illustrates this relationship, again using a binned scatterplot. The assassination rate is now shown per 100,000 politicians, for comparability with the standard way of showing homicide rates in the general population. Overall, there is a weak negative relationship between rates of homicides and political assassinations. The mean homicide rate is 16 per 100,000. Figure 2.13 shows a nonmonotonic relationship: the number of political assassinations increases to a homicide rate of 200 per 100,000 people and then decreases. Most important, the fact that overall homicide rates do not perfectly predict assassination rates of politicians suggests that the latter are indeed a distinct phenomenon worthy of thorough investigation.

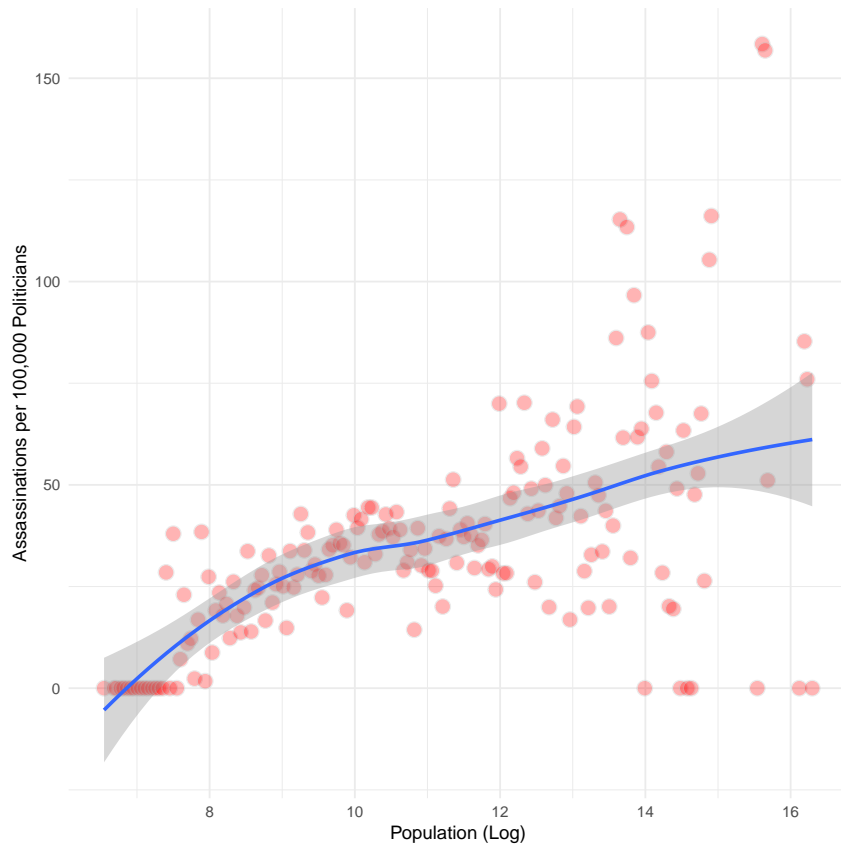
Population Size and Urbanization

Next, I analyze how political assassinations vary with two demographic factors: population size and density. Crime rates are higher in larger cities than in smaller cities and rural areas (Glaeser and Sacerdote 1999). There are various reasons for this pattern, one being that many cities are growing fast while they have weak labor markets, which tends to increase criminality (World Bank, 2013). In Brazil, as their population size increases, municipalities have more city councilors, so there are more possible victims of political assassinations. But even adjusting for this fact, Figure 2.14 shows that the *rate* of political assassinations (per 100,000 politicians) is also positively correlated with population size. Larger cities are not just more dangerous for residents writ large but also for elected officials.



Note: The figure illustrates the relationship between political assassinations and homicide rates per 100,000 people. One outlier was removed to improve data visualization. The binned scatterplot groups the data points into 200 bins and computes the mean of the variables within each bin. The blue line indicates the smoothed conditional mean, with gray-shaded areas showing confidence intervals. Data on assassinations are from the author’s analysis, based on officially authorized cross-referencing of the *TSE*’s candidate databases and the Ministry of Health’s *SIM* mortality database.

Figure 2.13: Binned Scatterplot



Note: The figure illustrates the relationship between political assassinations and log of population size. The binned scatterplot groups the data points into 200 bins and computes the mean of the variables within each bin. The blue line indicates the smoothed conditional means, with gray-shaded areas showing confidence intervals. Data on assassinations are from the author's analysis, based on officially authorized cross-referencing of the *TSE*'s candidate databases and the Ministry of Health's *SIM* mortality database.

Figure 2.14: Rate of Political Assassinations by Population Size

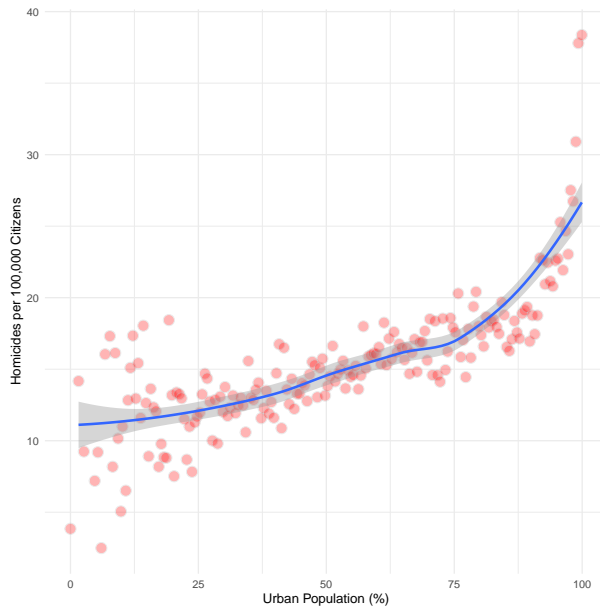
Urban areas also tend to be more violent than rural areas. Higher levels of urbanization generate poor living conditions due to disorderly urbanization and higher levels of unemployment, which are key determinants of homicides (Alvarado and Muggah 2018). Also, in urban areas, there are more opportunities for crime (Vilalta and Muggah 2016). Furthermore, gang violence has plagued urban centers around the world and is associated with rising levels of violence in urban areas (Jütersonke, Muggah, and Rodgers 2009; Muggah 2012). The left panel of Figure 2.15 confirms that in Brazil, higher urbanization levels are strongly associated with higher homicide rates.

However, the relationship between urbanization and political assassinations is starkly different. The right panel of Figure 2.15 shows that there is no clear relationship between the percentage of citizens living in urban areas and the murder rate of local politicians. This finding contradicts the notion that political assassinations are merely derivative of overall violence — as factors associated with overall violence, such as urbanization, do not explain the executions of politicians. And, crucially, municipalities where gangs commit the highest number of murders in Brazil — mostly urban cities (Muggah 2015) — are generally *not* where most politicians are killed. In the next chapter, I elaborate an alternative, novel explanation about political corruption for why political assassinations occur.

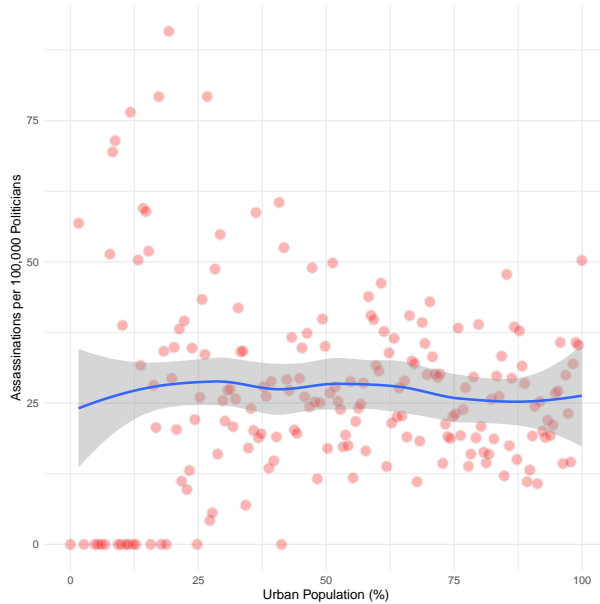
Race

Brazil's black population, which represents 56% of the total population, accounts for the vast majority of the country's homicide victims.²² They represented 69% of homicide victims in 2009, and this percentage increased to 77% in 2019 (Cerqueira et al. 2021). Moreover, blacks have a higher risk of violent death than whites, regardless of education level (Soares Filho 2011). There are several potential explanations for this racial concentration of homicides. First, race is associated with poverty, and blacks are more vulnerable than whites to social problems in Brazil

22. I use the definition of the Census that includes mixed race — *pardo* — in their definition of black.



(a) Overall Homicide Rate (General Population)



(b) Assassination Rate (Politicians)

Note: The figure illustrates the relationship between violence and urbanization. Panel A shows urbanization rates by homicide rates. Panel B shows urbanization rates by political assassination rates. The binned scatterplot groups the data points into 200 bins and computes the mean of the variables within each bin. The blue line indicates the smoothed conditional means, with gray-shaded areas showing confidence intervals. Data on assassinations are from the author’s analysis, based on officially authorized cross-referencing of the *TSE*’s candidate databases and the Ministry of Health’s *SIM* mortality database.

Figure 2.15: Urbanization and Homicide Rates (General Population and Politicians)

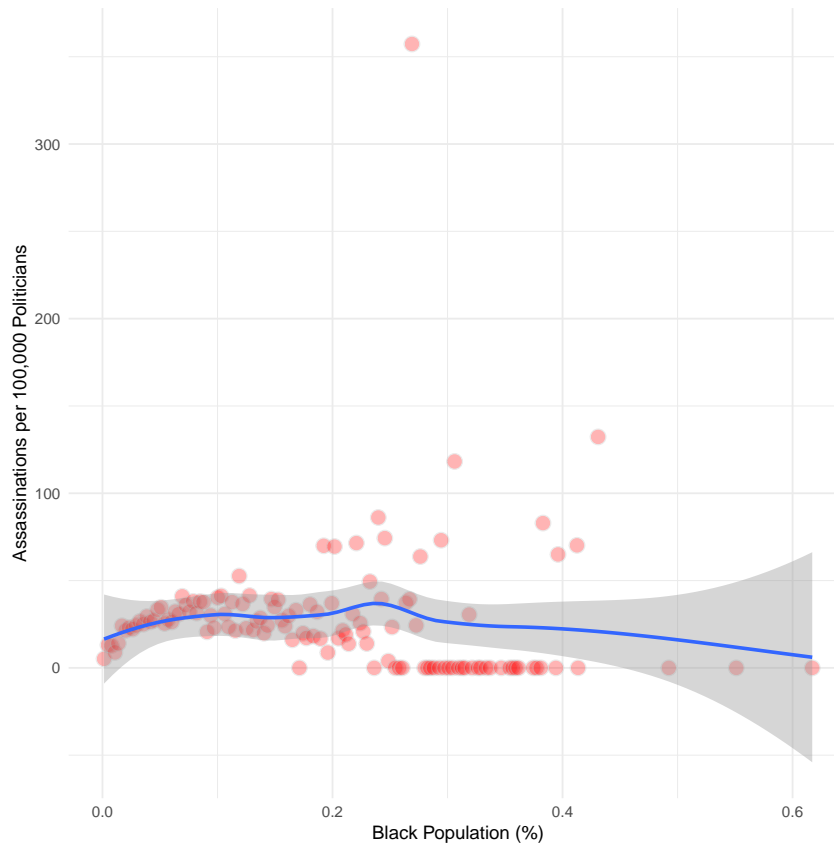
(Cerqueira and Moura 2014). Second, young black men in Brazil are more likely than white men to be arrested and convicted. Police often target black people based on racial criteria (Sinhoretto et al. 2014). Therefore, racial disparity in criminal justice systems can also lead to higher levels of violence against an underrepresented majority.

Although there is no data available on politicians' race prior to 2014, studies have documented racial disparities in politics in Brazil. Black politicians hold less than 10% of the seats in Congress (Janusz 2021), and disparities are also substantial at the municipal level. This racial gap may be especially driven by resource disparities between white and non-white candidates (Bueno and Dunning 2017). Given that murder rates are so much higher for blacks in the Brazilian population, I investigate whether there is a correlation between the assassination rate of politicians and the share of the population that is black. Figure 2.17 finds no obvious correlation.

Multivariate Analysis

The descriptive analyses above reveal intriguing patterns but are bivariate and do not include controls. As done for the earlier analysis of electoral cycles, the present section employs a municipality-year dataset. That is, it uses panel data covering the period between 2001 and 2017 to evaluate the correlates of political assassinations.

Table 2.4 shows the results of an OLS analysis using the number of assassinations in a municipality in a given year as the dependent variable. Columns 1–3 control for each of the factors discussed above and columns 4–6 also include political controls, as discussed in Section 5. Recall that these political controls are whether an incumbent mayor ran, share of votes of the mayor, and number of candidates. All specifications include year fixed effects, which unlike in Table 1 is now possible given the exclusion of campaign year variables. Columns 2 and 5 include state fixed effects and columns 3 and 6 include municipality fixed effects. In Appendix A, I show that effects are robust too when examining only the assassinations of active politicians



Note: The figure illustrates the relationship between political assassinations and race (share of black people). The binned scatterplot groups the data points into 200 bins and computes the mean of the variables within each bin. The blue line indicates the smoothed conditional means, with gray-shaded areas showing confidence intervals. Data on assassinations are from the author’s analysis, based on officially authorized cross-referencing of the *TSE*’s candidate databases and the Ministry of Health’s *SIM* mortality database.

Figure 2.17: Political Assassinations and Race

(Table 6.4) as well as when using logit specifications (Table 6.5).

GDP per capita. Estimates for GDP per capita are statistically significant with the inclusion of year- and municipality fixed effects — as can be seen in columns 3 and 6. A one-unit increase in GDP per capita decreases the number of assassinations by 0.007, holding other variables constant and controlling for municipality fixed effects (column 3). The significance and substantive size of the effect is similar when I add political covariates (column 6). When I include state fixed effects only, the effect disappears (column 2). Finally, the estimated coefficient has the opposite effect if I do not add state and municipal fixed effects, i.e., when I am comparing across municipalities (column 1). When I look at the variation within municipalities over time, I find that GDP per capita is negatively correlated with assassinations.

Overall violence. Table 2.4 also shows the association between homicide rates and political assassinations, holding other factors constant. Unlike the descriptive analysis above, the homicide rate in the general population (per 100,000 citizens) is positively and statistically significant across all specifications. However, the effect size is not substantively significant. The increase in political assassinations is around 0.0008 for a one-unit increase in violent crime rate. These results do not indicate that homicides are causing more assassinations. The multivariable regression conditioning on several other municipal characteristics induces a dependence between types of violence that might not exist — known as collider bias.

Population size. Consistent with the descriptive analysis, population size is strongly significant in both statistical and substantive terms across all specifications. I observe an increase of 0.009 and 0.018 in the number of assassinations as population increases.

Urbanization. The regression analysis shows that higher urbanization is associated with fewer assassinations. This effect is only statistically significant when adding year- and state fixed

effects — for specifications with and without political covariates (columns 2 and 4). Although these findings differ from the descriptive analysis, one implication is similar: urbanized districts, where gang violence is most intense (Muggah 2012), do *not* have the highest assassination rates.

Race. The percentage of the population that is black is significantly associated with higher levels of political assassinations. A one-unit increase in black population is associated with a 0.06 increase in the number of assassinations (column 1). When controlling for municipality fixed effects, the coefficient decreases but is still positive and statistically significant (column 3). The effect holds for other specifications that control for political covariates (columns 4 and 6).

In sum, this section shows that important correlates of political assassinations at the municipal level include GDP per capita, population size, overall level of violence, urbanization rates, and race. Most findings from the multivariate analysis corroborate the previous results of my bivariate descriptive analysis. Population size and black population are positively associated with assassinations while GDP per capita and homicide and urbanization rates are negatively correlated with killings of politicians.

2.7 Conclusion

This chapter examined an important phenomenon that remains understudied in much of the world. The assassination of politicians is not limited to national leaders and prominent figures but also affects the local level, with important implications for public administration, political accountability, and representation. Yet most of the current literature has ignored this type of violence, often incorporating it as a secondary manifestation of electoral violence.

This gap in the literature has to do in part with a lack of disaggregation of political violence. Another explanation is that existing data sources on election-related violence are usually set up at the national level, with no narrative accounts of the incidents and few details on the identity of the actors engaged in the violence and the timing and location of incidents vis-à-vis

Table 2.4: Municipal-Level Correlates of Assassinations

	(1)	(2)	(3)	(4)	(5)	(6)
DV: Assassinations of local politicians						
GDP per capita (Ln)	0.00241*** (0.00088)	-0.00183 (0.00132)	-0.00695** (0.00351)	-0.00004 (0.00089)	-0.00292** (0.00133)	-0.00700** (0.00351)
Population (Ln)	0.01760*** (0.00098)	0.01811*** (0.00110)	0.01699** (0.00750)	0.00936*** (0.00094)	0.01014*** (0.00114)	0.01660** (0.00757)
Homicides Rate	0.00082*** (0.00004)	0.00083*** (0.00004)	0.00060*** (0.00004)	0.00080*** (0.00004)	0.00080*** (0.00004)	0.00060*** (0.00005)
Urban (% of Population)	-0.00414 (0.00265)	-0.01366*** (0.00324)	-0.00087 (0.01979)	-0.01432*** (0.00280)	-0.01809*** (0.00331)	-0.00104 (0.01999)
Black (% of Population)	0.06716*** (0.01199)	0.03350*** (0.01264)	0.03906* (0.02262)	0.03600*** (0.01214)	0.00874 (0.01269)	0.04489** (0.02269)
Second-term mayor ran				0.00048 (0.00111)	0.00040 (0.00111)	0.00021 (0.00116)
Share Votes Mayor				0.01375*** (0.00432)	0.01112** (0.00438)	0.00341 (0.00509)
Number of Candidates (Ln)				0.02238*** (0.00168)	0.02064*** (0.00196)	0.00977*** (0.00322)
Observations	83,004	83,004	83,004	81,228	81,228	81,228
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	No	Yes	No
Municipality FE	No	No	Yes	No	No	Yes

Notes: This table illustrates the effects of municipal characteristics on assassinations of politicians. I use a municipal-year level dataset. The table reports the coefficients of OLS regressions with controls. The dependent variable is the total number of assassinations of local politicians between 2001 and 2017. The dependent variable is the number of politicians assassinated in a municipality in a given year. The variables GDP per capita (logged), population size (logged), share of population living in urban areas, and share of black population come from Census 2010. I use homicide rates per 100,000 people (Ministry of Health's *SIM* mortality database). Political variables come from *TSE*. Data on assassinations are from the author's analysis, based on officially authorized cross-referencing of the *TSE*'s candidate databases and the Ministry of Health's *SIM* mortality database. Robust standard errors are clustered at the municipal level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

elections, as described in the first chapter of the dissertation. Therefore, a major challenge in the literature is measuring different forms of political violence systematically. To provide an empirical study of political assassinations, I used government data on homicides and political candidates in Brazil to map the universe of elected and unelected mayors and local councilors. I worked with the Ministry of Health in Brazil to access non-anonymized data, which enabled me to identify all executed local politicians in Brazil. I presented the results of this effort, shedding light on a neglected type of political violence. By quantifying the number of local politicians who are victims of violence, this chapter has shown the magnitude of the problem.

Using the original data, I revealed interesting patterns showing which politicians are more likely to be murdered and where assassinations are more likely to occur. Most politicians killed were men between 30 and 50 years old, with relatively low levels of education. Winning a mayoral election is positively associated with being executed. Political parties are in most cases not associated with more assassinations, except for the PT, which is negatively associated with murders in regression analyses.

Second, contrary to what might be assumed, assassinations are not more likely during electoral years. Third, they are dispersed geographically but are correlated with income and other demographic variables, such as GDP per capita, population size, share of black population, urbanization rate, and homicide rate. These findings provide important insights into the correlates of violence against politicians.

A fundamental takeaway from the findings in this chapter is that political assassinations cannot be easily explained by simply using the predictors of overall homicides identified in the academic literature. Indeed, to understand why assassinations occur, it is important to understand the actors involved and their incentives to murder.

The next chapter tackles this critical task by investigating how corruption often causes assassinations of local politicians. As is explored next, assassinations are often carried out by politicians as a way of appropriating rents and maintaining lucrative corruption schemes. Socioe-

conomic conditions that allow for more rent extraction are important determinants of political violence.

Chapter 3

The Political Economy of Assassinations

3.1 Introduction

In recent years, hundreds of mayors, city councilors, and candidates for these positions have been executed in Brazil, Mexico, Nigeria, South Africa and beyond. This study investigates how corruption — defined as the abuse of public office for private gain — is a key cause of assassinations of local politicians. Despite theoretical arguments that competitive democratic elections should decrease political violence by guaranteeing peaceful transitions of power (Powell 1994; Dahl 1971), politicians often face substantial violence in democracies. These assassinations are a threat to democratic elections — they directly impact representation and affect political stability (Iqbal and Zorn 2008) and institutions (Jones and Olken 2009). Although many studies have deepened our understanding about how and why violence is employed against citizens for political reasons (Straus and Taylor 2009; Hafner-Burton, Hyde, and Jablonski 2014; Birch, Daxecker, and Höglund 2020), violence against *politicians* has received far less attention. This article addresses this lacuna by exploring the causes of political assassinations.

While a few studies of political assassinations do exist (Iqbal and Zorn 2008; Jones and

Olken 2009; Perliger 2015; Blume 2017), they exclusively conduct cross-national analyses of assassinations of national leaders, and do not look at the local level at all. In many cases, such assassinations involve strategic ends, including the removal of dictators (Walzer 1974) and the promotion or prevention of political changes (Perliger 2015). Additionally, assassinations of national-level politicians are often used as a repressive tool to eliminate or deter regime enemies in dictatorships (Valentino, Huth, and Balch-Lindsay 2004) or to gather the support of elites (Esberg 2018). While this literature provides insights for the present study, they overwhelmingly focus on national-level politicians and ignore assassinations of local-level politicians. To understand what drives violence against local politicians, I take a micrologic approach to uncover the incentives to kill politicians when corrupt exchanges are at stake.

Why would a politician kill another politician? Politicians collude with other politicians to access resources associated with the administration of the political office. They make corrupt contracts that are illegal by definition (Boycko, Shleifer, and Vishny 1996) and, as a consequence, cannot be enforced (Rose-Ackerman 1999). Various mechanisms exist to make contracts enforceable such as reputation and social embeddedness (Lambsdorff 2002). When such mechanisms fail, politicians can also resort to violence and physical coercion to enforce their corrupt agreements. I argue that corrupt contracts affect assassinations through two channels. First, these corrupt contracts are vulnerable to "hold-up" (MacLeod and Malcolmson 1993; Chang 2013). In other words, a politician who has accepted a bribe from another politician to grant a public contract, for example, may still later choose not to fulfill the promise and renegotiate the terms of the agreement. Violence is a tool to address hold-up problems, reducing opportunistic defection and enforcing compliance. Second, violence is also used to discourage whistleblowing (Transparency International 2010). Given the illegality of corruption, insiders are often the only ones who can collect evidence and report wrongdoing. To prevent the disclosure of information and protect their corrupt schemes, politicians involved in corrupt contracts are willing to kill.

Assassinations are not the only form of physical punishment. However, it is the one we can observe and measure empirically. I build a novel dataset of all politicians executed in Brazil between 2001 and 2017. In order to identify all political assassinations in Brazil over twenty years, I cross-reference independent government databases of all 1.3 million candidates in recent elections with individual level candidate information and statistics on 10 million violent deaths reported in by the Health Ministry of Brazil. The matching reveals that a remarkable number of local politicians were murdered across Brazil: 2,241 mayors and local councilors were assassinated between 2001 and 2017. To the best of my knowledge, this is the most complete and detailed measure of local political assassinations to date. I complement this quantitative measure with qualitative evidence on a random sample of cases. Some of these cases are used to motivate the theoretical mechanisms. This exercise allows me to describe some of the reasons behind assassinations and the actors involved in these assassinations.

Although an active body of theoretical and empirical literature has investigated the interplay between political violence and corruption, establishing a causality has proven extremely difficult for several reasons. First, it is hard to measure corruption. Second, exogenous sources of variation in corruption are not trivial. I circumvent this obstacle by exploiting the randomized audits across municipalities in Brazil. These anti-corruption audits have been shown to have an effect in reducing corruption (Avis, Ferraz, and Finan 2018). I combine this with data on government revenues that increase opportunities for corruption (Brollo et al. 2013). Given the high cost of assassinations, I test if assassinations are more likely if more money is involved.

I show that political assassinations in audited municipalities, i.e. where corruption has been exogenously reduced, are 12 p.p. less likely than in non-audited municipalities. Moreover, consistent with theoretical predictions, the effects of anti-corruption audits are significantly greater in municipalities with higher revenues. My findings are inconsistent with alternative explanations such as electoral competition and state capacity leading to more assassinations and are robust to an alternative research design using different outcomes of violence.

