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CRIMINAL DOMINANCE AND CAMPAIGN CONCENTRATION

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AND CAMPAIGN  
CONCENTRATION

Bullock, J.

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CAF – Working paper No. 2019/04  
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## ABSTRACT

There are many journalistic and anecdotal accounts about the prevalence of electoral corrals in Brazil, geographic areas where brokers, politicians, or community leaders influence residents to vote for a specific candidate. In this paper, I investigate one particular type of suspected electoral corral: the favela, urban slum. This analysis focuses on the 1000+ favelas in the city of Rio de Janeiro, Brazil. I explore whether or not vote share is indeed more concentrated in urban slums, and then whether or not vote concentration is related to criminal dominance. I contend that politicians in Rio de Janeiro have incentives to work with criminal groups in order to get more votes, and that finding a way to access these electoral corrals may be an election-winning strategy. Using novel, geospatial data and introducing a new text dataset on criminal dominance in Rio de Janeiro, I show that vote concentration is indeed more concentrated in urban slums and, within these slums, even more concentrated in slums that have steady criminal dominance from one election to the next.

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# PREDOMINIO CRIMINAL Y CONCENTRACIÓN ELECTORAL

Bullock, J.

CAF - Documento de trabajo N° 2019/04  
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## RESUMEN

Existen muchos relatos periodísticos y anecdóticos sobre la prevalencia de corrales electorales en Brasil; áreas geográficas donde corredores, políticos o líderes comunitarios influyen en los residentes para que voten por un candidato específico. En este trabajo, investigo un tipo particular de presunto corral electoral: las favelas, o barrios urbanos marginales. Este análisis se centra en las más de 1000 favelas en la ciudad de Río de Janeiro, Brasil. Analizo si la proporción de votos está o no más concentrada en los barrios urbanos marginales y luego si la concentración de votos está relacionada o no con el dominio criminal. Sostengo que los políticos en Río de Janeiro tienen incentivos para trabajar con grupos criminales para obtener más votos y que encontrar