This article contributes to the scholarship on conflict in democratic societies. While studies focused on political assassinations tend to analyze national-level politicians, some studies of criminal violence mention executions of local politicians by drug cartels, mafias, and other organized criminal groups. Whereas Trejo and Ley (2019) argue that cartels in Mexico use attacks on local politicians to establish their governance, Blume (2017) shows that assassinations of Mexican politicians are associated with electoral and criminal competition. In addition, Daniele and Dipoppa (2017) find that mafia attacks against Italian politicians occur in a three-month window after the elections, after a new government is elected. While gangs and criminal groups enable politicians to hire their services, a key contribution of this article is that, under some circumstances, the majority of political assassinations are not conducted by gangs but rather are driven by political actors. Stahlberg (2021) shows that, before 2010, most drug factions were concentrated in the South and Southeast regions of Brazil, mainly in Rio de Janeiro and São Paulo. Despite their expansion in the last years, these groups do not have territorial presence in the majority of municipalities and are concentrated in city capitals (Albarracín 2018; Batista dos Santos 2015; Zaluar and Barcellos 2013; Faria, Alves, and Ferreira 2014). Therefore, I explore factors that increase assassinations driven by local disputes not related to criminal governance or policy making.

In this study, I identify yet another negative effect of corruption, that has been largely unrecognized in the literature. Corruption has harmful consequences for economic growth and democracy (Mauro 1995; Rose-Ackerman 1999), affecting levels of investment (Mauro 1995), education (Mauro, 1998), foreign direct investment (Malesky et al, 2015), and the legitimacy of democratic government (Anderson and Tverdova, 2003; Selignson, 2006). Another consequence of corruption is larger governments with distortions related to tax and spending (Rose-Ackerman 1999). Besides creating a market for extortion and bribes, corruption can also generate violent outcomes when politicians kill to maintain the embezzlement of public resources and avoid investigations.

3.2 Theoretical Framework

Politics include a set of transactions that take place in markets where property rights are not well defined. Politicians make formal and informal contracts in part access private rents and corruption. In order to engage in corruption, politicians must often collude with other politicians. This collusion typically involves agreements to share illicit funds stemming from corrupt acts. Yet such informal contracts exist in the "shadow of the law" (Lambsdorff 2002), as by definition corruption is illegal (Boycko, Shleifer, and Vishny 1996). Therefore, contract enforcement institutions of the state cannot typically be used to enforce these illegal, corrupt transactions. As is commonly emphasized in the corruption literature, the illegality of corruption makes its contracts unenforceable in courts (Rose-Ackerman 1999). For instance, the collection of bribes is not a legal right that a court can protect or that the parties involved (e.g., the payer and payee of bribes) can legally enforce (Shleifer 1994). All in all, with corruption politicians cannot rely on third party enforcement by the courts and other formal contract enforcement institutions.

Various mechanisms are posited to deal with this challenge of enforceability within corruption, such as reputations, repeated interactions, social embeddedness, and "hostage" strategies.¹ First, having a track record of complying with agreed upon terms of corrupt transactions establishes a reputation and indicates to others that the individual can be trusted not to engage in opportunistic defection (Lambsdorff 2002). By contrast, politicians who renege on corrupt agreements may be replaced as partners or excluded from future collaborations (Shleifer, 1995; Lambsdorff, 2002). Second and relatedly, repeated interactions are also used as a deterrence against opportunism. They incentivize cooperation due to the threat of losing future opportunities to earn corrupt rents. Third, social embeddedness can be used to heighten compliance within corruption. In part by increasing the costs of being ostracized from one's community, social relationships often facilitate economic exchange (Granovetter, 1992) and provide safe-

1. For a more thorough list of possible mechanisms, see Lambsdorff (2002) and Vannucci (2015).

guards against defection and opportunism (Lambsdorff 2002). Yet another mechanism involves "hostage" strategies; for example, corrupt actors can give valuable assets as collateral within corrupt exchanges, which is then lost if they defect. In short, numerous mechanisms exist to mitigate opportunistic defection within corruption transactions, given the lack of third-party enforcement.

In addition to the mechanisms just discussed, in many contexts actors involved in corrupt transactions resort to violence and physical coercion (Shleifer 1994; Della Porta and Vannucci 2012). In such settings, when corrupt actors cannot easily enforce contracts through formal means, "the essence of enforcement power" is in the "ability to punish." (Barzel 2002, p. 38-39). While not all punishment involves physical violence (Dal Bó, Dal Bó, and Di Tella 2006), violence can often be an effective tool to enforce corrupt exchanges. For instance, corrupt actors can hire "hoodlums to discipline the bribee" (Bardhan 1997, p. 1324) – and as the present study emphasizes, even involves politicians killing politicians who renege on corrupt agreements. In some cases, politicians and other corrupt actors carry out physical violence themselves, and in others they rely on criminals who are specialists of violence and can carry out orders to execute defectors in order to deter opportunism (Lambsdorff 2000: 233; Shleifer 1995). Indeed, organized criminal groups enable corrupt politicians to "buy the resources of violence and intimidation needed to enforce their deals" (Della Porta and Vannucci 2012). When present, this role may be played by mafia groups and/or drug trafficking organizations. But a broader range of actors also play an intermediary role to sustain corrupt exchanges (Della Porta and Vannucci, 2012). For example, even in many Brazilian municipalities where such groups do not operate, violence is common amidst a high degree of impunity (Medeiros 1996), and politicians often hire intermediaries (commonly known as *Jagunços* or *pistoleiros*) to murder and harm foes on their behalf (Medeiros 1996; Hammond 2009; Ayoub 2016). In short, violence is often an important mechanism employed by politicians to mitigate opportunistic defection within corrupt agreements.

As an illustrative example from Brazil — the main focus on this dissertation — consider the case of Jones William (of the PMDB party). William was assassinated in 2017 while mayor of Tucuruí, Pará in Brazil's North region. The municipality of Tucuruí has Brazil's third largest hydroelectric power plant, which generates inflows of federal transfers to the municipality that are generally subject to substantial corruption (Brollo et al. 2013; Ferraz and Finan 2011). At the time of his murder, William was under investigation by the State Attorney's Office (Ministério Público do Pará) for corruption. In ongoing investigations, authorities suspect that William was executed because he did not comply with a corrupt agreement with his vice-mayor Arthur Brito, in which he was supposed to favor Brito's affiliated firm when procuring municipal government services. After William's assassination, Brito was appointed as mayor, and Brito's mother was arrested for contracting the gunman who executed William.²

To provide further insight about why politicians involved in corrupt deals are sometimes motivated to murder other politicians, consider how their informal contracts involving corruption are often subject to "hold-up" problems.³ Although more frequently discussed in terms of firms' specific investments, hold-up problems also loom large with corrupt transactions between politicians. That is, a politician who accepts a bribe from (or otherwise colludes with) another politician may later renege on his or her part of the bargain. As illustration, consider a stylized example. Politician A pays a bribe to Politician B to collude on rigging procurement procedures; a specific firm is to be chosen, which would then provide kickbacks to Politician A. But once A bribes B, B can demand an even larger bribe from A. A fundamental source of the problem is that the two politicians entered a corrupt agreement that cannot be enforced legally. One mechanism to address this hold-up problem is for A to threaten to impose physical violence – including

2. While each case has unique features, it is worth emphasizing that many vice-mayors dispute the mayoral office after their mandates, and some replace them after a mayor's death. Brazil's penal code identifies the "intention to occupy the position of the victim" as an explicit motive for murder (Lenza and Gonçalves 2021).

3. For the classic treatment of hold-up problems, see Williamson (1985). In the world of firms, it happens when a contract between firms is agreed upon, one of the firms makes an investment or a sell, and the other firm wants to renegotiate the contract. Given the prior commitment, the firm can "hold up" the other firm for the value of the commitment.

but by no means limited to murder – on B. The specter of physical punishment helps to induce compliance and thus alleviates the hold-up problem, because it is a costly punishment – one that in contexts with impunity is viable. In particular, the fear of execution would be expected to induce compliance in such contexts. To be clear, physical punishment is by no means the only way to resolve such problems — and as discussed extensively below, political assassinations are a particularly costly form of violence. Yet in Brazil and beyond, politicians often commit murder in their attempts to mitigate opportunistic defection in their corrupt dealings with other politicians.

In addition to serving as a mechanism to reduce opportunistic defection in corruption, political assassinations are also used to prevent whistleblowing. Corrupt contracts are often at risk of whistleblowing, and one politician can provide authorities with incriminating evidence about another politician. Indeed, given the secrecy of corruption, insiders are often the only ones who can report wrongdoing (Transparency International 2010). Whistleblowing poses a threat to politicians involved in corruption, who thereby use violence against whistleblowers (Fisman and Miguel, 2010). As with hold-up problems, physical punishment is by no means the only way to discourage whistleblowing about corrupt contracts — and again, political assassinations are an especially costly form of violence. But in Brazil and elsewhere, politicians often engage in executions in order to prevent the disclosure of damaging information in their corrupt dealings with other politicians. One indication of this reason for assassinations is the timing of murders; in some cases, they happen just before the politician will testify or disclose information about the misconduct. As one example, Acre’s governor Edmundo Pinto was killed the day before testifying at the Parliamentary Commission of Inquiry (Comissão Parlamentar de Inquérito, or CPI) investigating potential corruption and other irregularities with pensions. Delving more deeply into an example at the municipal level — the focus of the dissertation — the murder of city councilor Fernando José da Costa (PP) in 2010 is an example of a political assassination to prevent whistleblowing. Also in Acre state, da Costa was allied with the mayor of Acrelândia,

Carlos Araujo (PSB), since the 2008 municipal election. Da Costa was being investigated for corruption by the state's Public Prosecutor's Office, and he began to accuse the mayor of corruption involving budgets allocated to education and health. For example, he accused the mayor of overbudgeting public construction so that he could collect kickbacks. Da Costa, collected evidence of the mayor's crimes, and was scheduled to present it to the local council on May 3, 2010 (at which time he would ask the council to open an investigatory committee. On May 1, 2010, two days before speaking on the council floor, da Costa was assassinated when leaving his house. The mayor he was about to denounce, Carlos Araujo was later convicted to 18 years in prison (and restitution of R\$15,000, or about US\$3,000) to da Costa's family. Overall, these examples illustrate that politicians involved in corruption may kill other politicians in order to prevent the disclosure of damaging information.

This theoretical discussion provides important insights informing my empirical investigation of political assassinations. Because corruption involves informal contracts that are not enforceable by the state, politicians may kill other politicians with whom they have corrupt agreements. And to avoid the risk of prosecution, corrupt politicians may kill other politicians who they fear will engage in whistleblowing. This logic suggests the following hypothesis:

Hypothesis 1. *Political assassinations are more prevalent in contexts with high corruption.*

Of course, political assassinations are costly, so it is not the exclusive mode of violence that politicians would employ to enforce corrupt contracts. Violence includes an extensive repertoire ranging from mild physical intimidation to gruesome assassinations. In many cases, assassinations may be carried out as a last resort when less expensive forms of violence fail. Assassinations tend to be a more costly form of punishment than other forms of physical coercion as it attracts disproportionate attention (Trejo and Ley, 2018). In addition, punishment for murder tends to be especially severe, even resulting in capital punishment in some countries. Consequently, the costs of using assassinations as a form of enforcement are higher than other types of violence.

Notwithstanding its high cost, assassinations are a particularly effective form of physical violence. The willingness of politicians to incur the high cost of assassinations to enforce corrupt agreements depends on how much money is at stake. If corrupt deals involve a small modicum of money, politicians are unlikely to murder their counterparts. But if massive sums are involved, political assassinations are more likely to be deemed a worthwhile form of punishment. Various studies suggest that corruption involves greater resources as the size of government increases. The resource curse literature provides evidence that a windfall of resources leads to heightened corruption (Ross 2015). Within countries, exogenous increases in municipal revenues are associated with more corruption in Brazil (Brollo et al. 2013) and Bulgaria (Nikolova and Marinov 2017). By extension, given the high cost of assassinations, politicians are likely to find corruption contracts worth killing over when governments are larger. This leads to the following hypothesis:

Hypothesis 2. *The effect of corruption on assassinations is stronger in contexts with large governments.*

The present study tests these two hypotheses, employing a novel dataset of political assassinations and exogenous variation in corruption from randomized anti-corruption audits. Before turning to those tests, I first discuss the institutional environment and data sources.

3.3 Institutional Background

3.3.1 Violence in Brazil

As presented and discussed in the first two chapters of this dissertation, Latin America is the most violent region in the world. Brazil is one of the countries at the top of the rank with a homicide rate of 30.5 per 100,000 in 2017 — for comparison, the homicide rate in South America is 24.2 and in Mexico is 29 per 100,000 population (UNODC 2019). Part of this

violence is associated with gangs and organized crime. Despite being an important fuel for conflict, gang violence is not the only factor determining the high levels of violence. Other factors such as high inequality, low incarceration rates, and small police forces play important roles (Soares and Naritomi 2010). Different types of violence are related to multiple causes. Overall, we still lack systematic evidence and comprehensive studies of the causes of different types of violence. In terms of political violence, the evidence is even more scant.

To the best of my knowledge, this is the first article to systematically collect data on violence against politicians in Brazil over time.⁴ Violence against social leaders, such as environmentalists, social activists, and indigenous leaders, is documented by the *Comissao Pastoral da Terra*. In their 2019 report, they showed that rural violence has increased reaching to 32 killings of indigenous, landless, settlers and agrarian leaders in 2019 (Canuto et al. 2019). Violence against politicians has recently received attention in Brazil, especially after the brutal assassination of Marielle Franco, a local councilor in Rio de Janeiro. As I show in this dissertation, her assassination is one in more than two thousand killings that happened in the last two decades.

3.3.2 Local Politics at Brazilian Municipalities

Brazil offers an opportunity to understand the drivers of violence against politicians. Brazil is a federal state composed of 26 states and a federal district, further subdivided into 5,570 municipalities. Municipal governments are composed of mayoral office (elected mayor) and elected legislative bodies, that have at least nine local councilors.⁵ Mayors in most municipalities are elected by a plurality system⁶ and local councilors by proportional representation. Municipal elections in Brazil take place every four years, two years after national elections.

4. Borba et al. 2022 collected cases of political violence during the 2020 Elections by following several media channels.

5. The number of local councilors vary according to the size of the population.

6. In municipalities with more than 200,000 voters, if none of the candidates reach absolute majority, there is a runoff between the top two candidates.

The municipal government has extensive power over policy and budget allocation. They are responsible mainly for public services related to basic education, health, infrastructure, public transportation, and land use, creating many opportunities for corruption. Corruption in Brazil occurs through a combination of fraud in the procurement of goods and services, diversion of funds, and over-invoicing of goods and services (Ferraz and Finan, 2011). With only minimal federal oversight accompanying these transfers and state capture by local oligarchies, corruption at the subnational level is very common. Previous studies have shown that corruption tends to be more prevalent in Brazilian municipalities that receive more federal transfers or where the local media and the judiciary are absent (Brollo et al. 2013; Zamboni and Litschig 2018).

Regarding the state capacity at the local level, the two main institutions analyzed are the police (law-enforcement) and local courts (criminal justice system). Although municipalities can decide whether or not to have policing units (known as municipal guards), most policing and law enforcement are provided by the state government (Ricardo e Caruso, 2007). Police stations are located in large cities and some municipalities. With respect to judicial institutions, there is also variation. Some municipalities are the headquarters of *comarcas*, i.e. the territory in which a judge exercises his jurisdiction. *Comarcas* are equivalent to judicial districts and can cover one or more municipalities. Most judicial districts are not responsible for criminal justice and less than 15% of them have competence to judge criminal cases (Conselho Nacional de Justiça 2020). Therefore, most cases after the police investigations go to the state's Prosecutor Office (*Ministerio Publico Estadual* and, later, sent to state courts (*Tribunais Estaduais*).

3.4 Data

3.4.1 Dependent Variable: Political Assassinations

Definition

This chapter focuses on murders of local politicians. In the context of Brazil, local politicians include all elected and unelected candidates for the offices of mayor and city council (i.e., the executive and legislative branches of municipal government).⁷

Murders of individuals closely associated with politicians, such as family members and campaign staff, are not included as they are not public figures, following several prominent studies (e.g., Kasher and Yadlin 2007). Some murders of politicians involve personal vendettas or other causes, but given the empirical difficulty of categorizing assassinations according to motive, I follow other studies examining all murders of politicians (e.g., Rowlette Jr. 2001 and O'Brien 2001). While recognizing that politicians may be murdered for various reasons, the present study defines assassinations by focusing on who is executed (i.e., local politicians), rather than focusing on why they are executed. This approach greatly facilitates quantitative analysis.

Measurement

This study advances the literature on political violence by producing new data on violence against politicians. Many studies use newspaper data to measure deadly attacks against politicians. For instance, Daniele and Dipoppa (2017) and Alesina, Piccolo, and Pinotti (2019) use data from newspapers to study violence against Italian politicians. Trejo and Ley (2019) and Blume (2017) look at assassinations in Mexico drawing from a systematic review of Mexican newspapers. In Brazil, a reputable journalist from a major newspaper in Brazil collected

7. I provide a typology of the term in Chapter 1 and define the term in greater detail in Chapter 2.

information about assassinations around Brazil (Nossa 2013).⁸ However, biased media coverage and serious systematic measurement error are major concerns emphasized by academic studies about a broad range of topics (DellaVigna and Kaplan 2007; Di Tella and Franceschelli 2011; Von Borzyskowski and Wahman 2019). For example, many newspapers in Brazil are believed to have a political bias that might influence coverage (Miguel 1999; Schudson 2002). Additionally, small or poor municipalities are unlikely to have assassinations covered by newspapers. As such, my novel approach to identify assassinations allows us to avoid such sources of bias.

Instead of relying on media sources, I construct an innovative dataset stemming from official statistics on deaths in Brazil. I obtained rarely granted access to individual-level information from the Ministry of Health, and linked homicides in that dataset to information about all Brazilians who have run for political office. The Ministry of Health's Mortality Information System (SIM) provides individual-level data about every death in Brazil. For example, it includes the date of deaths, the municipality where deaths occurred, the municipality where the deceased resided, and a doctor's evaluation about the cause of death (including whether it was by homicide, suicide, or natural causes). Until 2001, the dataset did not capture names, precluding the identification of politicians among Brazilian murder victims. Fortunately, in 2001, the ministry began to capture the name of the deceased in these records, without releasing these data publicly. I link these data with records from the Superior Electoral Court, which records and publicly provides information about every political candidate, including personal characteristics (such as name, date of birth, gender) and political information (such as party affiliation, whether they were elected in a given election, and votes received).⁹

Linking these two datasets — which no prior study has done — identifies over seven times as many political assassinations as past estimates based on media reports. My novel dataset identifies 2,241 murders of local politicians between 2001 and 2017. That is, 149 of every

8. With a broad definition of assassinations, Nossa considered the motive as the main characterization of a political assassination. Therefore, he included cases of staff and family members killed in order to pressure politicians.

9. I was granted rarely access to the Ministry of Health data. I worked with an official to merge the datasets in the ministry's server.

100,000 local politicians were murdered during this period. By contrast, the murder rate in Brazil is 30 of every 100,000 citizens according to the UNODC.

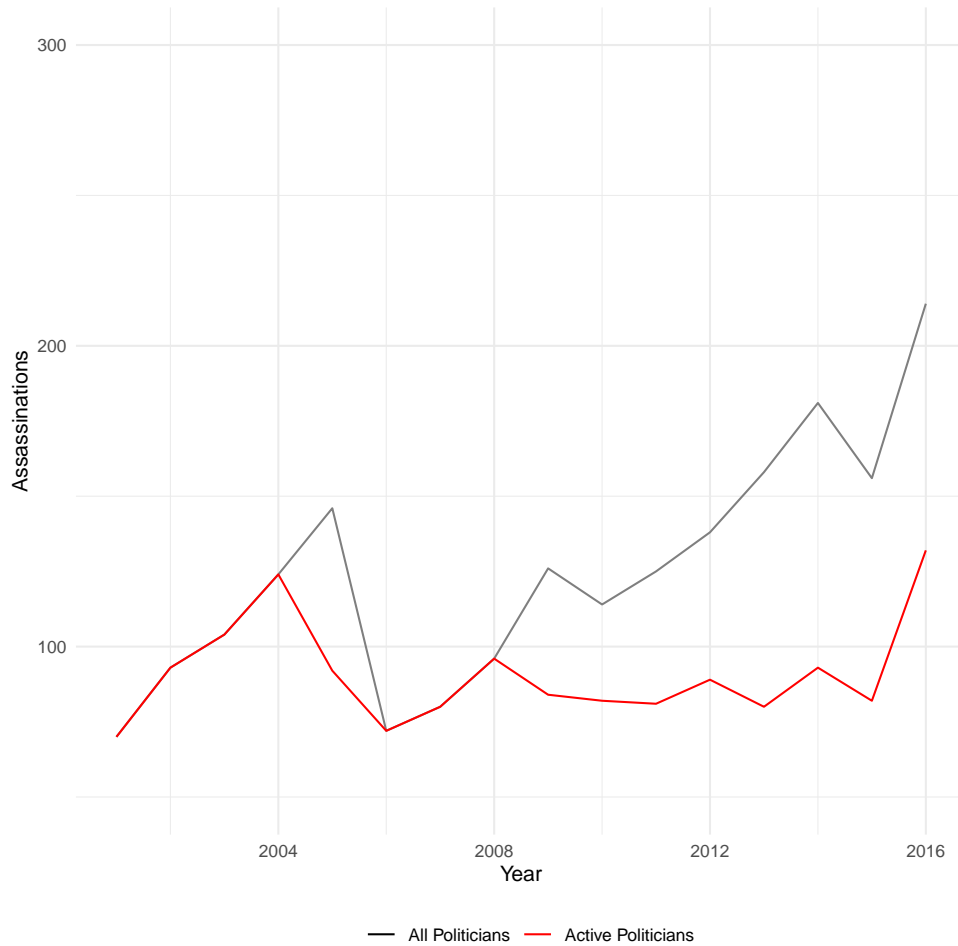
In Chapter 2 of the dissertation, I presented descriptive statistics on assassinations of local politicians. Figure 3.1 shows the yearly variation in the number of assassinations considering the two measures of political assassinations: (1) all politicians who ran for office at some point, and (2) only politicians who ran for office in the last electoral cycle. When I restrict the sample for only Active Politicians, the upward movement in the number of assassinations almost disappear. The red line shows that after the peak in 2004, when 124 assassinations occurred, the number stayed between 80 and 96. In 2016, assassinations started to rise again reaching 132 deaths.

3.4.2 Independent variables

Corruption and The Randomized Audit Program

This paper analyses the impact of corruption shocks on assassinations. To test the hypothesis that corruption increases the likelihood of violence against local politicians, I obtain data on anti-corruption audits in Brazil. These audits offer an exogenous shock to corruption allowing to measure the causal impact on violence against politicians.

Given that quantitative measures of corruption are restricted, I use anti-corruption crackdown on municipal governments from 2003 to 2016. In 2003 the federal government in Brazil created an anti-corruption program targeted at municipal governments. The program, which was conducted by the Office of the Controller General (*Controladoria Geral da Uniao*, CGU), consists of random audits of municipalities for their use of federal funds. The CGU is mainly responsible for evaluating the execution and effectiveness of government programs and considered to be the main anti-corruption body in Brazil. The randomized audit program focused on investigating the misuse by municipalities of public funds.



Note: The figure illustrates the number of assassinations of local politicians between 2001 and 2016. Data on assassinations are from the author’s analysis, based on officially authorized cross-referencing of the *TSE*’s candidate databases and the Ministry of Health’s *SIM* mortality database. The black line indicates assassinations using the full sample of assassinations and the red line indicates only assassinations of active politicians, that is, politicians murdered within four years of running for office.

Figure 3.1: Assassinations over Time

The municipalities are randomly selected, with replacement, in a lottery held publicly in Brasilia. Municipalities with more than 500,000 inhabitants or state capitals are not eligible.¹⁰ As of February 2015, there have been 2,205 audits across 40 lotteries in 1,949 municipalities and over R\$22 billion worth of federal funds audited (see Figure 6.1 in Appendix B).

The audit process starts immediately after the lottery, with the CGU gathering information on all federal funds transferred to the municipal government and issuing a random selection of inspection orders. The state offices are then in charge of sending a team of auditors to the selected municipalities within days of the lottery. The audits investigate how the federal transfers from the central government to the municipality are spent, focusing mostly on the previous 3-4 years. Auditors spend a few weeks in the municipality during which they collect receipts, analyze relevant documents, interview local bureaucrats and other relevant parties, and report the quality of public service delivery. Everything is documented in a final report following CGU instructions and publicly available.

The audits may have severe legal consequences. Following the data collection and auditing phases, the CGU discusses the findings with the Ministries responsible for the transfers with irregularities at the municipality. It also reviews the material with the state and federal prosecutors, who decide to open investigations. They analyze the relevant irregularities and decide to apply enforcement activity. All this process can take up to three years, including the visit of federal police and prosecutors. The most immediate consequence of the audits is the suspension of public officials and the loss of mandate by elected politicians. The CGU reports can also affect the next elections (Ferraz and Finan, 2008) and future levels of corruption (Avis et al., 2018). Avis, Ferraz, and Finan (2018) find supporting evidence that the audits reduce corruption through legal discipline. There is no evidence in Brazil of electoral discipline or selection effects.

10. In the beginning, only municipalities with less than 100,000 inhabitants were eligible, but the threshold increased to 300,000 soon after the launch, and then 500,000 for the remaining years. It includes almost all Brazilian municipalities

Figure 3.3 shows the difference in the number of detected corruption irregularities between municipalities that had an assassination and municipalities without any assassination. The variance in bar sizes is because there are fewer municipalities with assassinations that were audited. The distribution for municipalities with assassinations is slightly skewed to the right compared to municipalities without assassinations which indicates that there is evidence of corruption in municipalities where politicians were assassinated.

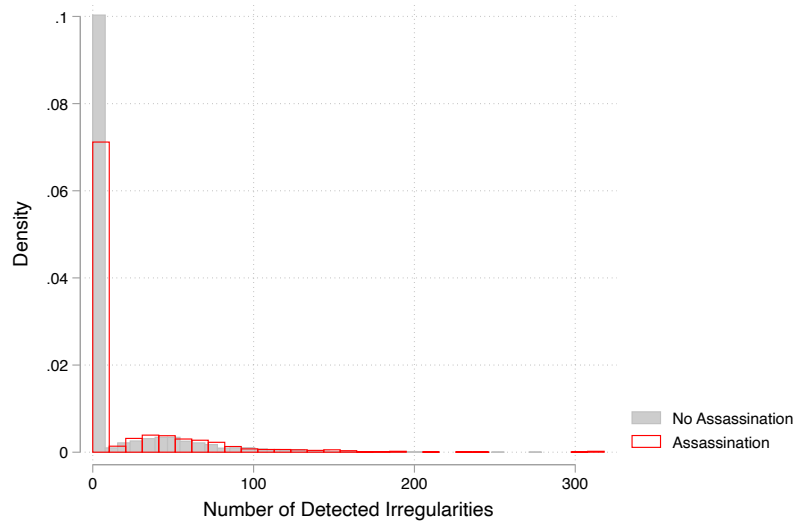


Figure 3.2: Detected Irregularities and Assassinations

Federal Transfers to Municipal Governments

To test Hypothesis 2 — that greater resources amplify the effect of corruption on political assassinations — I collected data on federal transfers to municipalities from the Brazil’s National Treasury. These transfers are the most important source of municipal revenues in Brazil, while local taxes represent a very small percent of total revenues. Municipal government must spend one third of the transfers on education and health care, which are the sectors in which almost 78 percent of the corruption occurs Avis, Ferraz, and Finan 2018.

The Brazilian Constitution of 1988 was written based on two elements: popular partic-

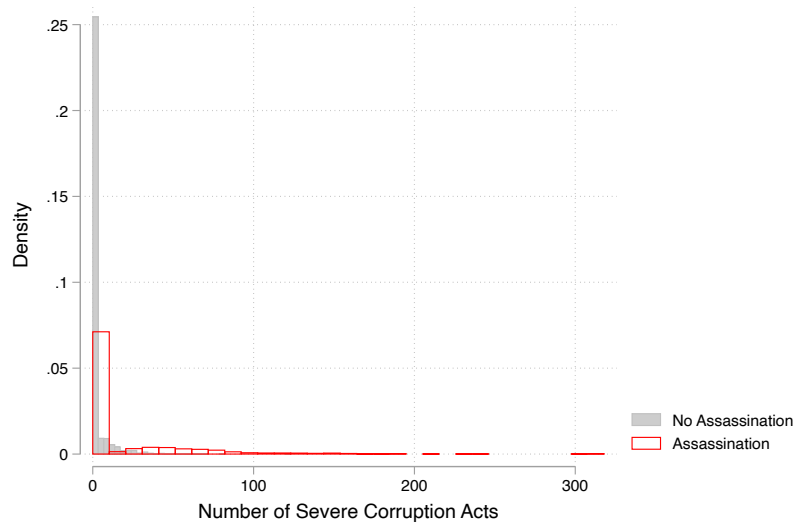


Figure 3.3: Severe Acts of Corruption and Assassinations

ipation and decentralization (C. Souza 2001), which gave municipalities extensive powers over policy and decreased the role of states in expenditures. The resources of municipalities come from (1) local revenues, such as residential property taxes (IPTU) and service taxes (ISS), and (2) transfers from federal, state, and municipal transfers. Municipalities have a limited ability to raise taxes, with most municipalities heavily depending on federal transfers.

Each year, municipalities receive millions of dollars from the federal government to provide basic public services such as primary education, health care, and sanitation. An elected mayor decides how to allocate these resources in conjunction with its locally elected legislative body. With only minimal federal oversight accompanying these transfers, corruption at the local level is a serious concern.

Figure 3.4 shows the distribution of federal transfers in municipalities that had an assassination and municipalities without any assassination of politicians between 2001 and 2017. The distribution for municipalities with assassinations is skewed to the right, indicating that there is a possible correlation between the amount of resources received by the municipal government and violence against local politicians.

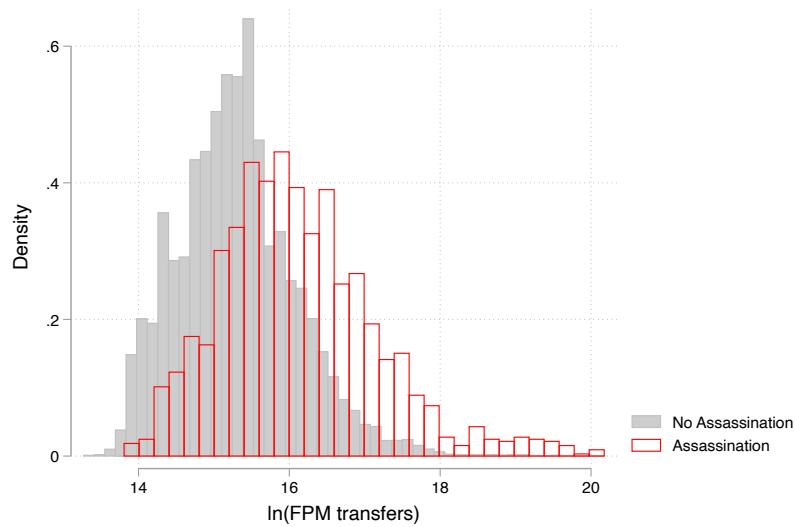


Figure 3.4: Federal Transfers and Assassinations

3.5 Research Design

In this section, I illustrate the research design that relies on the randomization of anti-corruption audits across municipalities in Brazil. The key identification concern is that unobserved confounding factors may be correlated with both corruption and assassinations. For example, higher levels of poverty may lead to worse political institutions that allow for more bribes and violence among government officials.

Since we cannot directly measure corruption in municipalities over time — given that only a few municipalities are selected per year to be audited — I focus on the impact of corruption audits. Previous work have shown that anti-corruption audits are effective in reducing corruption (Avis, Ferraz, and Finan 2018). In other words, I estimate the reduced-form impact of audits on assassination of local politicians.

The main identifying assumption is that the timing of the audit is uncorrelated with municipal outcomes that are correlated with political violence. Previous work has established the validity of the audits’ randomization (Ferraz and Finan, 2008; Ferraz and Finan, 2011; Zam-

boni and Litschig, 2018; Colonnelli and Prem, 2021). I also test this in the data. Table 6.6 in Appendix B shows the results of cross-sectional regressions where the dependent variable, an indicator of whether the municipality was audited between 2003 and 2015 is regressed on state fixed effects and a set of local economic and demographic characteristics. The results show that municipalities are similar based on observable characteristics to never-audited municipalities. This suggests that randomization was successful.

The main dependent variable is political assassinations — I use both extensive and intensive margins. I estimate the models below for two samples of assassinations. One considers all the politicians who ran for office in any election in the time frame. The other is a more restricted sample of assassinations that consider only assassinations of politicians who ran for office in the last electoral cycle (active politicians).

The design of the program therefore lends itself to a municipality-level event-study estimation method. I have a set of treated (at different points in time) and never-treated municipalities. Then, I can compare violence in municipalities that were audited to those never audited. Given the structure of the data, I estimate the following parametric model for municipality i audited in year t .

$$Assass_{it} = \alpha + \beta PostAudit_{it} + Z_i' \gamma + \eta_s + \mu_t + \varepsilon_{s,t} \quad (3.1)$$

where $Assass_{it}$ is an indicator whether an assassination occurred at municipality i during year t , and $PostAudit_{it}$ is an indicator variable taking value 1 for all years after the audit in the audited municipality i , and 0 otherwise. The vector Z_i' consists of a set of municipal characteristics (e.g., population, income per capita, income inequality) measured in 2000 and 2010. These controls allow us to account for any socioeconomic differences across municipalities. The parameter of interest is β , which measures the change in assassinations of the audited municipalities compared to the never audited municipalities, conditional on a set of municipal controls, state and year fixed effects.

My sample consists of municipalities that were treated between 2003 and 2015. Since, municipalities are not treated at the same time, I follow the recent literature on difference-in-differences, and calculate "heterogeneity-robust" estimators for staggered treatment timing. I use the Sun and Abraham (2020) estimator to consider cohort-specific average treatment effects. I estimate the following non-parametric event-study model:

$$Assass_{it} = \alpha_i + \alpha_t + \sum_{y=-4}^{-2} \eta_y D_{i,t}^y + \sum_{y=0}^5 \beta_y D_{i,t}^y + \varepsilon_{i,t} \quad (3.2)$$

Here, α_i is a municipality fixed effect, α_t is a year fixed effect, and $D_{i,t}^y$ is an indicator variable taking the value of 1 if it is year y relative to the audit announcement year in municipality i . This indicator variable is always 0 for the eligible but never audited municipalities. I normalize $\eta_{-1} = 0$ so all other coefficients of η_y and β_y represent differences in outcomes relative to the year that the municipality was selected to be audited.

To test hypotheses that the the size of the government amplify the effects of corruption on assassinations, I use the data on federal transfers to municipalities from the Brazil's National Treasury. I estimate the same parametric event-study model presented in equation 3.1 but adding the amount of resources transferred to municipalities:

$$Assass_{it} = \alpha + \rho Transfers_{it} + \phi PostAudit_{it} + \beta PostAudit_{it} \times Transfers_{it} + Z_i' \gamma + \eta_s + \mu_t + \varepsilon_{s,t} \quad (3.3)$$

in which where $Assass_{it}$ is an indicator whether an assassination occurred at municipality i during year t , and $Transfers_{it}$ is the log of the amount of federal transfers received by municipality i in year t . The vector Z_i' consists of a set of municipal characteristics (e.g., population, income per capita, income inequality) measured in 2000 and 2010.

3.6 Results

In this section, I test the main predictions of my theoretical framework. I use two main classifications of my dependent variable: assassinations that happened in a given municipality-year irrespectively of when the politicians were elected (*All Politicians*) and assassination of politicians that were elected or ran for office in the last election cycle before his death (*Active Politicians*).

3.6.1 Anti-corruption Audits and Assassinations

This section employs the empirical strategy to test the two hypotheses from the theoretical framework elaborated above. The first hypothesis suggests that assassinations are more likely in municipalities with greater corruption. As described above, to test this hypothesis, I examine the impact of random anti-corruption audits that have been rigorously shown to endogenously reduce corruption (Avis, Ferraz, and Finan 2018).

Table 3.1 reports the effect of audits on political assassinations. Consistent with H1, the ATE is significant and negative across all specifications. Column 1 shows that assassinations are 0.3 percentage points less likely in municipalities with an anti-corruption audit, relative to the control group without audits. This effect is not only significant at the 1% level, but is also substantially large as it represents an 13.5 percent decrease.¹¹ Column 2 examines the extensive margin, and finds similar results. The ATE is .005 fewer assassinations (significant at the 1% level). In proportional terms, anti-corruption audits cause a 12.6 percent decrease in the number of political assassinations.¹² This effect suggests that audits caused a decrease of 6 murders of politicians between 2003 and 2015, from a base of fifty assassinations in control municipalities. Columns 3 and 4 are analogous to the specifications just discussed, but focus only on the

11. On average, 24 percent of unaudited municipalities have experienced political assassinations.

12. On average, unaudited municipalities experienced 0.02 political assassinations per year.

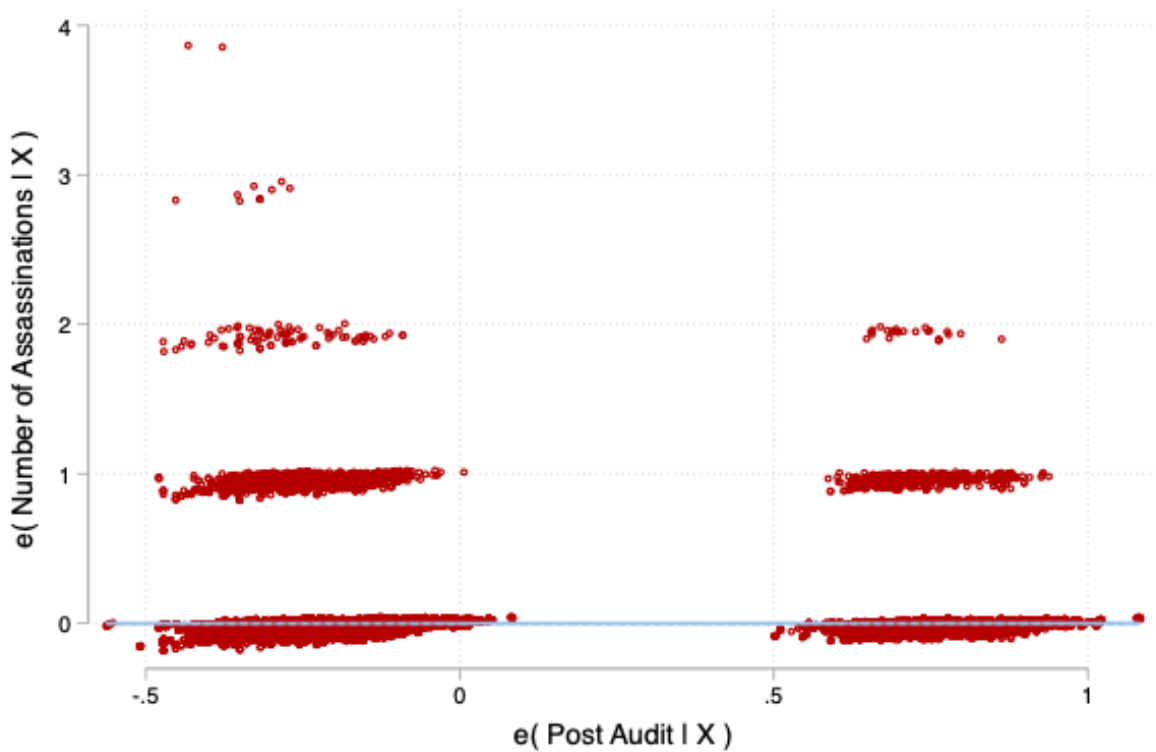
murders of active politicians. More specifically, the dependent variable is coded as 1 only if the municipality experienced an assassination that year of an individual who had run for mayor or city councilor in the last election (i.e., in the past four years). Results are significant and similar in magnitude, as expected if executions of politicians stem from their recent involvement in corruption. Overall, findings in Table 1 provide causal evidence corroborating H1: a decrease in corruption reduces political assassinations.

As visualize results, consider the added variable plot in Figure 3.5, which nets out the possible effects of other explanatory variables. Audited municipalities, which are on the right, have considerably fewer assassinations – and never experienced more than two assassinations in a given year.

Table 3.1: Corruption Audits and Assassinations

	All Politicians		Active Politicians	
	Any Assassination	Assassination	Any Assassination	Assassination
Post Audit	-0.003*** (0.001)	-0.005*** (0.001)	-0.003** (0.001)	-0.003*** (0.001)
Observations	77,498	77,498	77,498	77,498
State FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Municipal Controls	✓	✓	✓	✓
Mean Dependent Var	0.0222	0.0236	0.0159	0.0166
Mean: Audited Municipalities	0.0221	0.0230	0.0157	0.0162
Mean: Unaudited Municipalities	0.0223	0.0239	0.0161	0.0168

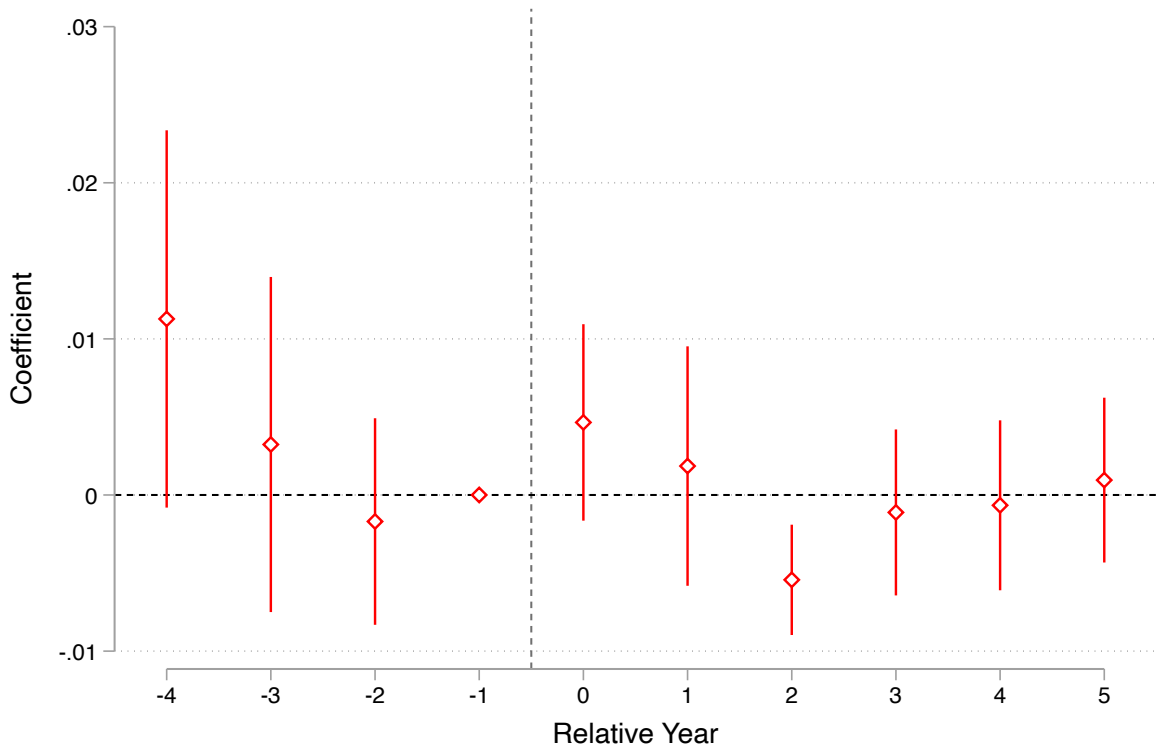
Notes: This table illustrates the main effects of audits on assassinations of politicians. The table reports the coefficients obtained from the estimation of equation 1. The sample includes all municipalities between 2003 and 2016. Post Audit is an indicator variable taking 1 for all years after the audit in the audited municipality. Post Audit is always zero for never treated municipalities. Columns 1 and 2 use the full sample of politicians assassinated. Columns 3 and 4 consider active politicians only, i.e. ran in the last electoral cycle before the assassinations. Any assassination is a dummy indicating if a assassination occurred in a municipality-year. Assassination is total number of assassinations in a municipality-year. All specifications include year and state fixed effects. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.



Notes: The figure reports the added variable plot of audits on assassinations. It displays the residuals from the original regression. The plot partials out the effect of other predictors. On the x-axis we have audits after other predictors are accounted for and on the y-axis we have assassinations after other predictors are accounted for.

Figure 3.5: Added Value Plot: Corruption Audits and Assassinations

I also present the results from specification 3.2. Figure 3.6 shows that the coefficients for the period before the audit event are not statistically different from zero. I normalize η_{-1} to zero. All the coefficients are statistically insignificant except for $t = 2$, where I find a significant effect of corruption shocks caused by audits on assassinations. The coefficient -0.006 indicates that assassinations decrease two years after treatment. This is coherent with the timing of the audits. The lottery happened in year 0, while police crackdowns can occur two years after that, affecting politicians' ability to engage in corruption.



Notes: This figure reports the dynamic coefficients obtained from the estimation of equation 3.2 together with 95% confidence intervals. The sample includes all municipalities between 2003 and 2016.

Figure 3.6: Relationship between Audits and Assassinations

3.6.2 The Effect of Larger Governments

Now consider H2, which suggests that corruption increases assassinations more in municipalities with larger governments. To test this prediction, Table 3.2 adapts the specifications above to examine whether audits' effects are amplified in municipalities receiving more federal transfers. Recall that in Brazilian municipalities with populations under 500,000 citizens (i.e., those eligible for audits), federal transfers account for the majority of the budget. In particular, analyses in Table 3.2 focus on the federal transfers through the FPM program discussed above, which are automatically allocated based on population thresholds.¹³ First, Column 1 shows that a 10% increase in FPM transfers is associated with a 2.8 percentage point increase in assassinations. Columns 3, 5, and 7 show findings are comparable when using all dependent variables analyzed in Table 1: i.e., when investigating the intensive and extensive margin for both active and all politicians.

In line with H2, the coefficient β in Column 4 indicates that the negative effect of audits on assassinations is greater in municipalities with larger budgets from federal transfers. This interaction term is significant at the 1% level. As shown in Columns 6 and 8, this effect is consistent across different specifications of the dependent variable. Overall, this evidence lends support to H2.

13. As a further test of the effect of transfers on assassinations, I investigated the possibility of using population discontinuities of FPM transfers (see Brollo et al. (2013)). However, this approach is suboptimal for this application, there is very low variation in the dependent variable when focusing on municipalities close to such discontinuities. Indeed, only 21 municipalities had assassinations in suggested bandwidths. Unsurprisingly, RDD analyses yield null results.

Table 3.2: The Effects of Federal Transfers on Assassinations

	All Politicians			Active Politicians		
	Any Assassination	Assassinations	Any Assassination	Any Assassination	Assassinations	Assassinations
FPM transfers (log)	0.028*** (0.004)	0.036*** (0.005)	0.040*** (0.005)	0.023*** (0.003)	0.025*** (0.004)	0.028*** (0.004)
Post Audit	0.162*** (0.040)	0.241*** (0.049)	0.241*** (0.049)	0.138*** (0.035)	0.138*** (0.035)	0.174*** (0.039)
Post Audit x FPM transfers (log)	-0.011*** (0.003)	-0.016*** (0.003)	-0.016*** (0.003)	-0.009*** (0.002)	-0.009*** (0.002)	-0.011*** (0.003)
Observations	70,584	70,584	70,584	70,584	70,584	70,584
State FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Municipal Controls	✓	✓	✓	✓	✓	✓
Mean Dependent Var	0.0210	0.0210	0.0224	0.0154	0.0154	0.0160
Mean: Audited Municipalities	0.0207	0.0207	0.0215	0.0150	0.0150	0.0154
Mean: Unaudited Municipalities	0.0212	0.0212	0.0228	0.0156	0.0156	0.0164

Notes: This table illustrates the main effects of resources on assassinations of politicians. The table reports the coefficients obtained from the estimation of equation 4. The sample includes all municipalities between 2003 and 2016. FPM transfer is the log of total FPM transfers received by a municipality. Post Audit is an indicator variable taking 1 for all years after the audit in the audited municipality. Post Audit is always zero for never treated municipalities. Columns 1-4 use the full sample of politicians assassinated. Columns 5-8 consider active politicians only, i.e. ran in the last electoral cycle before the assassinations. Any assassination is a dummy indicating if a assassination occurred in a municipality-year. Assassination is total number of assassinations in a municipality-year. All specifications include year and state fixed effects. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

To clarify the substantive effects, Figure 3.7 shows audits' effects from this specification across different levels of federal transfers. The plot clearly shows that with increasing federal transfers, the magnitude of the coefficient of corruption audits on assassinations increases — in other words, the negative effect increases. The plot also shows the distribution of municipalities according to their levels of received transfers.

In the top quartile of FPM transfers, an audit reduces a municipality's probability of experiencing a political assassination in a given year by 2.66 percentage points (the mean log of federal transfers is 17.63). By contrast, in the bottom quartile of FPM transfers, this effect is only 2.14 percentage points (the mean log of federal transfers is 14.23). Table 3.2 shows that results are comparable when using all dependent variables analyzed in Table 3.1: that is, when examining both the intensive and extensive margin for active as well as all politicians. These findings provide support for H2, as they indicate that a decrease in corruption especially reduces political assassinations when the government is large.

In sum, my findings corroborate all two hypotheses elaborated in Section 2. Analyses of randomized anti-corruption audits — which exogenously reduce subsequent corruption — yield important novel findings about several determinants of assassinations. Corruption increases political assassinations, especially in municipalities with larger governments.

3.7 Alternative Explanations

The present study argues that corruption is an important determinant of political assassinations. While analyses above employ audits that have been shown to exogenously reduce corruption, it is important to investigate several potential alternative explanations. Analyses below investigate three such explanations, involving broader homicides, state capacity and electoral competition.

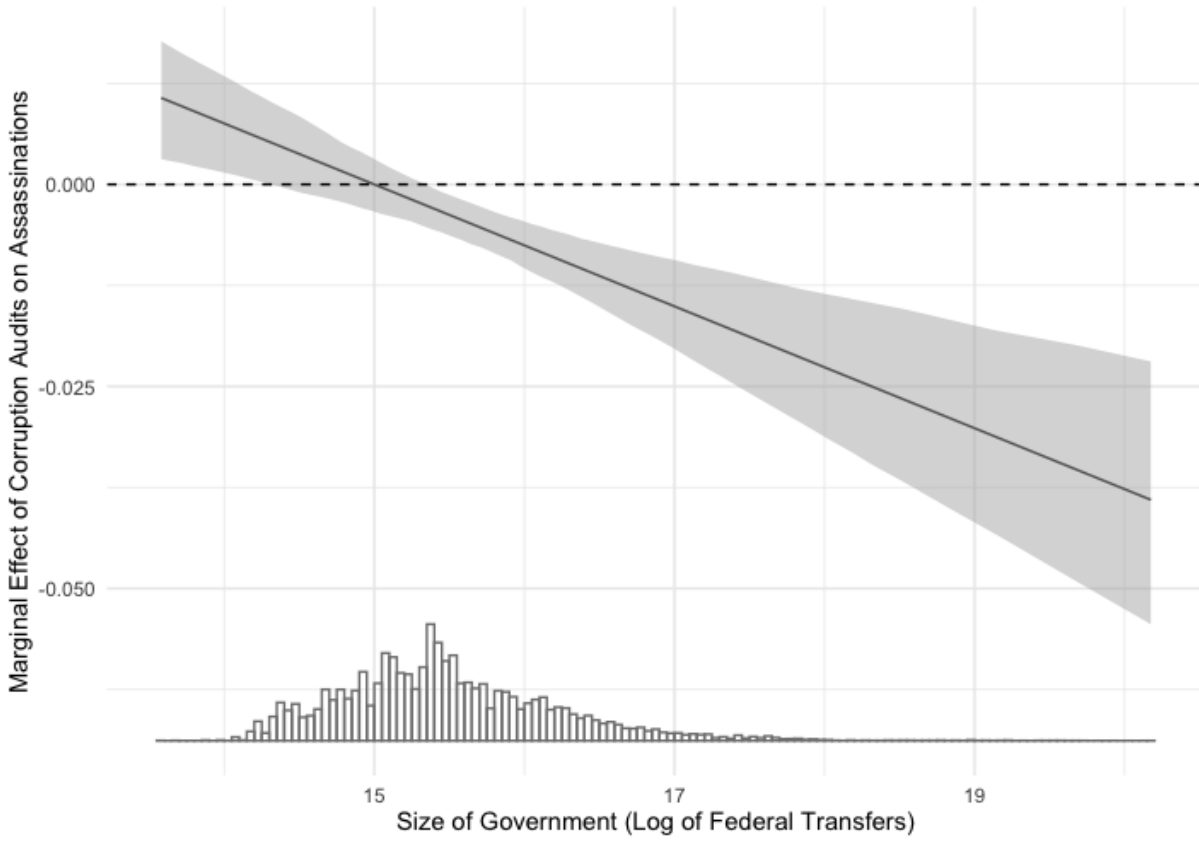


Figure 3.7: The Effects of Federal Transfers on Assassinations

Broader Homicides. First, one might be concerned that the effects of corruption audits do not specifically pertain to murders of politicians, but rather they apply to homicides more generally. If audits indeed affect broader homicides, then it might be the case that they increase the legal costs of committing *all* violent crimes. To test this possibility, Table 3.3 adapts the key specifications in Table 1 (i.e., Columns 1 and 2). Instead of using murders of *politicians* as the dependent variable, this first two columns of Table 3.3 use murders of *any citizens* in the municipality. Findings are significant but positive for the intensive and insignificant for the extensive margin (Columns 1 and 2, respectively). Columns 3 and 4 conduct similar analyses for the murders of social leaders, such as of the landless workers' movement (MST) and environmentalists.¹⁴. Again, results are statistically indistinguishable from 0. Columns 5 and 6 examine murders of indigenous citizens, and yet again find no effects of audits. Overall, evidence belies the alternative explanation that this study's findings reflect patterns about homicides more generally, instead of about political assassinations.

14. Murders against social leaders and indigenous people are common and have been on the rise in Brazil. See reports by Comissão Pastoral da Terra and several newspaper articles such as Mongabay

Table 3.3: The Effects of Anti-corruption Audits on Other Homicides

	Overall Population		Other Social Leaders		Indigenous Leaders	
	Any Homicide	Homicide Rate	Any Murder	# Murders	Any Murder	# Murders
Post Audit	0.018*** (0.003)	0.206 (0.167)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)
Observations	77,498	77,498	77,498	77,498	77,498	77,498
State FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Municipal Controls	✓	✓	✓	✓	✓	✓
Mean Dependent Var	0.667	18.20	0.00143	0.00166	0.000671	0.000903
Mean: Audited Municipalities	0.698	19.27	0.00179	0.00206	0.000897	0.00101
Mean: Unaudited Municipalities	0.650	17.63	0.00124	0.00146	0.000552	0.000848

Notes: This table illustrates the main effects of audits on other types of homicides. The table reports the coefficients obtained from the estimation of equation 1. The sample includes all municipalities between 2003 and 2016. Post Audit is an indicator variable taking 1 for all years after the audit in the audited municipality. Post Audit is always zero for never treated municipalities. Any Homicide is an indicator variable taking value 1 for municipality-year that had a homicide of any citizen, 0 otherwise. Any murder is an indicator variable taking value 1 for municipality-year that had a murder of a social or indigenous leader, 0 otherwise. Homicide rate is the homicide rate per 100,000 citizens in a municipality-year. All specifications include year and state fixed effects. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

State capacity. Second, one might be concerned that anti-corruption audits only affect political assassinations when state capacity at the local level is strong. Although audits are randomized, this line of reasoning suggests that audits might not be effectively carried out in localities where state capacity is weak, such that audited municipalities receive differential treatment. Although the fact that the CGU sends teams of federal auditors to municipalities counters this possibility, Table 3.4 provides quantitative tests. Following Avis, Ferraz, and Finan (2018) and Zamboni and Litschig (2018), Column 1 uses the presence of a judiciary district as a proxy for state capacity.¹⁵ Although municipalities that are the seat of judicial districts have significantly fewer assassinations, no heterogeneous effect is observed. The interaction term is statistically insignificant, suggesting that the effect of corruption audits on assassinations is not higher (or lower) in municipalities that judicial districts. Column 2 tests for heterogeneity using another proxy for judicial state capacity: the presence of a police station (see Shiavon, 2019).¹⁶ Similarly, municipalities with police stations have fewer assassinations, but no heterogeneous effect is observed for the effect of corruption audits on assassinations. Column 3 and 4 employ another proxy for judicial state capacity: whether municipality has a public security fund or a public security committee (see Novaes, 2022).¹⁷ Again, no heterogeneous effect exists for the effect of corruption; moreover, this variable has no effect on assassinations. Similar results are found when I use only active politicians who were murdered in the dependent variable (Columns 5-8). Altogether, evidence points away from the possibility that audits only affect political assassinations in municipalities where state capacity is strong.

15. Approximately 48 percent of Brazilian municipalities are the seat of the judiciary district.

16. Approximately 85 percent of Brazilian municipalities have a police station.

17. Approximately 7 percent of Brazilian municipalities have a public security fund.

Table 3.4: The Effects of State Capacity on Assassinations

	All Politicians			Active Politicians				
Post Audit	-0.002 (0.001)	-0.004* (0.002)	-0.005*** (0.001)	-0.005*** (0.001)	-0.001 (0.001)	-0.004** (0.002)	-0.003** (0.001)	-0.003** (0.001)
Post x Judicial District	-0.005* (0.003)				-0.003 (0.002)			
Judicial District	-0.022*** (0.002)				-0.017*** (0.002)			
Post x Police Station		-0.002 (0.003)				0.001 (0.002)		
Police Station		-0.009*** (0.002)				-0.007*** (0.001)		
Post x Security Fund			-0.012 (0.008)				-0.002 (0.007)	
Security Fund			0.004 (0.005)				0.001 (0.004)	
Public Security Committee								-0.000 (0.003)
Post x Public Security Committee								-0.001 (0.005)
Observations	77,498	77,484	77,463	77,470	77,498	77,484	77,463	77,470
State FE	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Municipal Controls	✓	✓	✓	✓	✓	✓	✓	✓
Mean Dep Var	0.0159	0.0159	0.0159	0.0159	0.0159	0.0159	0.0159	0.0159
SD Dep Var	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125

Notes: This tables investigates the effects of state capacity on assassinations. Columns 1-4 use the full sample of politicians assassinated. Columns 5-8 consider active politicians only, i.e. ran in the last electoral cycle before the assassinations. All specifications include year and state fixed effects. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Electoral discipline. Third, one might posit that anti-corruption audits only affect political assassinations if mayors face the threat of electoral sanctioning from voters. For example, mayors who are term limited or who won landslide elections might arguably not change their actions vis-a-vis corruption after an audit, undermining a key channel by which audits affect assassinations (see Figure 3.5). To explore this possibility, Table 3.5 examines whether the impact of corruption on political assassinations is heterogeneous across such factors. Columns 2-3 examine effects for second-term mayors, who are ineligible for reelection in Brazil. The effect of corruption on assassinations is not significantly different for second-term mayors; furthermore, they are not more or less likely to be assassinated than first-term mayors. To examine the role of electoral competition, Columns 4 and 5 investigate the effective number of candidates and Columns 6 and 7 look at the share of votes the mayor received in the prior election. I find evidence that effective number of candidates for mayor influence the effect of audits. The coefficient is significant at 0.1. One possible explanation is that audits reduce the number of opportunistic politicians running for office. For vote share, the interaction term is insignificant, suggesting no heterogeneity across this variable for the effect of corruption on assassinations. In addition, mayors who won a large share of votes are no more or less likely to be murdered.

Table 3.5: The Effect of Political Competition on Assassinations

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post Audit	-0.002** (0.001)	-0.002** (0.001)	-0.004*** (0.001)	-0.002** (0.001)	0.006 (0.005)	-0.002** (0.001)	-0.008* (0.005)
Second-term mayor ran		0.001 (0.001)	-0.000 (0.001)				
Post x Second-term Mayor ran			0.003 (0.002)				
Eff N of cand mayor				0.002** (0.001)	0.003*** (0.001)		
Post x Eff N. of cand mayor					-0.004* (0.002)		
Share Votes						-0.003 (0.003)	-0.005 (0.004)
Post x Share votes mayor							0.010 (0.008)
Observations	77,498	77,315	77,315	77,219	77,219	75,998	75,998
State FE	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓
Municipal Controls	✓	✓	✓	✓	✓	✓	✓
Mean Dep Var	0.0159	0.0159	0.0159	0.0160	0.0160	0.0158	0.0158
SD Dep Var	0.125	0.125	0.125	0.125	0.125	0.125	0.125

Notes: This tables investigates the effects of incumbency and political competition on assassinations. The dependent variable is an indicator variable taking the value 1 if an active politician was assassinated and 0 otherwise. All specifications include year and state fixed effects. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Taken together, these additional analyses counter three alternative explanations regarding broader homicides, state capacity and electoral competition.

3.8 Conclusion

Politicians are being murdered around the world. This dissertation investigates the prevalence of this phenomenon focusing on Brazil. The political office provides a substantial access to resources. Politicians collude with other politicians in order to control the allocation of resources and have access to the monetary benefits of office. This study argues that politicians enter corrupt contracts to share the spoils of office and these contracts happen in the absence of a third party enforcer. Therefore, they are subjected to hold ups and whistleblowing. Violence renders a mechanism to enforce corrupt contracts. I offer empirical evidence based on anti-corruption audits that have shown to reduce municipal corruption. This study shows that less opportunities for corruption reduce assassinations.

My dissertation reveals how politicians use violence to advance their private goals. Past research has shown how criminal groups use violence to get politicians associated with them elected or to avoid the election of a politician who is likely to fight against them (Dal Bó, Dal Bó, and Di Tella 2006; Trejo and Ley 2019). But this ignores the role of politicians in the dispute for spoils associated with the control of the administrative office. Politicians often are criminal themselves and are also engaging in violent crime (Vaishnav, 2017). Politicians may murder other politicians who refuse to participate in corrupt contracts, renege on promises, or intend to expose the corruption schemes.

While this study focuses on the local dynamics of Brazilian municipalities, the argument can be generalized to other contexts where politicians engage in different levels of corruption. For instance, targeted assassinations are on the rise in South Africa and there is a notable proportion of these killings who had been politicians (Thomas 2018). This study highlights the

importance of studying violence against politicians in developing countries and how it connects to other types of violence such as violence towards voters (Birch, Daxecker, and Höglund 2020; Birth 2020) or assassination by criminal groups in places such as Mexico (Trejo and Ley 2019) and Italy (Daniele and Dipoppa 2017).

This study also contributes to a broader policy debate about the consequences of anti-corruption crackdowns. I provide evidence that random anti-corruption audits that are known to reduce corruption, also diminish violence against local politicians. Anti-corruption policy can play a central role in affecting violence levels. It also connects to other types of crimes such as criminal organizations that are entering the government.

My findings inform our understanding of democracies. There are several avenues of future research. For example, the audits are short term and one direction is to explore how we can increase the horizon of the effects. Additionally, in this dissertation, I focus solely on assassinations due to restrictions on data. However, this high level, extreme violence is the last resort when other strategies have failed. Future research should investigate threats and assassination attempts as well. Finally, more work is certainly needed to specify specific mechanisms. When politicians obtain rewards from holding office, it is not surprising that they are willing to employ criminal violence at their partners to benefit themselves. Additionally, when politicians are criminal themselves, they are not only passive when negotiating with criminal groups, as often assumed by the literature (Bullock, 2021). Instead, we should advance our understanding on when politicians decide to pay criminal groups to enforce their corrupt contracts.

The next chapter addresses the role of criminal groups. With co-authors, I examine the effect of criminal groups' expansion on criminal violence. As these groups increase territorial control and become more powerful, they can reduce levels of conflict. This allows them to exploit new economic markets.

Chapter 4

Territorial Criminal Enterprises: Evidence from Rio de Janeiro

4.1 Introduction

Many peripheral areas in urban cities are marked by the presence of criminal groups, which are considered one of the most significant urban and national security challenges of the 21st century (World Bank, 2011). These groups include drug factions, militias, vigilante groups, prison and street gangs,¹ and have driven a substantial proportion of violence in several countries. The highest number of homicides and homicides rates are located in Latin America (UNODC 2019; Yashar 2018), where criminal conflict has ravaged several countries. Citizens in countries such as Brazil, Mexico, Colombia and El Salvador now live in areas in which criminal groups have established subnational criminal governance regimes and dictate the main parameters of social, economic, and political life (G. D. S. Feltran 2012; Trejo and Ley 2021; Lessing 2020; Mantilla and Feldmann 2021). Their presence and disputes over territories negatively im-

1. Some scholars tend to define all these groups as Organized Criminal Organizations (Barnes 2021). We prefer to refer to them as criminal groups since not all these groups have highly organized structures.

pact economic development by reducing human capital investment, earnings and labor mobility (Monteiro and Rocha 2017; Sviatschi 2022, 2021; Melnikov, Schmidt-padilla, and Sviatschi 2018).

A recent body of literature has discussed how these groups emerge, expand, and govern populations (Blattman et al. 2018a; Lessing 2020; Magaloni, Franco Vivanco, and Melo 2020; Trejo and Ley 2021). Yet, we still lack knowledge about criminal groups' relationship with the state and their infiltration into legal activities. One challenge that persists in this scholarship is mapping criminal groups' presence and how they finance themselves, including the economic activities they exploit. Given the illegal nature of their activities, we have little systematic evidence on other businesses run by criminal groups and the literature considers that criminal groups engage mainly in drug trafficking. However, as we show in this article, criminal groups often enter markets of licit goods and services to diversify their portfolios and increase profit margins. Their capacity to exploit new markets depends on whether their turf is challenged by the state and other groups. Conflict is costly and divert efforts from business activities, but is necessary when an enemy challenges their territorial control. Therefore, crucial questions regarding criminal groups are: Under what conditions are criminal groups able to diversify their economic activities? What are the incentives for criminal groups to engage in violence?

In this paper, we first conceptualize criminal groups as territorial firms — more specifically, territorial criminal enterprises (TCE), a definition coined by Arias (2006) to explain different types of criminal governance. In contrast to Arias, we instead focus on the economic aspects of criminal groups. Territorial criminal enterprises are criminal groups that monopolize coercion over a given territory in order to establish local monopolies of illegal and legal goods and services. To establish the monopoly of coercion, these groups must stop threats and attacks from two opponents: (1) the state enforcement apparatus, especially the police, which retain *de jure* a monopoly of use of force and (2) other criminal groups who dispute territories with them. Therefore, criminal groups decide whether to fight these contesters while maximizing

their profits from territorial control.

We build a model with two scenarios to illustrate the strategic interaction between criminal groups and the state. In the first scenario, there is only one criminal group and the state. The criminal group extracts rents from its local territory and decides whether to fight or bribe the police. The state balances the political return to its use of military force versus the bribe it collects to not repress criminal activities. There is a peace dividend that arises when there is no military confrontation because criminal groups are able to put resources into exploiting additional markets. Therefore, this game has two equilibria. One equilibrium has a high level of conflict and low economic diversification. There is also a peaceful equilibrium where the criminal group is able to bribe the government, avoid repression, and exploit the provision of other goods and services. Politically connected groups that are able to avoid losses from state repression end up in the second equilibrium. In addition, the model shows that the bribe needed to avoid state repression increases with the political return to the use of military force. In the second scenario, there are two criminal groups and the state. The incumbent criminal group chooses to invest in military capacity to protect its territory from rival groups and the state and conquer new territories to increase its profits. Therefore, we expect higher levels of conflict, which affect criminal groups' capacity to diversify economically.

To test this, we use a unique dataset to map and describe the geospatial distribution of territorial criminal enterprises in Rio de Janeiro as well as their economic activities. The data come from *Disque Denuncia* (Dial Report in English), a well-established crime tip line with more than 1.4 million reports related to criminal groups in Rio de Janeiro. We use Natural Language Processing techniques to classify transcribed text reports into group activities and use a strict rule to measure whether a neighborhood has the presence of a criminal group that militarily controls the territory and illegally explores different economic activities. We cross-check our data with official records to assess the accuracy of our estimates and supplement our empirical analysis.

We have three sets of results. First, we present the first measure of yearly presence of criminal groups at the neighborhood level.² We find that on average, 41% of neighborhoods in the Rio de Janeiro metropolitan area have at least some of its area controlled by a criminal group from 2008 to 2019. According to the 2010 Census, these neighborhoods contain 72% of the population of the metropolitan area. We show that despite the state's effort to curb these groups in the past years, the number of neighborhoods with group presence has not varied much in the city of Rio de Janeiro, but we document an expansion in the outskirts of the city. Second, we identify that criminal groups participate in several economic activities and their portfolio of activities change over time. Third, we build a measure of criminal consolidation that indicates when militia groups and drug factions operate in geographical areas further away from other criminal groups. We explore variation over time in criminal consolidation, violence and business activities and show that criminal consolidation is associated with lower levels of violence and higher business diversification. We also document a different equilibrium according to group type. We show that when militia groups govern solely in a neighborhood, without the threat of a drug faction, homicide levels, shooting and police killings are lower, while economic diversification increases.

We contribute to a burgeoning literature that uses several methods and data sources to measure the presence of criminal groups.³ Although our paper is not the first to explore the richness of *Disque Denuncia*⁴, our study is the first one to apply cutting-edge techniques to the detailed *Disque Denuncia* dataset to systematically measure specific armed groups presence in Rio de Janeiro. We contribute to seminal works that describe the presence and operation of criminal groups in Brazil (Zaluar and Barcellos 2013; Cano and Ioot 2008; Misse 2011).⁵

2. The reports from *Disque-Denuncia* provide addresses as references to the reported events, which does not allow us to calculate the extension of the territory within neighborhoods controlled by groups.

3. See Sobrino (2019) for the use of Google news, Dipoppa (2020) collects articles discussing typical mafia-related crimes from a national newspaper in Italy, Lonsky (2019) uses crime reports on the Russia mafia, and Bruhn (2021) exploit police intelligence data on Chicago's gangs.

4. Cano and Duarte (2012) uses a sample of *Disque Denuncia* reports to measure the presence of militia groups from 2006 to 2011.

5. Recently, a collaborative project of five organizations led by the group GENI-UFF created a map of

These studies have provided evidence on how these groups operate in Rio de Janeiro based on qualitative research, case studies, surveys, focus groups and ethnographic work. The present study advances this agenda by measuring different criminal groups and how their presence and economic diversification changes over time.

Additionally, our study expands our understanding about criminal groups' relationship with the state and other criminal groups and how it impacts their ability to diversify economically. Armed groups often have relations with at least some state officials and varying combinations of these relationships determine greater confrontation or even cooperation with the state (Arias, 2006). Lessing (2020) conceptualizes the symbiotic relationship between criminal groups and the state, which is also known as *mercadorias politicas* or political goods (Misse 2006, 2010), the hybrid state (Jaffe, 2013), the gray zone of criminality (Trejo and Ley 2021), state sponsored protection rackets (Snyder and Duran-Martinez 2009), and the complicit state (Yashar 2018). In this study, we detail the incentives criminal groups face to engage in negotiations and bribe state agents, thus not only avoiding repression but also allowing them to exploit additional markets. Our paper is closely related to Castillo and Kronick (2020) in examining the effects of state repression on criminal groups' interactions. However, to the best of our knowledge, previous work does not explicitly examine the impacts of state repression and turf wars on the economic diversification of criminal groups.

Our framework also allows us to highlight a key distinction between different territorial criminal groups, which is their ability to collude with the state. This distinction makes highly connected groups less subject to police military repression, which enables an equilibrium with low levels of violence and higher economic diversification. Therefore, we explore the role of criminal groups as firms to understand the equilibrium in which they are able to expand their activities and connect our study with the literature that analyzes the activities of criminal firms (Gambetta 1996; Gambetta and Reuter 1995; Fiorentini and Peltzman 1996; Levitt and

armed groups in Rio de Janeiro. The map can be accessed through the website: <https://nev.prp.usp.br/mapa-dos-grupos-armados-do-rio-de-janeiro/>.

Venkatesh 2000; Blattman et al. 2018b; Brown et al. 2021). This suggests that governments should fight organized crime not only militarily but also economically. Poor results associated with government crackdowns suggest that the “war” against criminal groups requires new strategies and a better understanding on how these groups rule their territories, their sources of revenue, networks and motives to engage in turf wars.

4.2 Overview of Territorial Criminal Enterprises in Rio de Janeiro

Rio de Janeiro is a city with 6.7 million people, where 20% of the population lives in very densely populated informal settlements known as *favelas*.⁶ These are not stateless areas. In the past 30 years, police raids and state programs have been frequent in order to improve urban conditions.⁷ Over the years, the state has invested in street lighting, pavement, asphalt, sewers, and cash-transfer programs to poor families. However, it has not been able to maintain a monopoly over the use of force. This has contributed to create a complex environment where social and urban conflict co-exist with high levels of violent crime. The most important attempt to provide public security in *favelas* was the Pacifying Police Units (UPPs) which were launched in 2008 with the aim of reducing gunfights between drug gangs and to boost the urban integration of the *favelas*. Though highly successful in the first five years, the UPP policy did not sustain its results subsequently (Ferraz, Monteiro, and Ottoni 2021).

Many people living in *favelas* experience violence on a daily basis. They are exposed to turf wars and to highly militarized police raids. While criminal groups fight for territorial control

6. According to the 2010 Census (Brazilian Institute of Geography and Statistics).

7. The Popular Settlements Urbanization Program of Rio de Janeiro, popular known as *Favela Bairro* was implemented in 1993 by the city hall of Rio de Janeiro. In 2007, *favelas* received investments from the Growth Acceleration Program (PAC), a federal government program. In 2010, the *Favela Bairro* became *Morar Carioca*, a rebranding of the program. Additionally, the government invests in several cash transfer programs that target low-income residents of *favelas* such as *Cheque Cidadão*, *Renda Melhor*, and *Familia Carioca*.

to exploit illegal markets (Arias and Barnes 2017; Zaluar and Conceição 2007), the state fights against these groups to seize guns and illegal goods as well as arrest gang leaders. The actions that these groups undertake generate high economic, social and political costs, from regular shootings (Cavalcanti, 2008) to disrupting school routines (Monteiro and Rocha 2017). Broadly, there are two types of criminal groups in Rio: drug factions and militias — paramilitary groups usually formed by current and former police officers. Below we discuss these groups, how they emerged and rose, their relationship with the state, and their main economic activities.

4.2.1 Drug Factions

The first prison-based gang in Brazil was born in Rio de Janeiro. Scholars link the emergence of *Comando Vermelho* (CV) to the dictatorship's attempt to repress armed political opposition (Amorim 1993; Lima 2001; Misse 2006).⁸ According to Penglase (2008), the CV emerged in the 1970s in a prison where members of armed political groups and regular prisoners were housed in the same unit. The group of prisoners gathered together and organized a movement against state repression and for better living conditions within the prison system (Amorim 1993). However, violence was always present and was often used among them to establish order (Lima 2001). The CV's authority was not restricted to the prison. The order established by the faction as well as the group's foundational ideas expanded beyond the prison walls to Rio's *favelas* (Penglase 2008). Prisoners went back to their homes in *favelas* with the message to organize a "fighting front" to protect people in *favelas* (Amorim 1993). The faction quickly complemented the state and also started governing these areas. For instance, rules prohibiting rival organizations and establishing order, such as banning theft and rape, were implemented in several places around the city of Rio de Janeiro.

The rise of the CV and the high profitability of the cocaine trade led to increasing disputes

8. The CV was born as *Falange Vermelha* when political prisoners and common prisoners were sharing prison cells. Inspired by guerrillas and other left wing groups, political prisoners organized a movement within the prison (Silva, 2014).

among gang members. As a result, some members left *Comando Vermelho* and created *Terceiro Comando* (TC), in the late 1980s (Misse, 1999). In the early 1990s, *Amigos dos Amigos* (ADA) emerged in alliance with TC to contest CV's power. In 2001, the *Terceiro Comando* became *Terceiro Comando Puro* (TCP) when its leader was killed in one of the biggest *favelas* in Rio, Complexo da Maré (Silva, 2014). Historically, these gangs have disputed territories around the city to monopolize drug sales.⁹ In addition, they impose restrictions on residents' rights to enter and exit *favelas* partly as a response to these conflicts. Residents of a *favela* controlled by a drug faction cannot enter a *favela* dominated by a rival gang for any business or personal reason (Zaluar 2012). The conflict between these groups generates much of the crossfire and gun violence that mark the city of Rio de Janeiro (Monteiro and Rocha 2017).

The conflict is not only between members of drug factions, how drug gangs are often referred. Clashes with the police and state forces are also very common. These disputes often resemble civil conflict as military capabilities of drug factions increase (Lessing 2008). The police in Brazil is also highly militarized, and repressive crackdowns on drug factions often produce escalation (Lessing 2015). Additionally, drug factions differ in how they interact and deal with the state. They use different strategies to avoid state repression, such as bribing state forces to evade enforcement or building alliances with the state (Barnes 2017). In the case of Rio de Janeiro, for instance, the faction ADA follows a strategy of integration while the CV engages in confrontation (Magaloni, Franco Vivanco, and Melo 2020). These distinct strategies also affect the results of police interventions, which can often backfire (Magaloni, Franco Vivanco, and Melo 2020).

The contentious relations with security forces affect *favelas'* security systems. Without the state to provide security, order and access to justice, and, in addition, with state officials often generating more insecurity, residents had to create their own security forces and find ways to resolve conflicts among residents. Since the 1980s, this role has been captured by drug factions

9. For more on turf wars, see: Dowdney (2003) and Gay (2015).

that have been “managing neighborly disagreements and suppress conflict” (Arias and Barnes 2017). Therefore, the drug gangs assume several functions, from policing and law enforcement to resolving disputes and enforcing contracts (G. Feltran 2018; Lessing 2020).

Additionally, they often regulate illicit and licit markets. Notwithstanding the fact that drug factions started operating the illegal drug markets, they have expanded their operations. There is anecdotal evidence that they engage in several legal and illegal activities, such as loan-sharking to taxing legal goods such as gas, transportation, and electricity. Yet we do not know how and when they are able to enter new businesses and expand their activities.

4.2.2 Militias

While drug factions were fractionalizing and fighting against each other and the state, another type of group emerged in Rio: militias. These groups are often formed by members of the military police and other public security agents that use extra-legal methods to combat organized crime and drug trafficking.

The term militias has also been broadly used to name any corrupt or violent police officer, leading to a very broad and imprecise definition of this type of criminal group (Santos 2007). The first organizations of police officers specialized in killings were called *grupos de exterminio* (death squads) and go back to the period of military dictatorship in Brazil during the 1960s to the 1980s. Some scholars do link these groups to what we have come to know as militias (L. A. F. Souza 2012). However, some *grupos de exterminio* are still in operation to this day. They are often hired by businessmen or politicians to execute competitors, political opponents, or other targets (Cano and Duarte 2012).¹⁰

In this study we focus on militias that seek territorial control to extract rents from extortion or other economic activities.¹¹ These groups consolidate their power by monopolizing

10. Soares (2022) describes how militias work in Rio de Janeiro.

11. Our definition of militias is similar to the one used by Cano and Duarte (2012). They characterize militias using a five-point definition: (1) territorial control; (2) coercion over residents in controlled territories; (3) individ-

violence mostly with the intention to expel drug traffickers from the community. As such, they use coercion to create protection rackets (Tilly 1985). In *favelas* and poor neighborhoods, where people do not have access to the legal system, security agents become local authorities and enforce extralegal rules (Zaluar 2012). Citizens have to pay taxes to militia groups for “security”. However, people were often paying taxes to protect themselves from the same group that was charging them. According to a victimization survey by Zaluar and Conceição (2007), most people agree that military police use excessive force and are corrupt. Additionally, 25% of people interviewed admitted they had some form of private security. In that sense, militias resemble the Sicilian mafia that rose in a vacuum of power or of the inability of the state to ensure public order in a society that had turned away from state power to private means of protecting power and ensuring order (Catanzaro, 1992).

Militias are politically connected and have a symbiotic relationship with the state that has allowed them to expand.¹² This symbiotic relationship between criminals and state agents is called the “gray zone of criminality” by Trejo and Ley (2021). Instead of recognizing the state and crime as two separate entities, the gray zone of criminality is where members of public security institutions co-exist alongside criminal groups. In other words, police forces and state agents cooperate with organized crime and coordinate actions to serve them. Using Trejo and Ley (2021)’s definition, militias belong to the gray zone. The main consequence of this is that areas controlled by them are able to reduce state repression. Militias often enjoy impunity and their ties with city and state politicians have allowed them to foster and spread. One consequence

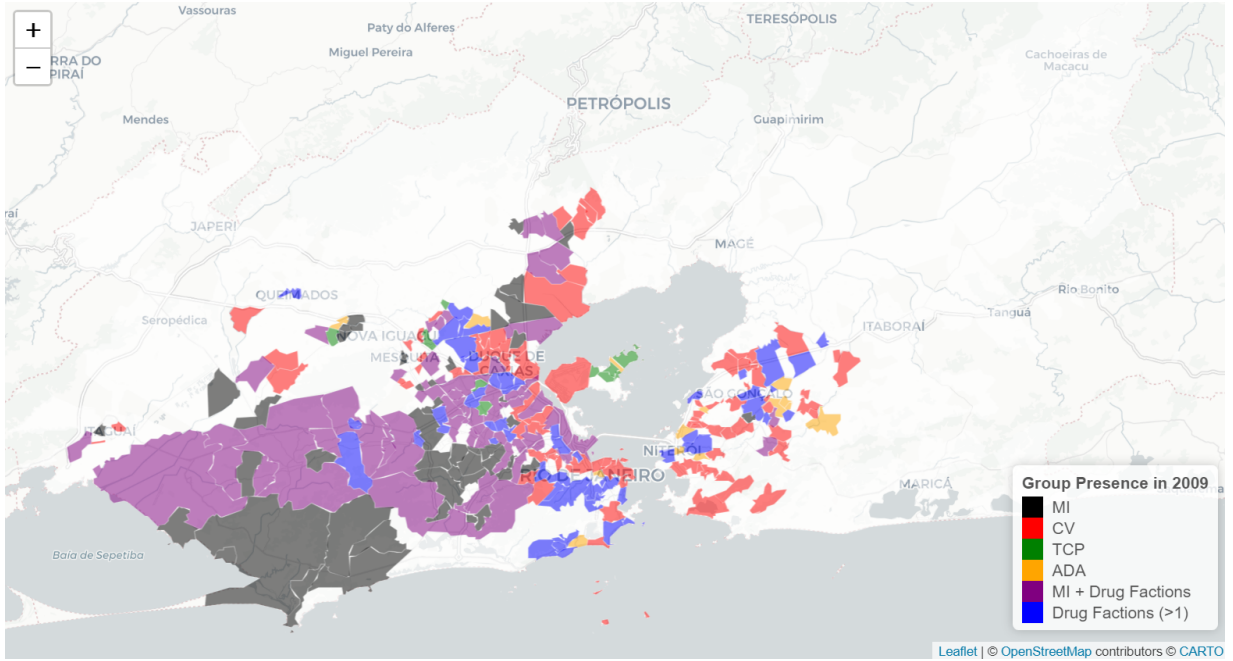
ually rationally-motivated profit; (4) discourse based on protection and establishment or order; (5) participation of state agents within public security institutions.

12. Using qualitative research techniques such as focus groups and interviews with locals, Mesquita (2008) reconstructs the violent formation process of the Rio das Pedras militia in the early 1990s, and shows how this had an impact on people’s daily lives. The events are also described in a resident’s report published by O Globo newspaper (<https://oglobo.globo.com/epoca/rio/o-nascimento-da-milicia-em-rio-das-pedras-pela-visao-de-um-morador-23831103>), in which the participation of public security agents is emphasized. More recently, in an ethnography carried out in the Batan *favela*, also in the West Zone of Rio de Janeiro, Mendonça (2014) describes how, in September 2007, a group of policemen, military men and firefighters “expelled” a drug trafficking faction from and established territorial control over the place.

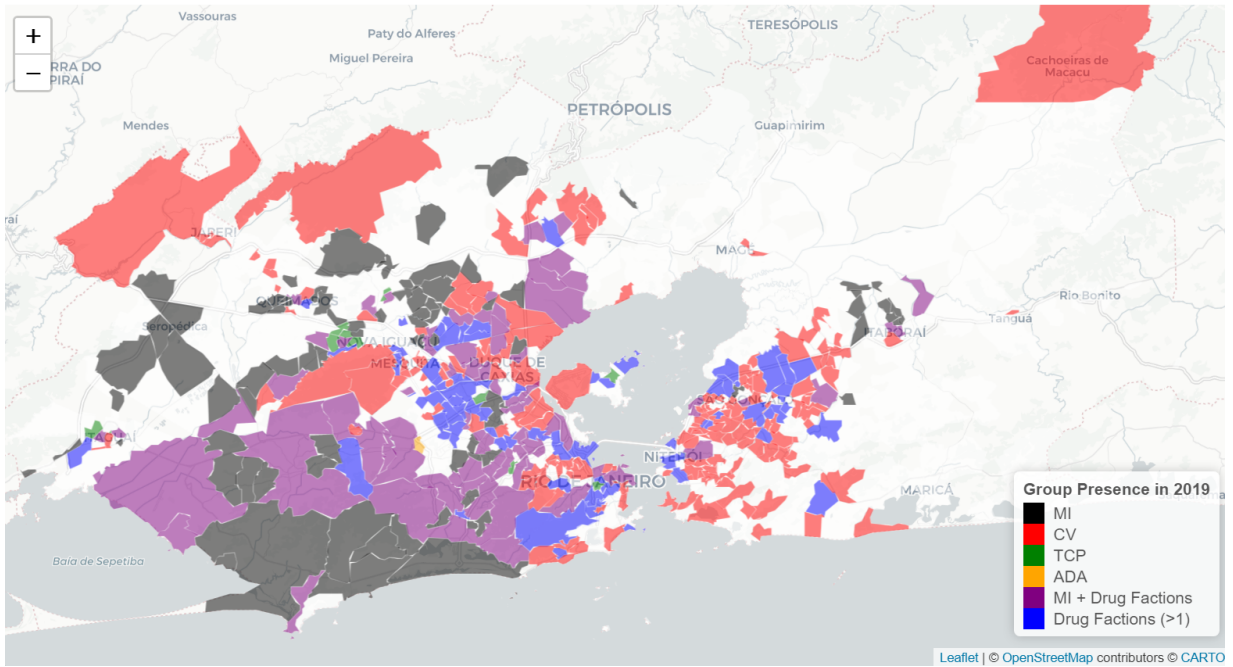
of this is that conflict is lower in areas controlled by militias compared to areas controlled by drug factions because militias rarely engage in violent confrontation with the police (Arias 2013).

Regarding their economic activities, militias operate several lines of business. Historically their main activity has been extortion and private security. However, their sources of income are not limited to violent illicit activities. They often operate legal markets, such as cable TV, gas, and transportation. More recently, there are several reports that they have entered real estate investment.

In this paper, we study how these two types of criminal groups, that have such distinct origins are now operating in similar ways and exploiting licit and illicit economies. Figure 4.1 shows how both types of groups are spread out in the Metropolitan Region of Rio de Janeiro. The maps indicate the neighborhoods that had some presence of criminal groups in 2009 and 2019, respectively. Each color indicates a specific group or combination of groups in the territory. We can see that there was an expansion of areas occupied by criminal groups in Rio de Janeiro in the period. In the next section, we describe how we created this measure of group presence and the consequences for economic activities in these areas.



(a) Presence of TCE at the neighborhood level in 2009



(b) Presence of TCE at the neighborhood level in 2019

Figure 4.1: Presence of TCE at the neighborhood level in Rio's metropolitan area

4.3 Mapping Territorial Criminal Enterprises

4.3.1 Definition of Territorial Criminal Enterprises

Criminal groups such as Brazil's drug factions and militia groups, Colombia's *combos*, *maras* from El Salvador, and Mexico's drug cartels share similar behaviors and dynamics. In contrast to rebel and insurgent groups, criminal groups do not seek to contest the political power of regional or national governments. Rather their primary motivation is to obtain economic rents. In our case, we are particularly interested in analyzing the economic operations and growth of the two types of criminal groups that control territories in Rio de Janeiro.

We propose a definition that embraces both types of groups and builds on the scholarship of political science and the economics of organized crime. Arias (2006) claims that Latin America and Caribbean criminal groups may have different compositions and structures, but many operate as territorial criminal groups, i.e., they seek to control and defend a particular territory as an operational base for illicit activities. The economics of organized crime literature emphasizes the importance of territorial control as a way to monopolize markets. According to Schelling (1971), the core business of the criminal organization is to acquire a rule-making role in a given area (geographical or economic) so as to levy taxes and impose regulations over legitimate and/or illicit business. Fiorentini and Peltzman (1996) define organized criminal groups as organizations competing and/or colluding with the government and among themselves to obtain a monopoly over coercion in a given territory.

4.3.2 Data on Criminal Groups

The main challenge in understanding armed group characteristics is to gather information on their activities and presence in the territory due to their illegal nature and violent practices. Many existing studies for different contexts use crime reports, police intelligence data (Bruhn

2021), newspaper data (Trejo and Ley 2017; Daniele and Dipoppa 2017), and Google news (Sobrino 2019). In the case of Brazil, previous works mostly focus on case studies of specific groups or lack systematic information on group activities.

Our paper circumvents these problems using information from *Disque-Denúncia* (DD), a hotline that receives anonymous reports from citizens regarding an array of criminal behavior in the state of Rio de Janeiro (Cano and Duarte 2012). Running since 1995, the Non-Governmental Organization (NGO) has compiled a dataset of more than 2 million reports registered between 2002 and 2019. The calls received by the hotline are directly forwarded to civil and military police, which decide whether and how to respond to each report.

We were granted access to all 1.4 million reports for Rio de Janeiro's metropolitan area from 2008 to 2019.¹³ This region embraces the city of Rio de Janeiro and 21 neighboring cities, where a total of 13.1 million people live. The DD dataset records the transcription of the reported event, its time, date and address. Even though there is a degree of uncertainty on the precision of reports individually, we argue that the combination of numerous reports represents a unique source of data in understanding criminal dynamics in the state.

Our goal is to use this set of reports to locate groups across time and space and understand their main practices of territorial control and choices of business streams. Therefore, we first filtered reports that explicitly mention armed groups (gang names or militia) or popular names of their members (e.g. drug dealers and militia members), keeping around 420,000 reports. In order to understand how these groups behave in the territory, we then automatically interpret the content of each report, propose a rigorous definition of group presence and validate our approach with data from other sources.

There are a few challenges to use Disque Denuncia data to map the presence of criminal groups. First, the reports are anonymous claims from citizens that have not been confirmed by

13. When studying only militia groups, Cano and Duarte (2012) analyze in total 41,542 reports. The mentions to militias are sporadic prior to 2008. The years of 2006 and 2007 count for only 12% of all the reports analyzed by the authors. Therefore, we opted to begin our analysis in 2008 since this was the year which the mentions to militias were more consolidated as described in the previous section.

any investigation. We argue that although a single report might not provide enough evidence to indicate the presence of a criminal group, several similar reports are a good indication of criminal group presence. In section 4.3.5, we explain how we aggregate reports. Second, we aim to identify different criminal groups that exert control over a territory. For instance, we are not interested in reports that refer only to the drug trade, that give the location of a criminal boss who is a fugitive, or that mention locations where militia men use to hang out. Therefore, we propose a rigorous definition of group presence based on territorial control *and* the exploitation of economic activities and automatically interpret the content of each report to filter reports that indicate the presence of a Territorial Criminal Enterprise. The last challenge is that Disque Denuncia data originate from people requesting help. As a consequence, if criminal groups go quiet and do not harm people despite still controlling the territory, people might be less likely to denounce them. To deal with this issue, we use a more strict definition to identify the presence of a group for the first time. Then, we lower the bar and request fewer reports to indicate that the group is still operating in the area. We validate this approach combining our data with qualitative research that maps criminal groups in 950 *favelas* and official records for years which data are available.

4.3.3 Other Sources of Data

We cross-check our measure of group presence based on Disque-Denuncia data with three sources of information. We obtained access to two pieces of information from government authorities that provide information for specific years. The State Attorney's Office of Rio de Janeiro (MPRJ in Portuguese) gathers information on group presence from local police officers that support the work of prosecutors responsible for investigating members of these organizations. The information is organized at the locality level, which can be either a *favela*, a housing project or other poor territory. We were granted access to data at the neighborhood level for 2019. In addition, we gathered data from the Institute of Public Security of Rio de Janeiro (ISP),

a state government body responsible for disclose crime records in Rio de Janeiro. ISP compiled a unique map depicting the areas of the state that were subject to illegal territorial control based on police sources in 2016.

These data are complemented by records of field work from Alba Zaluar, a prominent anthropologist from Rio de Janeiro (Zaluar 2012; Zaluar and Barcellos 2013). Zaluar carried out field work in more than 950 *favelas* of the city of Rio in 2009, 2010 and 2013. As we previously mentioned, criminal groups are not restricted to *favelas*, which means these data do not cover the universe of groups in these years. Still, *favelas* are arguably the most common type of territory that is run by militias and drug gangs of Rio, so these data depict the most relevant picture of TCE presence in the city. These data help us evaluate the quality of our measure of group presence in the territory and allow us to test the consequences of criminal consolidation on group economic decisions.

Finally, we gather police records on homicide and police killings provided by the Institute of Public Security (ISP) and a measure of shootings based on reports to *Fogo Cruzado*, an NGO created in 2016 to collect citizen reports on gun violence in Rio de Janeiro through an app and social media. These data allow us to understand how patterns of violence correlate with group presence and consolidation in the territory.

4.3.4 Content Classification

Our goals with the DD data are two-fold. First, we want to create a measure of TCE presence in the territory. We take two dimensions into consideration: military territorial control and exploitation of economic activities. After identifying groups in the territory, we move to our second goal, which is to build a profile of economic activities of criminal groups. We thus employ a rule-based classification method to automatically classify citizen reports that describe these activities. In order to make the processes more clear and precise when classifying reports, we propose definitions for the practices that characterize each dimension.

Our definition of *Territorial Control* captures the overt actions to protect the territory, i.e. practices of armed circulation (when group members ostensibly bear firearms to maintain control of the territory), roadblocks and surveillance (means of restraining access to the territory). This is shown in Table 4.1. On Table 4.2, we show how we measure *Exploitation of Economic Activities*, which may involve extortion (direct payments for protection rackets), illicit goods and services (such as drug trade and gambling) and also licit goods and services (TV and internet, cooking gas and electricity).¹⁴

Table 4.1: Practices of Territorial Control

Practice	Definition
Armed circulation	Illegally and ostensibly bearing firearms in order to maintain the illegal control of the territory
Roadblocks	Attempts to impede or impose difficulties of access to rivals in the territory – other armed groups or state forces
Surveillance	Surveillance mechanisms aiming at informing the proximity of a rival or other type of threats to the controlled territory

Table 4.2: Practices of Exploitation of Economic Activities

Practice	Definition
Extortion	“Fee-for-services” in which the groups demand direct payments for protection rackets
Illegal goods and services	Selling illegal products or services such as drug trade, gambling and loan sharking
Legal goods and services	Illegal provision of services to households (TV and internet, cooking gas, water and electricity), transportation, exploitation of lands and properties

14. We describe specific cases of two activities, transportation and water distribution, in the appendix ??.

Table 4.3: Measures of algorithm performance

Dimension	Practice	Measures of algorithm performance				Prevalence
		Accuracy	Precision	Recall	F1-Score	
Territorial Control	Armed Circulation	0.939	0.942	0.941	0.941	52%
	Roadblocks	0.961	0.893	0.665	0.762	10%
	Surveillance	0.986	0.900	0.791	0.842	5%
Economic Activities	Extortion	0.973	0.737	0.737	0.737	5%
	TV and Internet	0.998	0.947	0.947	0.947	2%
	Drug trade	0.897	0.974	0.813	0.886	51%
	Transportation	0.994	0.750	0.600	0.667	1%
	Gas*	-	0.920	-	-	<1%
	Loan Sharking*	-	0.860	-	-	<1%
	Water*	-	0.780	-	-	<1%
	Properties and Land*	-	0.780	-	-	<1%
	Electricity*	-	0.760	-	-	<1%
Gambling*	-	0.640	-	-	<1%	

Note: Third column depicts results for Accuracy (total share of true positives and true negatives in the samples). Fourth column depicts results for Precision (share of positives that are true). Fifth column depicts results for Recall (share of relevant cases that are true positives). Sixth column depicts results for F1-Score (harmonic mean between Precision and Recall). Seventh column depicts the prevalence of each practice in the sample. Appendix B details the exact definition of each measure. For practices that are rare in the sample (less than 1 %), we randomly re-sampled 100 positive cases to evaluate our rate of predictive power (Precision).

In order to classify the reports into these dimensions, we manually studied random samples of the data and defined rules to automatically interpret hundreds of thousands of reports using regular expressions. Since *Disque-Denuncia*'s transcriptions are standardized, this method has an overall good performance, is less costly to implement and more straightforward to interpret compared to other NLP techniques.¹⁵

To evaluate our classification method, we manually classified a random sample of 3,000 observations into the practices of territorial control and economic activities to test the performance of our algorithm. Table 4.3 details the overall performance of our methods. It shows the accuracy, precision, recall, and F1-Score of each indicator of territorial control and economic activities (Appendix C.2 describes each of these measures). In sum, the results indicate that our algorithm performs well, indicating that we rarely identify a dimension incorrectly.

15. See Appendix C.1 for examples of reports and classification.

4.3.5 Territorial Presence

The results from the previous section make us confident that we are able to interpret the content of the reports to Disque Denuncia reasonably well. We then move to the task of using information on the content of each report to build a panel of Territorial Criminal Enterprises in Rio de Janeiro between 2008 and 2019.

When studying the territorial dynamics of Rio de Janeiro's TCE, most studies focus on *favelas* as the main unit of analysis. However, drug factions and especially militias also control territories outside the boundaries of the slums and inside formal areas of poor neighborhoods. Therefore, we avoid using regular *favela* limits when mapping these groups and take advantage of information on the addresses of the calls to Disque Denuncia to geo-reference their exact location. With the coordinates of each report, we group them in order to identify those that refer to the same territory. We apply a hierarchical clustering algorithm, which aggregates points that are close by 300 meters.¹⁶ Figure 4.3 exemplifies how groups of reports are clustered depending on their spatial distribution.

16. Intuitively, the method consists of the repeated process of collecting observations that are closest together to form clusters until the distance of a cluster to a point is greater than an arbitrary value. We use $d = 300\text{m}$ and the average linkage, which means we compute the average distance of points in a cluster rather than the closest (single linkage) or the farthest (complete linkage). One advantage of this clustering strategy is that we do not need to impose the number of clusters in advance.

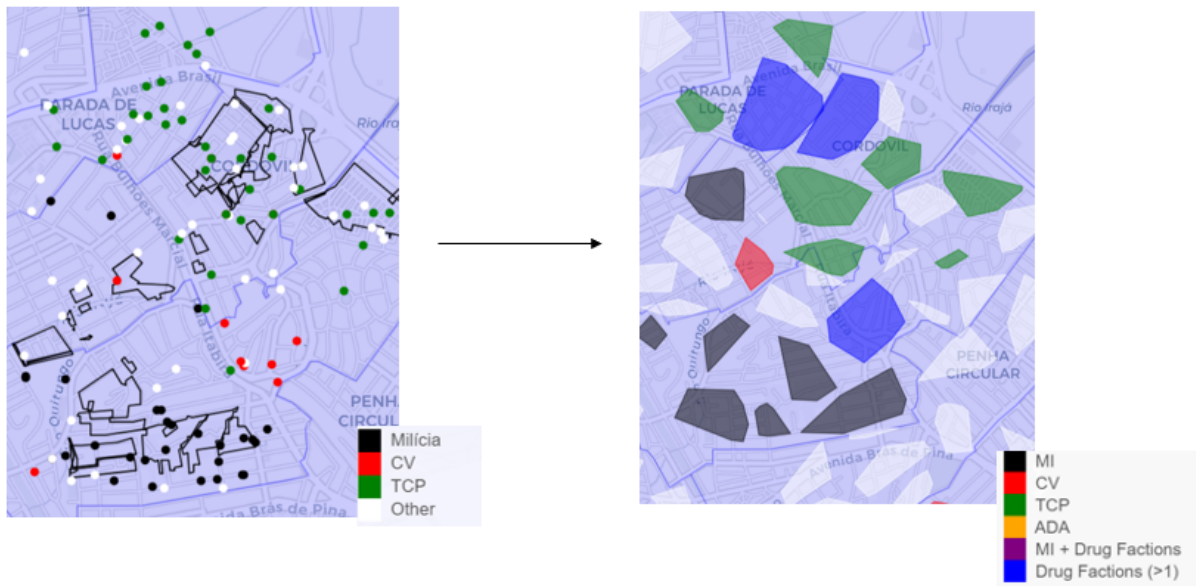


Figure 4.3: Example of clustering

After building clusters of territories based on the exact location of reports, we identify which group is present in each cluster for a particular year if the reports in the cluster mentioned a criminal group name plus the two crucial characteristics of territorial criminal enterprises: use of force to control territories and exploitation of economic activity. Finally, we aggregate these clusters at the neighborhood level to carry out our empirical analysis since our measures of violence are available at this level. Figure 4.4 summarizes how we use the data from the original database to develop our measure of group presence in the neighborhood.

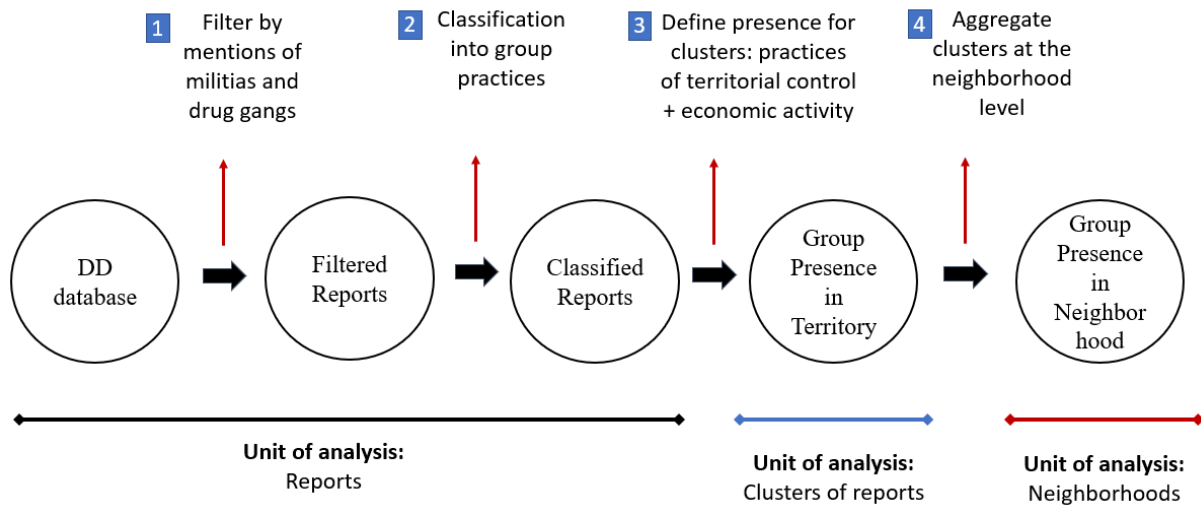


Figure 4.4: Summary of the process to map group presence

To evaluate the performance of our algorithm, we use three sources of information of criminal group presence that are available for specific years of our period of analysis: (1) intelligence unit data from the State Attorney’s Office of Rio de Janeiro for 2019, (ii) a map created by the Institute of Public Security based on police intelligence information for 2016, and (iii) field work records from Alba Zaluar that has identified criminal group presence at the *favela* level for 2009, 2010, and 2013. We aggregate data from these different periods at the neighborhood level for the city of Rio de Janeiro to make comparisons between different sources feasible. For the five years for which we have benchmark information, the correlation between these data and our measurement regarding the number of groups in each neighborhood is around 0.57 on average and around 0.61 if compared with government data. This is similar to previous efforts to map criminal groups.¹⁷ In addition, compared with State Attorney’s office data, our algorithm has a recall score (low level of false negative) of 84% and a precision rate (low level of false positives) of 0.65. This validity check makes us more confident in extending our analysis to other years.

17. Sobrino (2019)’s efforts in identifying criminal groups in Mexico correlates between 0.34 and 0.69 with official data depending on the year of reference. Dipoppa (2020)’s accuracy to locate Mafia presence in Italy is 78%.

Table 4.4: Performance compared to other sources of data

	Mean	State Attorney’s Office (2019)	ISP (2016)	Zaluar (2013)	Zaluar (2010)	Zaluar (2009)
Correlation (# of groups)	0.567	0.625	0.607	0.539	0.524	0.541
F-Score	0.697	0.729	0.707	0.653	0.682	0.711
Recall (1 - %FN)	0.688	0.837	0.622	0.614	0.676	0.614
Precision (1 - %FP)	0.717	0.646	0.819	0.698	0.689	0.731

This table provides scores to evaluate the performance of our measure of presence calculated using the Disque-Denuncia dataset. It compares our measure to existing datasets that captured group presence at specific years. Column 1 indicates the performance measure. Column 2 takes the mean of columns 3-7. Columns 3-7 indicates the performance values for each dataset. F-score represents the harmonic average of recall and precision scores. Recall evaluates the ability of correctly classifying reports as positive, conditional on the totality of true positive cases in the sample. This cross-check is made only for the city of Rio de Janeiro.

4.4 Descriptive Analysis

In this section, we document descriptive evidence on TCE presence in Rio de Janeiro using our novel panel data. First, we describe how these groups expanded in Rio’s metropolitan area between 2008 and 2019. Additionally, we analyze the portfolio of goods and services that these groups exploit in the territories controlled by them. In the next section, we present a theory to explain under what conditions these groups expand and diversify their economic activities.

We start our descriptive analysis presenting recent trends in the presence of each TCE in neighborhoods of Rio de Janeiro’s metropolitan area. Figure 4.5 shows that the Comando Vermelho (CV) is the most active group in the region, being present in 39 percent of neighborhoods in 2019. Comando Vermelho has increased its presence since 2008, while militia groups and Terceiro Comando Puro (TCP) presented a marked increase in 2018 and 2019. Our data also indicate a decreased presence of the gang Amigo dos Amigos (ADA) since 2018, which matches accounts that this drug gang lost power during that year.¹⁸ Even though *favelas* and housing projects in the city of Rio are still subject to active changes of power, most of the recent upward

18. See <https://projects.theintercept.com/death-of-a-rio-cartel/>

trend in group presence is explained by the expansion of criminal groups to neighborhoods in the outskirts of Rio. The maps from figures 4.2a and 4.2b present the spatial evidence of this expansion between 2009 and 2019.

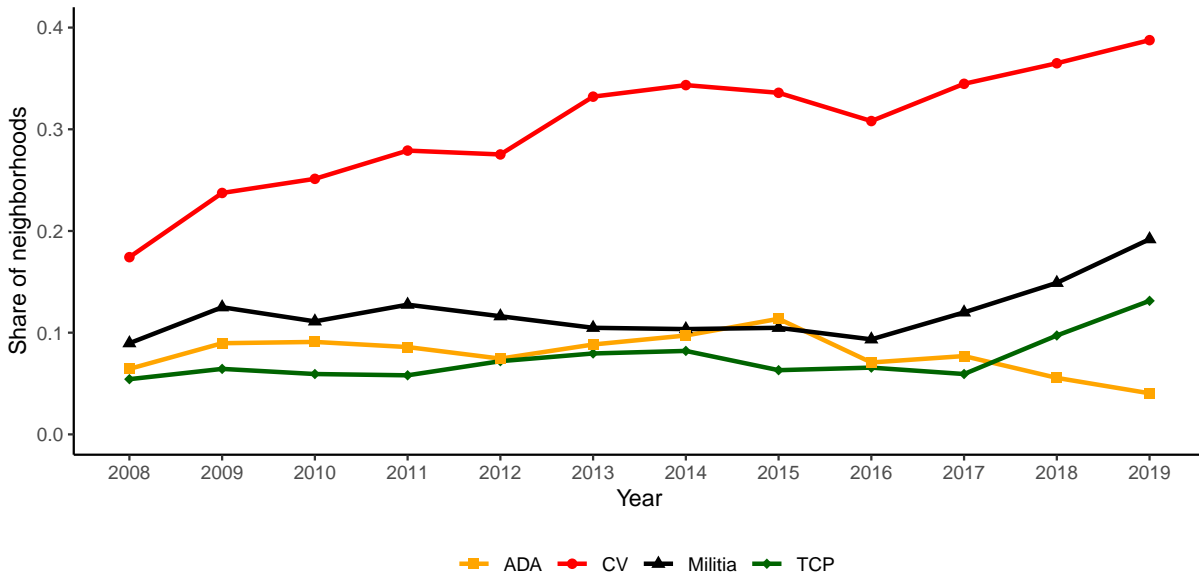


Figure 4.5: Share of neighborhoods with presence of each TCE

We next analyze whether groups operate alone or govern *favelas* close to other groups’ turf. Figure 4.6 depicts the evolution in the percentage of neighborhoods that are ruled by TCE in three mutually exclusive categories: i) only one militia group; ii) one drug gang; and iii) more than one group in the neighborhood (militia or drug gang). In comparison to earlier years, it has become more common for groups to be the only group in a neighborhood. This is one indication of higher levels of criminal consolidation. In the next sections, we explore the broader implications of this surge for criminal groups’ economic decisions and violence levels.

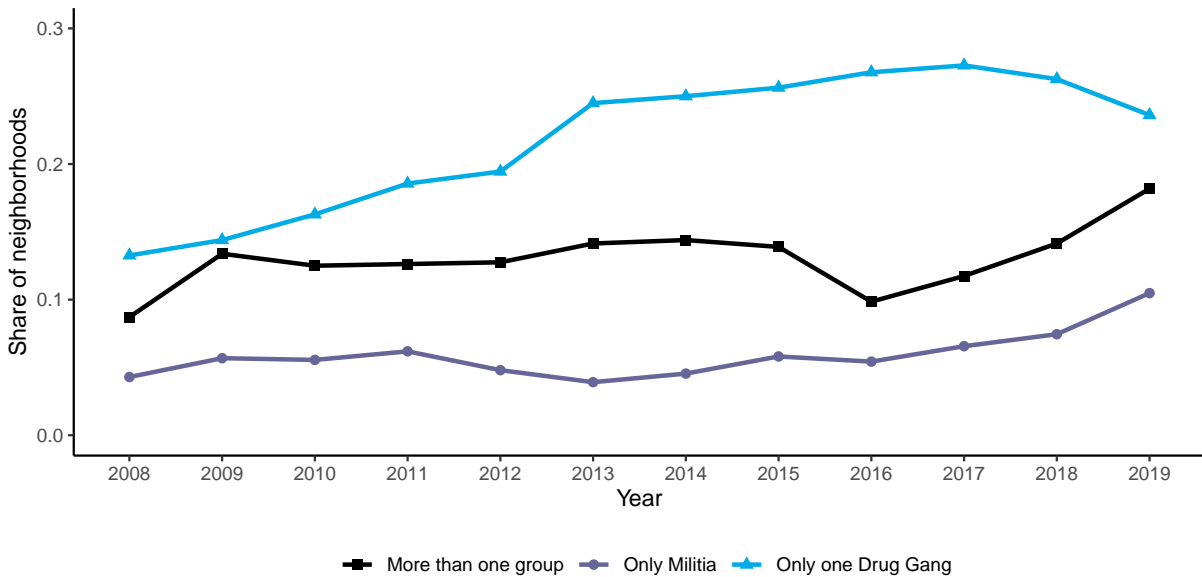


Figure 4.6: Share of neighborhoods with different types of TCE

Finally, another central contribution of this article is to analyze the economic side of TCEs. We then proceed our descriptive analysis to report the different economic activities exploited by TCEs. Many definitions of organized crime are restricted to illegal business. Reuters (2009) define organized criminal groups as private firms that operate illicit markets. These groups often grow by exploiting illegal markets and many studies overlook the economic diversification of criminal groups. Yet, economic diversification is seen in several contexts. The engagement of organized criminal groups into the trade and service of licit activities has been documented in studies about the mafia (Anderson 1997) and for combos that operate in Medellin, Colombia (Blattman et al. 2018b). TCEs do not restrict their activities to illegal markets and they do not only seek to govern and control the whole economic structure of the underworld Schelling (1971) but to maximize profits.

Table 4.5 describes the share of different types of economic activities exploited by the TCEs in Rio de Janeiro. Panel A presents illicit activities, i.e. goods and services that are considered criminal businesses such as drug trafficking, extortion, loan sharking, and gambling.

Panel B presents licit activities or services that are also provided by private companies and firms not related to crime, such as cable TV and gas.¹⁹ Historically, militias have focused on extortion while drug gangs, which often have members that grow up in the communities they govern, are known to avoid extorting community members. Their main business is centered around drug trafficking. However, Table 4.5 shows that both militias and drug gangs exploit a wide range of economic activities.

Panel A of Table 4.5 shows that while drug trafficking is exploited by virtually all drug gangs, the militias' main source of revenue is extortion fees.²⁰ Importantly, we show that militias often sell drugs (22% in 2019) and drug gangs extract rents from extortion (30% in 2019). This evidence highlights the necessity of studying these groups through the unique lenses of Territorial Criminal Enterprises, since criminal groups are not restricted to unique economic activities. Moreover, the results from the table point to a relative change for militias from illegal gambling to loan sharking between 2009 and 2019.

To expand our analysis to licit goods and services, Panel B in Table 4.5 presents the share of groups exploring activities such as the provision of cable TV and internet, informal transportation, and the distribution of water and cooking gas, among others. To reinforce our previous results, the main result from this panel is that militias engage in more licit markets than drug gangs. Around 10% of drug gangs control the provision and distribution of these services — with the exception of land and real estate, in which 21% of gangs explore these markets. On the other side, it is more common for militias to control shares of provision of services and goods. Despite the fall between 2009 and 2019, militias are still very strong in the market of cable TV and internet for territories controlled by them. Furthermore, while their investments in the distribution of cooking gas and transportation seem to have declined, they have increased their participation in water distribution, electricity, and construction — markets with high entry costs.

19. Gas and water refer to cooking gas cylinders and water gallons.

20. This confirms previous studies that describe the activities of these groups in selected territories.

In summary, there has been a change in the composition of activities exploited by these groups. Militias now invest in the selling of illegal substances and increased their participation in legal activities such as the provision of electricity and the distribution of water. Drug factions maintain drug trafficking as their main business, but also engage in extortion. Most importantly, drug factions have not changed their portfolios as much as militias. In the next section we explore the reasons behind this difference.

Table 4.5: Share of Militias and Drug Gangs exploiting economic activities

	TCE					
	Militias			Drug Gangs		
	2009	2019	Δ (p.p.)	2009	2019	Δ (p.p.)
<i>Panel A: Illicit Goods and Services</i>						
Drugs	19%	22%	3	100%	98%	2
Extortion	92%	91%	-1	28%	30%	2
Loan Sharking	10%	28%	18	2%	6%	4
Gambling	28%	11%	-17	7%	7%	0
<i>Panel B: Licit Goods and Services</i>						
TV & Internet	66%	41%	-25	11%	15%	4
Transportation	31%	14%	-14	14%	2%	-12
Properties and Land	19%	24%	5	19%	21%	2
Electricity	7%	19%	12	5%	6%	1
Water	15%	27%	12	5%	7%	2
Gas	38%	38%	0	7%	10%	3

4.5 Theoretical Framework

We define territorial criminal enterprises as criminal actors that can exert coercion in a given territory in order to establish local monopolies of illegal and legal goods and services. In order to accomplish this goal, these groups need to fight two enemies: the state, which holds by

law a monopoly over coercion and other criminal groups that also seek to exploit these markets. Therefore, a key decision for criminal groups is whether to invest in military capacity to protect their turf from the state and rival groups. This investment is costly and prevents the group from investing in their business enterprise. However, military capacity is crucial to guarantee property rights. In this section, we present a model in order to analyze how criminal groups' decisions depend on state and rival groups' response. This allows us to understand the conditions needed to achieve two different equilibria: one with high levels of violence and low economic diversification and the other with low levels of violence and high economic diversification. This model also helps us to understand how the characteristics of drug gangs and militia groups may make the equilibrium with lower violence easier to achieve.

4.5.1 Intuition of the Model

The theory is based on a game theoretic model that sheds light on the strategic interactions between criminal groups and the state. A criminal group controls a territory when it successfully uses force or threats to suppress competition and maximize profits in this territory. In practice, to achieve this, the group may employ different levels of military control over an area to deter contestants.²¹

The first contestant is law enforcement agents that represent the state repression apparatus, especially the police. When law enforcement agents use military means to enforce the law and criminal groups engage in direct confrontation the results are intense conflict and violence. When the state is willing to negotiate with criminal groups and these groups decide to engage

21. Blattman et al. (2018b) document the role of *razones* in supplying protection and regulating conflict among Combos in Medellin. In El Salvador, violence levels dramatically dropped after the truce between the gangs broke (Cruz and Durán-Martínez 2016). In Italy, *cosca mafiosa* manages relationships among the criminal groups and regulates disputes (Anderson, 1995). There is very limited research on whether these territorial criminal enterprises engage in negotiations to set boundaries and resolve disputes but historically criminal groups in Rio de Janeiro are intermittently involved in gunfights (Monteiro and Rocha 2017) which suggest that there is no mechanism in place to resolve disputes with less violence. Nevertheless, the literature has emphasized that gang truces and other types of negotiations have proven unstable (Cruz and Duran-Martinez, 2016).

in corruption and bribery, an equilibrium with low violence emerges alongside opportunities to exploit more markets. Therefore the decision on whether and how aggressively to seize illegal goods or jail or kill crime bosses affects criminal groups' time horizons (Castillo and Kronick 2020), and thus their ability to invest in more markets. In this case, group connections with police officers to avoid repression may affect violence and economic outcomes.

On top of the state, the control over a particular area can be constantly challenged by other criminal groups who also want to exploit markets in the territory to extract rents. Hence, if criminal groups have to dispute the territory with other groups, they have to spend more in conflict, and they can lose their territory and profits from economic activities within the territory at any moment. Conversely, if a group dominates an area such as there are no threats from other groups to challenge their power, they consolidate their local authority affecting aspects of everyday life — such as who enters and exits a community — and are able to diversify their economic activities. Therefore, territorial criminal enterprises must engage in dispute or collusion with the legal government in order to be able to coerce the population and establish its domain. This theory not only helps understand the behavior of these groups, but also allows us to explain violence and when groups expand their economic activities.

4.5.2 A Model of Territorial Criminal Enterprises

Setup

Our framework is based on a normal-form game with two types of agents: criminal groups and the state. An Incumbent criminal group i controls a territory that can be contested by a Rival group j or the State s . We present this model for two scenarios.

First, the incumbent criminal group i does not have to deal with rival groups nearby and is only contested by the state. This is the case for territories that are either isolated or when there are large areas controlled by a single group. In the second scenario, besides the state, there

is a rival criminal group posing a threat to the incumbent. Rival group j faces the exact same incentives as incumbent group i in his territory and is contested both by the other criminal group and the state.

One Criminal Group and State Intervention

In this case, the only players are the incumbent criminal group i and the state s . Criminal group i chooses whether to invest or not in arming to fight and protect its territory, which we model as strategies $\{Fight, Not Fight\}$. Simultaneously, the state s decides whether to intervene militarily in a territory and repress the group or not, i.e. it chooses from the strategy set $\{Intervene, Not Intervene\}$. Table 4.6 presents the payoffs each agent gets for each combination of strategies.

Table 4.6: Payoff matrix - one criminal group and the state

		State	
		<i>Intervene</i>	<i>Not Intervene</i>
Incumbent	<i>Fight</i>	$\pi_i - c_f, \rho - c_g$	$\pi_i - c_f, 0$
	<i>Not Fight</i>	$\pi_i - g, \rho - c_g$	$\pi_i + \pi_i^k - b, b$

The incumbent i always manages to extract profit π_i from local economic activities. Fighting is costly for criminal groups and they incur a cost c_f when they choose to arm themselves. However, fighting avoids economic losses g from state intervention, which negatively impact the criminal group's payoff otherwise. This economic loss is associated with seizures, disturbances in economic activities and arrests or deaths of members of the criminal group. When the incumbent decides not to fight and the state does not intervene, a bribe b is transferred to the police. In this case, colluding with state allows the criminal group to expand its business and exploit an additional market $k : \pi_i^k$.

For the state, besides the bribe b it may receive from the incumbent group, the parameters that govern its decision are related to the costs and benefits of the intervention. In order to contest the criminal group, it incurs c_g , which are associated with the costs of military capacity. On the other hand, there is a political return ρ of being tough on crime and fighting criminal groups.

We assume that $\pi_i^k > b$, which implies that rents from economic activities are high enough to bribe state agents. Since we observe the state's military repression in the data, we assume $\rho > c_g$, otherwise the state would not have an incentive to repress criminal groups.

Best responses and Nash equilibria

Incumbent's strategy $S_{incumbent}$ is as follows:

$$S_{incumbent} = \begin{cases} Fight & \text{if } S_{state} = Intervene \text{ and } g > c_f \\ Not Fight & \text{if } S_{state} = Not Intervene \end{cases}$$

If the state intervenes, the criminal group invests in military capacity and fighting if $g > c_f$. If the state does not intervene, the criminal group does not fight because $\pi_i^k - b > -c_f$.

For the State, the best strategy is:

$$S_{state} = \begin{cases} Intervene & \text{if } S_{incumbent} = Fight \\ Not Intervene & \text{if } S_{incumbent} = Not Fight \text{ and } b > b^* \end{cases}$$

If the criminal group invests in military capacity, the state intervenes because $\rho > c_g$. If the criminal group does not invest in military capacity, there is a level of bribe $b^* = \rho - c_g$ that makes the state indifferent in using repression. Therefore, for bribes $b \in (b^*; \pi^k)$ this game has two Pure Strategy Nash equilibria: {Fight, Intervene} and {Not Fight, Not Intervene}.

This simple framework leads to interesting insights. First, the bribe needed to avoid state repression increases with the political return to the use of military force. Second, there is an

incentive for groups not to engage in fights whenever there are rents they can collect in a peace environment.

This setup also helps us think about the difference between drug gangs and militia groups. While both can collude with the government, militia groups are better able to avoid economic losses from government crackdowns. This occurs because they have policemen in their ranks who provide key pieces of information used to avoid seizures and arrests even when the state decides to intervene. In our context, this could be modeled as lower levels g for militias in comparison with drug gangs: $g_m < g_d$.²² Therefore, for militia groups that are able to influence g_m to the point that it is lower than c_f , investment in military capacity is a dominated strategy because there is not a threat of big economic losses due to state repression, and the only equilibrium is {Not Fight, Not Intervene}.

Two Criminal Groups and State Intervention

We advance our framework to incorporate another criminal group, a rival group j . Intuitively, when another group controls a nearby territory, an incumbent faces the threat of losing its territory to the contestant. Rival group j is symmetric to the incumbent, which means it is choosing whether to fight or not to protect its territory from the state and the nearby group. Table 4.7 presents the payoff matrix for this scenario.

The main difference from Table 4.6 is that the decision of the rival group j affects the payoff of the incumbent i . If one criminal group fights and the other concedes, the criminal group takes its rival's territory and rents. $I(j = F)$ is an indicator function that turns on when the rival group invests in military capacity to contest the incumbent group. π_i represents the income from territory controlled by i and π_j represents the income from territory controlled by j .

22. Given their proximity with state agents, militias are more likely to be informed about state interventions in controlled territories. Therefore, they can prepare beforehand, avoiding apprehension and seizure of products. According to statements by a prosecutor, when there is a state operation in an area controlled by drug factions, the police seize drugs and guns. This is a huge cost for drug factions. However, when operations happen in territories controlled by militias, the operation is less likely to be successful. Militias can hide and avoid the economic loss caused by interventions.

Table 4.7: Payoffs for the game with two criminal groups and the state

		State	
		<i>Intervene</i>	<i>Not Intervene</i>
Incumbent	<i>Fight</i>	$(\pi_i + \pi_j * (1 - I(j = F)) - c_f, \rho - c_g)$	$(\pi_i + \pi_j * (1 - I(j = F)) - c_f, 0)$
	<i>Not Fight</i>	$(\pi_i - \pi_i * I(j = F) - g, \rho - c_g)$	$(\pi_i + \pi_i^k - (\pi_i + \pi_i^k) * I(j = F) - b, b)$

Best responses and Nash equilibria

First, the decision of the state is equivalent to the previous scenario with only one group: the state intervenes whenever the incumbent group invest in military capacity, and does not intervene otherwise provided $b > \rho - c_g$.

The criminal group's decision follows the strategy profile below:

$$S_{incumbent} = \begin{cases} Fight & \text{if } S_{state} = Intervene \text{ and } S_{rival} = Fight \\ Fight & \text{if } S_{state} = Intervene \text{ and } S_{rival} = Not Fight \\ Fight & \text{if } S_{state} = Not Intervene \text{ and } S_{rival} = Fight \\ Fight & \text{if } S_{state} = Not Intervene, S_{rival} = Not Fight \text{ and} \\ & \pi_j - c_f > \pi_i^k - b \end{cases}$$

The first and third decisions to fight are straightforward because losing its territory and rents π_i heavily impacts the incumbent's payoff ($\pi_i - c_f > 0 > -g, -b$). Likewise, the possibility to take the rents from the rival's territory exceeds the opportunity cost of not fighting whenever the rival decides not to fight and the state intervenes ($\pi_j - c_f > 0 > -g$).²³

When the state does not intervene and the rival does not fight ($j = N$), the incumbent decision depends on the economic return of acquiring the rival's territory ($\pi_j - c_f$) and net

23. If the state intervenes and the rival group fights ($j = F$), the incumbent always fights ($\pi_i - c_f > 0 > -g$). If the state intervenes and the rival group does not fight ($j = N$), the incumbent always fights ($\pi_j - c_f > 0 > -g$). If the state does not intervene and the rival group fights ($j = F$), the incumbent always fights ($\pi_i - c_f > 0 > -b$).

profits from exploiting additional markets locally ($\pi_i^k - b$). If $\pi_j - c_f > \pi_i^k - b$, then the only Nash equilibrium is the one in which groups fight and the state intervenes. However, the model indicates that it is possible to have a second Nash equilibrium equilibrium where nobody fights if $b > \rho - c_g$ and $\pi_i^k - b > \pi_j - c_f$.

4.5.3 Predictions

This game with two scenarios allows us to understand why equilibria with different levels of violence and economic diversification may emerge. While the state's decision depends on the political benefits of repressing the groups, the criminal groups are affected by their disputes and attacks from enemies — the state and a rival criminal group — and the economic incentives of governing in a peaceful environment — which allows groups to exploit more economic activities. In other words, the interaction between criminal groups and the state determines the outcomes of interest: violence and economic diversification.

The economic opportunities that emerge in a more peaceful and consolidated environment are captured by π_i^k in our model. These activities include the provision of a diverse range of goods and services such as local transportation, the selling of gas canisters, the wholesale of bottled water, internet services and cable TV, and gambling, among others. These are markets that criminal groups generate profits by using its coercive power to suppress competition. However, this requires more investment and time horizon than selling illicit drugs or charging fees for protection. For instance, in order to enter the market for internet services, criminal groups must install cables and cut the infrastructure of other suppliers. Therefore, groups will diversify their activities when they are not being contested in a territory.

Our framework with state and criminal group interactions leads to three predictions for what we should observe in the data. The first prediction refers to the level of consolidation in the territory. When criminal groups are not isolated from rival groups, they invest in more military capacity, increasing the level of conflict and state repression. This is summarized in the

Prediction 1:

Prediction 1. *Areas with more than one criminal group experience more conflict and state repression.*

The equilibrium where groups and the state collude is more likely to emerge when criminal groups are alone or consolidated in an area. When there is more than one group, on top of the state condition regarding the amount of the bribe ($b > \rho - c_f$), the equilibrium without conflict only emerges if the net profits from exploiting additional markets locally are high enough $(\pi_i^k - b) > (\pi_j - c_f)$.

In addition, this game also sheds light on the comparative advantages of militia groups relative to drug gangs, which is stated in Prediction 2.

Prediction 2. *Areas with militia groups experience less state repression in comparison with areas with only one drug gang.*

We argue that militia groups are better suited to minimize the economic loss from state intervention, reducing g . This is supported by qualitative evidence. When criminal groups do not face rival groups nearby and the economic loss g generated by the state is lower for militias ($g_m < g_d$), then this type of group has no incentive to fight, and it is more likely to observe the equilibrium with low levels of conflict and state repression.

Prediction 3 refers to the change in the number of economic activities exploited by the criminal groups that facing rival groups generates relative to scenarios of criminal consolidation.

Prediction 3. *Criminal groups, especially the militia groups, exploit more markets when not facing the threat of a rival group.*

Territorial criminal enterprises, which we argue control territories to extract rents, are more likely to exploit more markets when they are not being contested by other groups. In this case, the equilibrium in which criminal groups colludes with the state becomes more feasible,

especially for militia groups that always avoids violent equilibria and end up exploiting more markets.

4.6 Empirical Strategy

This section details how we measure the effect of interactions between territorial criminal enterprises on violence and the portfolio of economic activities exploited by them. First, we test whether the number or type of criminal enterprise at neighborhood level is associated with several indicators of violence. As pointed out by Sobrino (2019) for Mexican Drug Cartels, the number of groups in the territory represents an important driver of local violence.

We run the following regression:

$$violence_{nt} = \alpha + \beta NumberTCE_{nt} + \delta_n + \gamma_t + \varepsilon_{nt} \quad (4.1)$$

where $violence_{nt}$ takes three different measures of violence for neighborhood n in year t : i) the total number of homicides; ii) the number of gunshots using *Fogo Cruzado* NGO data, and iii) an indicator variable of police killings. Both homicide and police killings are official data registered by the police and disclosed by ISP. The main explanatory variable is $NumberTCE$ refers to the total number of TCE in the neighborhood and is based on our Disque-Denuncia algorithm. We also include in the regression neighborhood and year fixed effects. The parameter of interest β captures how the number of criminal groups are associated with violence at the neighborhood level. In order to test whether the type of criminal group matters, we also run alternative regressions replacing $NumberTCE_{nt}$ by indicator variables for whether there is the presence of militia groups, one drug faction and more than one drug faction at neighborhood n . This allows us to estimate changes in violence associated with changes in the type of group that rules an area. Therefore, any neighborhood characteristics that do not vary in the short run are controlled in our analysis.

The second outcome of interest is economic activities and diversification. We test whether the interaction between territorial criminal enterprises is related to a higher degree of economic diversification within groups. To investigate this question, we combine information on economic activities reported to *Disque-Denúncia* and previous field work data from Alba Zaluar in 2009 and 2013, which identifies TCE presence at the *favela* level. We refrain from using data from *Disque-Denúncia* to identify group presence in this exercise because our algorithm is a function of reports of TCE exploiting economic activities. Therefore, we use an independent source to determine which *favela* is controlled by which group in order to make our test cleaner. In this case, we define that a group exploits a given market if there is at least one report for this practice in its territory. Our dependent variables are three-fold: i) whether a group extorts or charges of fees for protection; ii) whether a group engages in illegal drug retail trade and iii) the sum of other exploited markets (gas canister, water, internet, transportation, electricity, gambling, real state and loan sharking). Equation 4.2 specifies the model.

$$EconActivity_{fy} = \alpha + \beta I(Rival = 0)_{fy} + \delta_f + \gamma_y + \varepsilon_{fy} \quad (4.2)$$

For a given *favela* f , we test whether changes in having at least one rival nearby affects the economic activities (*EconActivity*) exploited by the incumbent. We define that a group in a *favela* faces a rival in its surroundings if another group rules another *favela* that is within 1000 meters.²⁴ We use the lack of a rival group as a measure of criminal consolidation. Equation 4.2 adds *favela* fixed effects and year fixed effects to uncover the effect of having a rival nearby controlling for a specific time and *favela* invariant characteristics.

24. The results are robust to alternative distances: 500m, 1500m and 2000m.

4.7 Results

Our model suggests that areas with more than one group experience more conflict and state repression (Prediction 1) and that criminal groups exploit more markets when not facing the threat of rival groups (Prediction 3). In addition, it indicates that militia groups are more likely to end in the peaceful equilibrium because they are able to avoid the losses produced by state repression and even reduce state intervention. This implies that areas where militia groups consolidate their territorial control experience less state repression than areas with only drug gangs (Prediction 2).

Violence Levels

Conflict with other criminal groups and the state influences local violence. To evaluate how the presence of other criminal groups influence conflict, we look at the number of territorial criminal enterprises at the neighborhood-level. The odd columns of Table 4.8 presents the results of estimating two-way fixed effect models from equation 4.1 for each of the three measures of violence. Columns (1), (3) and (5) show the relationship between the total number of TCEs and homicides, shootings and police killings. Since police killings are rare events in the data, the dependent variable in column five is the probability of observing any death in a given neighborhood-year (linear probability model). Controlling for neighborhood and year fixed effects, the results indicate that an additional criminal group in a neighborhood is associated with 0.69 more homicides (or 34%), 2.08 more shootings (or 82%) and an increase in 0.04 in the likelihood of having someone killed by police (or 33%).

Columns (2), (4), and (6) replicate the same regressions changing the explanatory variables to categorical variables indicating four possible types of ruling in the neighborhood, as shown in Figure 4.6. The coefficients associated with $TCE > 1$, *Only Militias* and *Only one Drug Gang* refer to the increase in violence relative to periods without any groups in the neighbor-

hood (reference category). Homicides are 27% more common in territories with only one drug gang and 71% higher when there is more than one TCE. Interestingly, the results indicate that neighborhoods controlled by militia groups do not register more homicides than neighborhoods without criminal groups. As expected, shootings are a lot more likely when more than one criminal group is present at the neighborhood, 124% on average. The results confirms prediction 2 and indicates that state military intervention is less frequent in neighborhoods where only militia groups are present. Similar to homicide results, these areas do not register more police killings than neighborhoods without criminal groups. On the other hand, neighborhoods where more than one criminal group is present experience at least one police killing 10 percentage points more often than no criminal groups (or 83%), while neighborhoods with just one drug gang are 5.6 p.p. more likely to register this type of event at least once (or 47 %). In sum, these results support the previous evidence that having more than one group increases overall levels of violence and our model's prediction that the police uses more force against drug gangs.²⁵

25. Appendix C.4 presents results using Poisson regression models with roughly the same conclusions.

Table 4.8: Group presence and violence

	<i>Dependent variable:</i>					
	Homicides		Shootings		Police Killings	
	(1)	(2)	(3)	(4)	(5)	(6)
Number of TCE	0.691*** (0.160)		2.076*** (0.613)		0.042*** (0.009)	
TCE >1		1.462*** (0.298)		3.097** (1.318)		0.103*** (0.022)
Only Militias		-0.530 (0.339)		0.314 (0.759)		-0.042 (0.026)
Only one Drug Gang		0.554*** (0.142)		-0.039 (0.801)		0.056*** (0.015)
Model	OLS	OLS	OLS	OLS	LPM	LPM
Mean DV	2.04	2.04	2.50	2.50	0.12	0.12
Neighborhood FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
R ²	0.818	0.818	0.886	0.886	0.493	0.495
Observations	9,504	9,504	2,376	2,376	9,504	9,504
Neighborhoods	792	792	792	792	792	792
Years	12	12	3	3	12	12

Note: Std. Error clustered at the neighborhood level. *p<0.1; **p<0.05; ***p<0.01

Economic Activities and Diversification

To test Prediction 3, that criminal groups, especially the militias, exploit additional markets when not facing the threat of a rival group, we look at three different economic outcomes: (1) extortion, (2) drug trafficking, and (3) other markets. These variables are measured using the Disque Denuncia data. To avoid using the same data source for both our dependent and independent variables, we use data on group presence at the *favela* level provided by Zaluar. In this analysis, we reduce our sample for the period of 2009 and 2013.

Table 4.9 presents the results in two different panels, one for *favelas* run by militias (Panel A) and another one for *favelas* whose incumbent is one of the three drug gangs (Panel B). The results indicate that when militias are alone in a territory and unlikely to be contested by other criminal groups, the probability of engaging in extortion increases in 25 percentage points or 43%. Also, as predicted by our model, the number of markets exploited by militias is four times higher when there is no rival group threatening its territory.

Interestingly, this does not seem to be the case for drug gangs, as shown in Panel B. We do not find that drug factions expand their activities, including drug trafficking, when they are alone in a territory. From our model and the results from Table 4.8, we argue that this key difference is explained by their relationship with the state: relative to militias, drug gangs are more likely to be contested by the state when not facing threat from rival groups. In sum, the heterogeneity of our results most likely reflects the different degrees of interaction that these groups have with the state.

Table 4.9: Criminal Consolidation and Economic Activities

	<i>Dependent variable:</i>		
	Extortion	Drugs	Other markets
	(1)	(2)	(3)
<i>Panel A: Militias</i>			
I(Rival = 0)	0.254** (0.117)	0.154 (0.147)	1.011** (0.498)
Constant	0.589*** (0.026)	0.000 (0.019)	0.236*** (0.067)
Observations	534	534	534
R ²	0.658	0.570	0.716
<i>Panel B: Drug Factions</i>			
I(Rival = 0)	0.039 (0.079)	0.006 (0.101)	-0.045 (0.173)
Constant	-0.007 (0.042)	0.925*** (0.053)	0.087 (0.095)
Observations	718	718	718
R ²	0.582	0.622	0.716

Note: Std. Error clustered at the favela level. *p<0.1; **p<0.05; ***p<0.01

4.8 Conclusion

Criminal groups are one of the main public security threats in many countries around the world. They govern territories, increase violence, and affect the life of millions of people. This paper analyzes these groups through the lens of territorial criminal enterprises — i.e. profit-maximizing firms that monopolize violence and coercion in a given territory to control economic markets. We create a novel dataset to map the presence of territorial criminal enterprises in neighborhoods of Rio de Janeiro and analyze the different illegal and legal markets exploited by them.

Our paper reveals that the levels of territorial domination of criminal groups in the city of Rio de Janeiro have not changed much over the last 12 years. Instead, we document a continuous increase in criminal group presence in the outskirts of the city of Rio de Janeiro. We also document that militia groups and drug factions are multi-product enterprises that exploit a wide range of licit and illicit goods and services. It is often assumed that militias engage mostly in extortion as their primary business and drug factions would never extort and focus mainly on drug trafficking. Our paper shows that these groups have converged towards territorial criminal enterprises, and that both groups exploit a wide range of economic activities. However, the main difference between them is their capacity to cooperate with the state. Past research has studied how state repression can affect cartel-state conflict (Lessing, 2018) or cooperation between traffickers (Castillo and Kronick 2020). We contribute to this scholarship by studying how turf wars and state repression can affect not only violence levels but also the diversification of economic activities.

We build a model to explain how criminal groups interact with the state and other criminal groups, leading to conflict and the expansion of criminal activities. We test the predictions of our model using a novel dataset combined with existing detailed data on criminal groups in Rio de Janeiro. Our main results show that territories with more than one TCE are more violent.

Also, territories controlled by gangs are more likely to experience state repression than territories controlled by militia groups. Finally, we show that territorial consolidation is important for economic diversification, but only for territories controlled by militias.

The difference between militias and drug gangs is of remarkable importance to our understanding of criminal groups. We demonstrate that this is possible because militias have better skills to collaborate with the state. This result applies to other criminal groups that are able to negotiate with the state and corrupt police officers, as in the case of Mexico and Italy. Once the group diversifies, it grows and can reduce even more violence by avoiding repression. At the same time, militias strengthen their local power while subjecting citizens to the control of criminal groups. This indicates that even in scenarios with low levels of violence, these groups are flourishing and becoming even bigger threats to state power.

Our data also suggest that most of the policies that governments have pursued so far have been inefficient in curbing the expansion of these groups. In particular, our framework helps to shed light on the fact that the war on drugs pursued by many governments in Latin America, which is highly focused on direct confrontation has limited efficacy in restraining the power of territorial criminal groups. The survival and growth of TCEs depend on state policies and interactions with state agents. Any policy to curb these groups needs to consider that many people who are supposed to implement these policies are oftentimes colluding with criminal groups. Therefore, the fight against territorial criminal enterprises must encompass approaches to discipline and monitor government repression apparatus and increase the provision of public goods in poor areas to combat these groups by affecting their businesses.

This chapter is coauthored with Monteiro, J. Fagundes, E. and Chaves, R. The dissertation author was a primary investigator and author of this chapter.

Chapter 5

Conclusion

Violence and crime are major issues in Latin America and considered the most serious problem by Latin Americans.¹ Even with the decline in poverty and income inequality in the past two decades, violence continues to increase in most countries (Chioda 2017) including Brazil. Homicide rates in Brazil are among the highest in the world. To better understand the dynamics of crime and homicides, I propose to disaggregate different types of violence.

In this dissertation, I investigate the causes of two types of violence in Brazil: political assassinations and criminal violence. In the introductory chapter, I build upon the works of scholars who recognize the importance of disaggregating political violence to conceptualize and describe *political assassinations*. I also show how political assassinations are distinguished from criminal violence, which is perpetuated by criminal groups disputing territories.

Commonly discussed categories of violence fail to account for different types of violence observed in developing democracies. Sambanis (2004), Kalyvas (2006) and Blattman and Miguel (2010) have argued that it is hard to distinguish types of violence, and that the distinction between various forms of political instability — civil wars, interstate wars, coups, communal violence, political repression, and crime — "has largely been assumed rather than demonstrated."

1. According to data from AmericasBarometer.

(Blattman and Miguel 2010, p. 6). For instance, Kalyvas (2015) recommends that a way to improve research is to disaggregate and identify dimensions where research on civil wars and organized crime can be particularly productive. He advocates for a "productive cross-fertilization," which should also be applied to electoral violence and political assassinations. It should be noted that political assassinations are different from electoral violence and criminal violence in numerous ways, including who is involved, and when and why the violence is executed. Nevertheless, the study of political assassinations can inform studies of other types of violence (and vice versa). My study seeks to strengthen our understanding of political violence by exploring this prominent type that is typically ignored by the extant literature — political assassinations.

Chapter 2 investigates the correlates of political assassinations at the individual and context-level. I begin by conceptualizing political assassinations and presenting how I measure assassinations of local politicians in Brazil over the past two decades. One of various important findings is that violence against politicians is not strongly correlated with overall homicides, suggesting that the two phenomena are not explained by exactly the same constellation of determinants. Urbanization rates, for instance, that are highly correlated with homicide rates, are not good predictors of political assassinations. With respect to the victims, some of the individual-level characteristics that are positively correlated with assassinations are being a man, lower level of education, and winning a mayoral election.

In Chapter 3, I develop and test a theoretical mechanism by which corruption affects political violence. Political office provides access to personal benefits and economic rents. I argue that politicians often enter corrupt contracts that are not enforceable in courts. Corruption, thus, affects political assassinations through two distinct channels. First, politicians use assassinations an enforcing mechanism for corrupt contracts that are vulnerable to holdups. Second, assassinations are an effective way to prevent whistle-blowing. Brazil offers a great opportunity to study the effect of corruption on political violence. I exploit the randomized anti-corruption audits that have proven an effective way to reduce corruption and the size of the government that

are associated with high levels of corruption. I find that anti-corruption audits reduce assassinations and assassinations are associated with larger governments, that also amplify the effect of corruption. This is an important finding, especially considering that corruption is so prevalent in the country. In addition, it highlights how criminality is widespread in politics and that corrupt politicians can go as far as killing to protect their crimes.

Finally, I shift the focus from political assassinations to the operation of criminal groups. Given lack of data availability for the country, this chapter centers on the case of Rio de Janeiro, where several criminal groups have controlled parts of the city and its metropolitan region. Despite state interventions and police raids, these groups have expanded both spatially and economically. They have flourished not in the absence of the state, but rather by cooperating with the state. The chapter deepens our understanding about how criminal groups' interactions with the state and rival groups affect their ability to expand geographically and diversify their economic activities.

Taken together, the present dissertation underscore the extent to which political and criminal violence are key issues in Brazil. My findings may likely generalize to other contexts where the political office represents opportunities for rent seeking, corruption shapes interactions between state and non-state actors, various factors motivate political actors to engage in criminal activity. The connection between crime and politics is not restricted to Brazil, and the findings in this dissertation are relevant beyond Brazil's borders, affecting not only public policy but also democracy itself. For instance, in Italy and Mexico, mafias and drug cartels kill politicians to influence who gets elected and what types of policies will be implemented (Trejo, Albarracín, and Tiscornia 2018; Alesina, Piccolo, and Pinotti 2019; Dipoppa 2020). In Colombia, politicians historically used violence against the opposition. Then, right-wing paramilitary groups likewise used their deep pockets and political connections not only to get members elected but also to execute left-wing politicians (Robinson 2013). In South Africa, politicians within the same party, the African National Congress (ANC), have murdered their counterparts in their

conflictual efforts to rise in party rank. All of these examples illustrate the importance of political assassinations and why it is important to study the phenomenon.

Some areas of future work which could extend and improve upon the research presented here include: (1) a more in-depth analysis of the mechanisms driving political assassinations; (2) the consequences of violence against politicians; and (3) expanding my study of criminal groups to the national level in Brazil. With regards to the first point about mechanisms, I am currently developing a model to understand the micro-incentives that drive politicians' decisions to enter corrupt contracts when they are exposed to violence. This is an excellent setup for formalization. These corrupt contracts are not observable, and a model helps to rollout alternative explanations and understand the causal mechanisms in the process. With regards to the second point about consequences, in the context of Brazil, where several systematic factors make substantial corruption possible such as natural resources and dysfunctional institutions, strong opportunities for corruption create incentives for politicians to assassinate other politicians. This influx of money into politics also shapes candidates' decisions to enter politics in the first place, attracting lower quality politicians (Vaishnav 2017). Also, institutions such as large coalitions and parliamentary privilege allow for the abuse of the control over the power and resources of government that facilitate these corrupt transactions (Geddes and Neto 1992). Future research should investigate whether political assassinations restrict the range of policies that candidates and elected officials advocate. Additionally, political assassinations may influence who decides to run for office, due to higher opportunity costs and exposure to violence. Moreover, future research should explore how political assassinations affect voter behavior. For example, are citizens mobilized by their disgust of political violence, as in the case of city councilor Marielle Franco's murder in Rio de Janeiro², or are they often driven to abstain from political engagement? One avenue for further exploration is whether the prevalence of political assassinations contributes to the 53% of Latin Americans who are dissatisfied with democracy (according to LAPOP, 2021).

2. <https://g1.globo.com/rj/rio-de-janeiro/noticia/manifestantes-protestam-pelo-pais-contra-a-morte-de-marielle-franco.ghtml>

Finally, with respect to studying organized criminal groups across Brazil, high-quality data availability is a key limitation in studying criminal activities, organized crime, and criminal violence. Along with several collaborators, I am currently working on mapping criminal activities at the municipal-level in Brazil. We combine several research methods from case studies to web scraping. Moreover, we are processing relevant information about organized criminal activity from national and subnational traditional media outlets, social media accounts, and Google News to construct a rich dataset on criminal groups. Our goal is to document systematically the dynamics of criminal organizations in Brazil, where they operate, their activities, and their interactions with other groups.

As shown in this dissertation, government engagement is essential to prevent violence. First, the reduction of violence against politicians may not happen through the same channels that are used to reduce overall levels of violence. Understanding which actors are involved and what their incentives are to kill is thus central to reduce political assassinations. Using government data to track different types of violence is vital for monitoring violence and addressing its causes. Second, I contribute to a broader policy debate about the consequences of anti-corruption crackdowns. Several corruption scandals unfolded in Latin America and their adverse consequences are well-known. More recently, scholars have engaged in how to reduce corruption and the effectiveness of anti-corruption programs (Gans-Morse et al. 2018). I provide evidence that policies aimed at reducing corruption can have positive collateral effects in reducing consequences of corruption, such as assassinations. Third, I show that not only politicians, but also other state officials can often be involved in corruption and other types of violent crimes. In the case of political assassination, the office represents not only access to power and resources but also enhance politicians' ability to get away with corrupt practices. In the case of criminal violence, the state is complicit in activities of criminal groups. This pattern raises a set of questions about how to implement policies to punish corrupt state and government officials who are often the ones that should implement policies against crime.

Stepping back, the present dissertation underscores the important, disturbing role that political violence plays in Brazilian politics. Both political assassinations and organized crime shape the experiences and incentives of political actors and broader populations. This has severe consequences for public policy as well as the functioning of democracy. Reducing such patterns of violence is crucially important, as it offers the opportunity to improve public security and to strengthen protection of human rights.

Chapter 6

Appendix

A Chapter 2

A.1 Assassinations and Elections

Table 6.1: Electoral Cycles and Political Assassinations (2001–2017)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Municipal Election Year	0.00416*** (0.00117)	0.00411*** (0.00117)	0.00425*** (0.00114)	0.00361*** (0.00118)	0.00363*** (0.00118)	0.00384*** (0.00115)
National Election Year	-0.00018 (0.00107)	-0.00013 (0.00107)	-0.00052 (0.00106)	-0.00065 (0.00107)	-0.00061 (0.00107)	-0.00095 (0.00107)
GDP per capita (Ln)	0.00214*** (0.00076)	-0.00146 (0.00116)	-0.00452 (0.00305)	0.00053 (0.00076)	-0.00200* (0.00116)	-0.00438 (0.00303)
Population (Ln)	0.01328*** (0.00081)	0.01376*** (0.00092)	0.01205* (0.00642)	0.00750*** (0.00081)	0.00833*** (0.00098)	0.01164* (0.00644)
Homicides Rate	0.00056*** (0.00003)	0.00057*** (0.00004)	0.00041*** (0.00004)	0.00054*** (0.00003)	0.00055*** (0.00004)	0.00041*** (0.00004)
Urban (% of Population)	-0.00336 (0.00227)	-0.01088*** (0.00278)	0.02979** (0.01507)	-0.01073*** (0.00237)	-0.01426*** (0.00284)	0.02850* (0.01535)
Black (% of Population)	0.04475*** (0.00984)	0.01774* (0.01066)	0.00170 (0.01900)	0.02299** (0.00995)	0.00039 (0.01071)	0.00285 (0.01915)
Second-term mayor ran				0.00056 (0.00092)	0.00046 (0.00092)	0.00038 (0.00097)
Share Votes Mayor				0.00870** (0.00350)	0.00625* (0.00355)	0.00181 (0.00421)
Number of Candidates (Ln)				0.01546*** (0.00138)	0.01371*** (0.00158)	0.00910*** (0.00272)
Observations	83,004	83,004	83,004	81,228	81,228	81,228
Time Trends	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	No	Yes	No
Municipal FE	No	No	Yes	No	No	Yes

Notes: This tables illustrates the effects of election years on political assassinations. The table reports the coefficients of OLS regressions with controls. The dependent variable is number of assassinations of politicians who ran in the last electoral cycle (active politicians only). The sample includes all municipalities between 2001 and 2016. All specification include time trends. I also include state fixed effects in columns (2) and (5) and municipal fixed effects in columns (3) and (6). Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

A.2 Individual-level Correlates

Table 6.2: Electoral Cycles and Political Assassinations (2001–2017) - Logit

VARIABLES	(1)	(2)	(3)	(4)
Municipal Election Year	0.02762 (0.05830)	0.03447 (0.05889)	-0.01711 (0.05933)	0.00632 (0.05996)
National Election Year	-0.07064 (0.06162)	-0.08946 (0.06256)	-0.10495* (0.06295)	-0.12005* (0.06386)
GDP per capita (Ln)	-0.10445** (0.04056)	-0.34058** (0.14546)	-0.18674*** (0.04284)	-0.32848** (0.14765)
Population (Ln)	0.54947*** (0.02107)	0.88357** (0.36710)	0.23337*** (0.03880)	0.91179** (0.37366)
Homicides Rate	0.02169*** (0.00083)	0.02080*** (0.00133)	0.02117*** (0.00085)	0.02108*** (0.00136)
Urban (% of Population)	-0.17387 (0.14844)	0.62983 (0.69699)	-0.50535*** (0.15170)	0.58993 (0.72291)
Black (% of Population)	1.74954*** (0.47066)	1.96276 (1.58887)	0.75566 (0.49375)	2.28830 (1.63013)
Second-term mayor ran			0.04336 (0.04996)	0.00656 (0.05475)
Share Votes Mayor			0.28235 (0.18550)	0.06800 (0.22632)
Number of Candidates (Ln)			0.76772*** (0.07836)	0.38856*** (0.13631)
Observations	83,004	19,233	81,228	18,420
Municipality FE	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
Time Trends	Yes	Yes	Yes	Yes

Notes: This tables illustrates the effects of election years on political assassinations. The table reports the coefficients of Logit regressions with controls. The dependent variable is an indicator variable taking value 1 if there was an assassination in the municipality-year, and 0 otherwise. The sample includes all municipalities between 2001 and 2016. All specification include time trends. I also include state fixed effects in columns (2) and (5) and municipal fixed effects in columns (3) and (6). Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6.3: Individual-Level Determinants of Assassinations - Logit

VARIABLES	(1) All	(2) All	(3) Active Only	(4) Active Only	(5) All	(6) All	(7) Active Only	(8) Active Only
Male	0.12251*** (0.01830)	0.10798*** (0.04046)	0.23810*** (0.03527)	0.22200*** (0.08318)	0.10124** (0.05023)	0.03751 (0.04257)	0.18421* (0.09866)	0.16090 (0.20780)
Age	-0.00035*** (0.00012)	-0.00001 (0.00023)	-0.00027 (0.00030)	0.00013 (0.00054)	0.00007 (0.00031)	0.00018 (0.00030)	0.00019 (0.00051)	0.00070 (0.00106)
Years of Education	-0.05643*** (0.00502)	-0.05389*** (0.01483)	-0.07744*** (0.00517)	-0.08167*** (0.02020)	-0.06796*** (0.02064)	-0.02371 (0.02195)	-0.09634*** (0.03065)	-0.05644 (0.05647)
Married	-0.02185*** (0.00389)	-0.02116** (0.00837)	-0.04257*** (0.00840)	-0.04917*** (0.01894)	-0.01123 (0.00771)	-0.00598 (0.00708)	-0.01335 (0.01207)	-0.01490 (0.02005)
Won Mayoral Election	0.04335*** (0.01129)	0.03319** (0.01500)	0.10329*** (0.02512)	0.05472* (0.03212)	-0.00455 (0.00925)	0.00964 (0.00900)	-0.01101 (0.01569)	0.02295 (0.02709)
Party DEM	-0.01157* (0.00605)	-0.00237 (0.01094)	-0.01397 (0.01418)	-0.00171 (0.02476)	-0.01771 (0.01272)	-0.00290 (0.00884)	-0.02692 (0.02062)	-0.00484 (0.02624)
Party PMDB	-0.00562 (0.00509)	0.00217 (0.00819)	-0.00274 (0.01193)	0.00072 (0.01891)	-0.00139 (0.00904)	0.00659 (0.00831)	-0.01337 (0.01565)	0.00612 (0.01951)
Party PSDB	0.00083 (0.00527)	0.00399 (0.00887)	0.00758 (0.01258)	-0.00213 (0.02078)	0.00201 (0.01003)	0.00931 (0.01086)	-0.00751 (0.01679)	0.02245 (0.03022)
Party PT	-0.01071* (0.00569)	0.00752 (0.00928)	-0.03701** (0.01471)	0.00289 (0.02119)	-0.03627* (0.01913)	-0.00863 (0.01190)	-0.05508* (0.03116)	-0.02356 (0.03683)
Declared Wealth (Log)		0.00091 (0.00176)		-0.00017 (0.00365)		-0.00143 (0.00146)		-0.00568 (0.00573)
Private Donations (Log)		0.00078 (0.00166)		0.00412 (0.00402)		-0.00231 (0.00231)		-0.00648 (0.00743)
Observations	538,321	60,378	439,255	49,781	6,766	2,004	5,849	1,667
Municipal FE	✓	✓	✓	✓	✓	✓	✓	✓
Mean Dep Var	0.00168	0.00168	0.00118	0.00118	0.00168	0.00168	0.00118	0.00118

Notes: This table illustrates the effects of personal and political characteristics of politicians on assassinations. The table reports the coefficients of a logit regression with controls. In Columns (1)-(4), the sample includes all politicians who ran for office and were elected between 2001 and 2016. In Columns (5)-(8), the sample includes only elected politicians. All specifications include municipal fixed effects. Robust standard errors are clustered at the politician level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

A.3 Municipal-level Correlates

Table 6.4: Municipal-Level Determinants of Assassinations - Active Politicians Only

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
GDP per capita (Ln)	0.00218*** (0.00076)	-0.00141 (0.00116)	-0.00402 (0.00306)	0.00053 (0.00076)	-0.00198* (0.00116)	-0.00393 (0.00304)
Population (Ln)	0.01330*** (0.00081)	0.01378*** (0.00092)	0.01165* (0.00646)	0.00746*** (0.00080)	0.00829*** (0.00098)	0.01124* (0.00649)
Homicides Rate	0.00055*** (0.00003)	0.00057*** (0.00004)	0.00040*** (0.00004)	0.00054*** (0.00003)	0.00055*** (0.00004)	0.00041*** (0.00004)
Urban (% of Population)	-0.00348 (0.00227)	-0.01107*** (0.00279)	0.02961* (0.01651)	-0.01085*** (0.00238)	-0.01439*** (0.00284)	0.02997* (0.01684)
Black (% of Population)	0.04477*** (0.00984)	0.01745 (0.01065)	0.00197 (0.01891)	0.02284** (0.00994)	0.00008 (0.01068)	0.00378 (0.01904)
Second-term mayor ran				0.00044 (0.00093)	0.00035 (0.00093)	0.00027 (0.00098)
Share Votes Mayor				0.00875** (0.00351)	0.00628* (0.00356)	0.00184 (0.00423)
Number of Candidates (Ln)				0.01561*** (0.00138)	0.01386*** (0.00158)	0.00903*** (0.00279)
Observations	83,004	83,004	83,004	81,228	81,228	81,228
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	No	Yes	No
Municipality FE	No	No	Yes	No	No	Yes

Notes: This tables illustrates the effects of municipal characteristics on assassinations of politicians. The table reports the coefficients of OLS regressions with controls. The sample consists of a panel of all municipalities from 2001 to 2016. The dependent variable consists of only active politicians. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6.5: Municipal-Level Determinants of Assassinations - Logit

VARIABLES	(1)	(2)	(3)	(4)
GDP per capita (Ln)	0.01784 (0.03330)	0.13184** (0.06647)	-0.06100* (0.03513)	0.07036 (0.06945)
Population (Ln)	0.53915*** (0.02094)	1.40699*** (0.33718)	0.22511*** (0.03865)	1.32783*** (0.34625)
Homicides Rate	0.02202*** (0.00083)	0.02090*** (0.00133)	0.02144*** (0.00084)	0.02111*** (0.00136)
Urban (% of Population)	-0.32780** (0.14527)	0.78141 (0.69253)	-0.66259*** (0.14850)	0.67696 (0.71748)
Black (% of Population)	2.18776*** (0.45738)	2.41697 (1.57851)	1.22228** (0.47889)	2.60328 (1.62020)
Second-term mayor ran			0.02944 (0.04991)	0.00251 (0.05477)
Share Votes Mayor			0.28286 (0.18540)	0.08180 (0.22651)
Number of Candidates (Ln)			0.76727*** (0.07830)	0.44975*** (0.13471)
Observations	83,004	19,233	81,228	18,420
Municipality FE	No	Yes	No	Yes
Year FE	No	Yes	No	Yes

Notes: This tables illustrates the effects of municipal characteristics on assassinations of politicians. The table reports the coefficients of OLS regressions with controls. The sample consists of a panel of all municipalities from 2001 to 2016. The dependent variable is an indicator variable taking value 1 if there was an assassination in the municipality-year, and 0 otherwise. Robust standard errors are clustered at the municipality level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

B Chapter 3

B.1 Randomized Anti-Corruption Audits

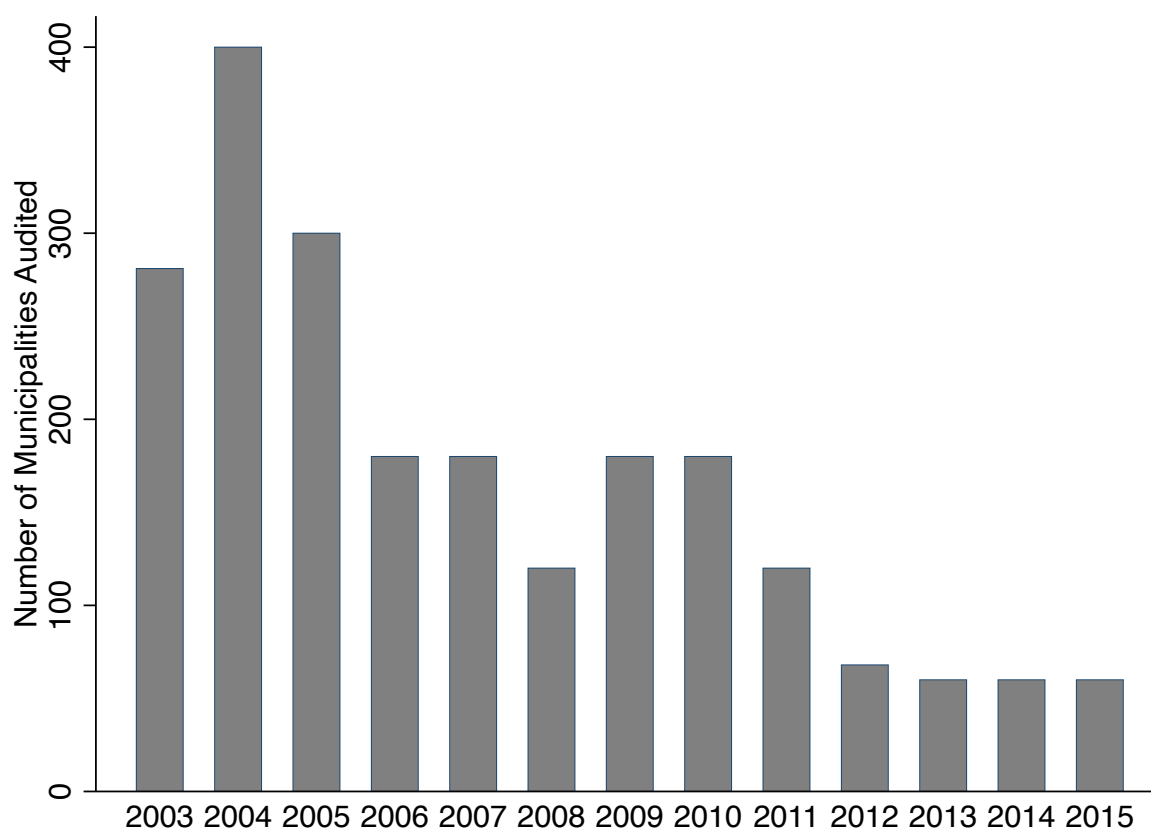


Figure 6.1: Number of Municipalities Audited

Table 6.6: Are Audits Random?

VARIABLES	(1)
Population	-0.00000 (0.00000)
GDP	-0.00000 (0.00000)
Urban Population	0.07610 (0.04689)
Literacy	-0.11311 (0.24416)
Education Level	0.00814 (0.02452)
Income	-0.00003 (0.00008)
Income Gini	0.13857 (0.14610)
Black Population	-0.08257 (0.18218)
Homicides	0.00005 (0.00060)
Radio	-0.12836 (0.11440)
Judicial District	0.00356 (0.01691)
Police Station	0.01299 (0.02248)
Constant	0.38688** (0.16698)
Observations	5,526
R-squared	0.03635
State FE	Yes
Mean Dependent Var	0.347
Robust standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

Notes: This table illustrates the randomness in the selection of municipalities to audit. It presents coefficients from a cross-sectional regression of the type $Audited_{m,s} = \alpha_s + \gamma \times X_m + \epsilon_{ms}$. The outcome variables $Audited_{m,s}$ is an indicator whether the municipality is audited between 2003-2015. The specification includes state fixed effects. Socio-demographic variables come from the mean of Census 2000 and 2010. *Homicides* come from the Ministry of Health's *SIM* mortality database. *Judicial District* and *Police Station* come from the survey MUNIC conducted by the Brazilian Institute of Geography and Statistics (IBGE). Robust standard errors are clustered at the municipality level. * $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

C Chapter 4

C.1 *Disque Denuncia* Reports

This section presents two examples of transcribed calls to *Disque-Denúncia*. The first refers to regular parties promoted by drug dealers to they sell drugs while heavily armed. The second report mentions militia members using firearms to charge monthly cash fees from residents. The words in bold exemplify how we used regular expressions to filter and classify reports.

“Informs that (...) drug dealing is intense during these parties and that these drug dealers are usually heavily armed (...)”

“Informs that (...) where local militia members (...), carrying firearms , charge monthly cash fees from local residents (...)”
--

C.2 Measures of Validity Check

Precision evaluates the ability of correctly classifying reports as positives, conditional on being classified as positives — when there are no false positives, precision equals one. Recall evaluates the ability of correctly classifying reports as positive, conditional on the totality of true positive cases in the sample — when there are no false negatives, recall equals one. F1-score is the harmonic mean of the previous two measures — if F1-Score equals one, then the algorithm is always correct when it identifies a dimension in a report and never fails to classify reports of that dimension.

$$Precision = \frac{TruePositives}{TruePositives + FalsePositives} \quad (6.1)$$

$$Recall = \frac{TruePositives}{TruePositives + FalseNegatives} \quad (6.2)$$

$$F1 - score = 2 \times \frac{Precision \times Recall}{Precision + Recall} \quad (6.3)$$

C.3 Presence at Neighborhood Level

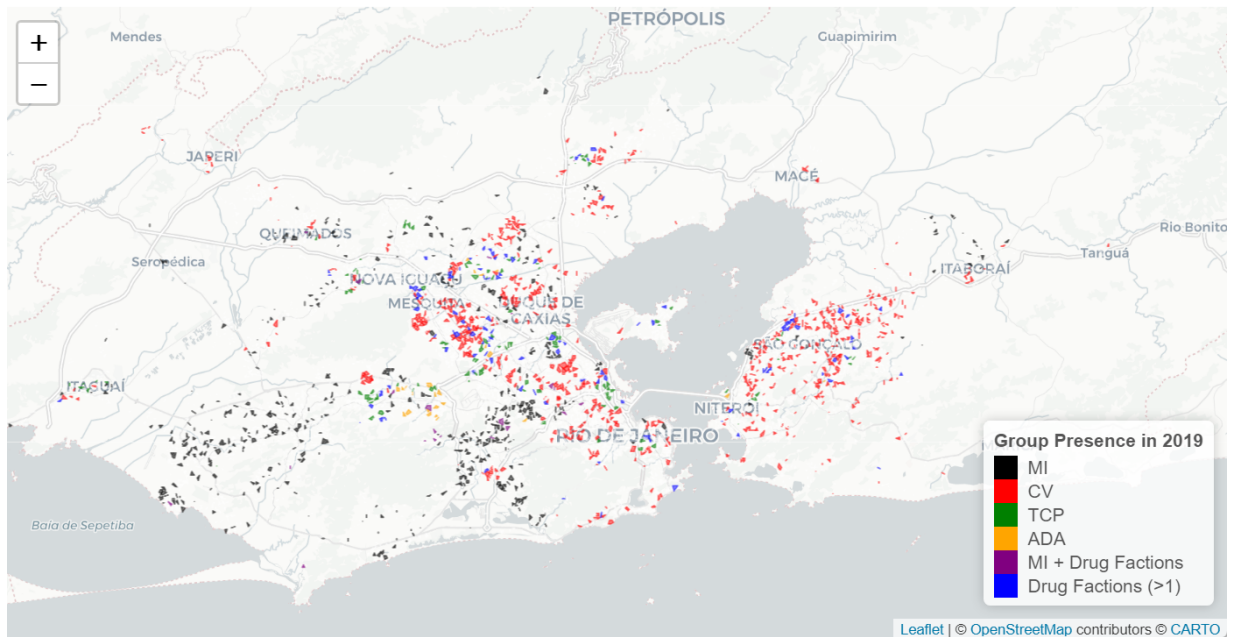


Figure 6.2: Presence of groups at cluster level in 2019

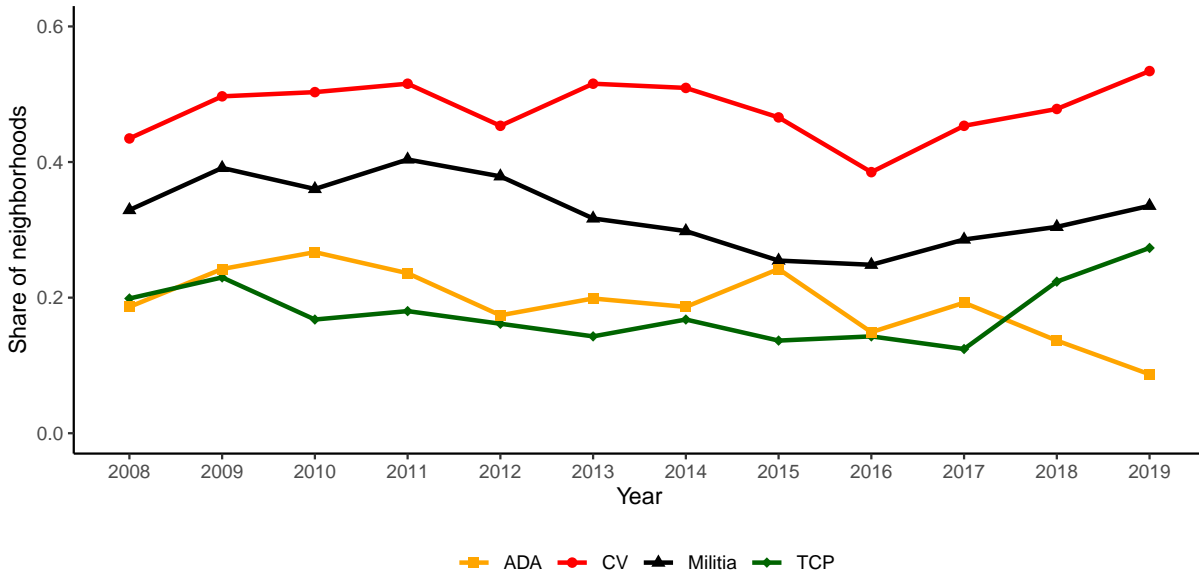


Figure 6.3: Percentage of neighborhoods with group presence - City of Rio de Janeiro

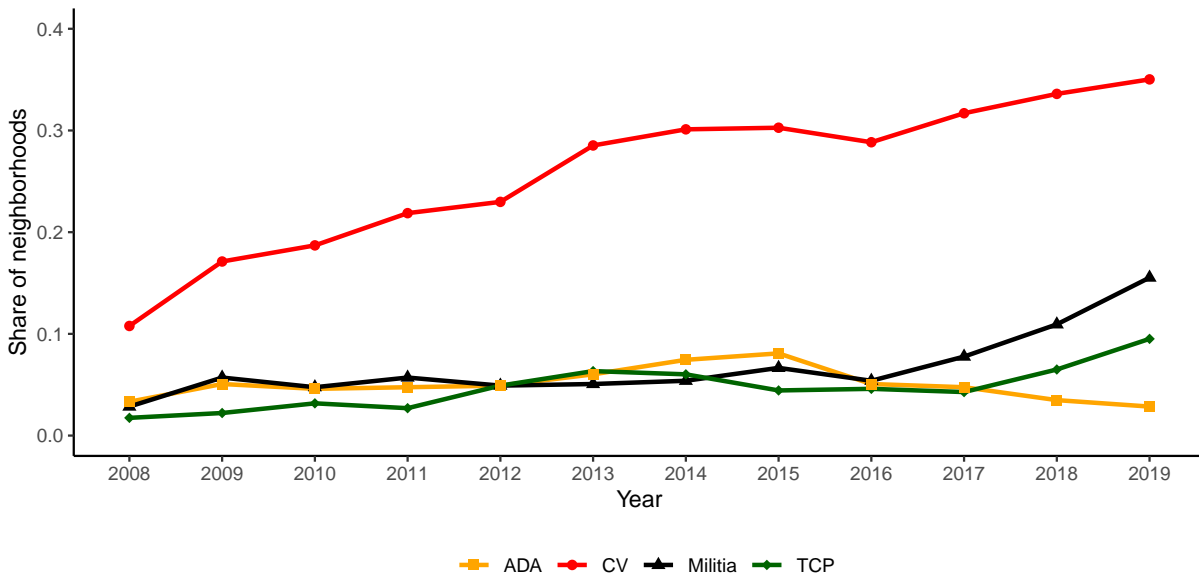


Figure 6.4: Percentage of neighborhoods with group presence - Metropolitan Area (excluding Rio de Janeiro city)

C.4 Results - Poisson

This section presents the results from Poisson models analogous to equation 4.1. The conclusions are virtually the same as in our main specification.

Columns (1), (3) and (5) show that an additional criminal group in a neighborhood is associated with 9.9% more homicides, 13.1% more shootings and 17.7% more police killings. Columns (2), (4), and (6) show that the coefficients associated with $TCE > 1$, *Only Militias* and *Only one Drug Gang* refer to the increase in violence relative to periods without any groups in the neighborhood (reference category). Homicides are 15% more common in territories with only one drug gang and 27.4% higher when there is more than one TCE. Neighborhoods controlled by militia groups do not register more homicides than neighborhoods without criminal groups. As expected, shootings are 32% more likely when more than one criminal group is present at the neighborhood. On the other hand, neighborhoods where more than one criminal group is present experience 66% more police killings than areas with no criminal groups, while neighborhoods with just one drug gang are 33% more likely to register this type of event.

Table 6.7: Group presence and violence

	<i>Dependent variable:</i>					
	Homicides		Shootings		Police Killings	
	(1)	(2)	(3)	(4)	(5)	(6)
Number of TCE	0.094***		0.123***		0.163***	
	(0.014)		(0.035)		(0.031)	
TCE >1		0.242***		0.280***		0.508***
		(0.035)		(0.093)		(0.086)
Only Militias		-0.007		0.107		-0.015
		(0.044)		(0.135)		(0.147)
Only one Drug Gang		0.140***		0.087		0.287***
		(0.032)		(0.095)		(0.071)
Model	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson
Mean DV	2.04	2.04	2.50	2.50	0.23	0.23
Neighborhood FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	9,504	9,504	2,376	2,376	9,504	9,504
Neighborhoods	792	792	792	792	792	792
Years	12	12	3	3	12	12

Notes: This table illustrates the main effects of territorial criminal enterprises on violence. The table reports coefficients obtained from the estimation of the equation (1). *Number of TCE* is the total number of groups in the neighborhood. *TCE > 1* is an indicator variable taking value 1 if there is more than one group. *Only Militias* is an indicator variable taking value 1 for neighborhoods with only militia presence. *Only one Drug Gang* is an indicator variable taking value 1 for neighborhoods with the presence of only one drug gang presence. Std. Error clustered at the neighborhood level. *p<0.1; **p<0.05; ***p<0.01.

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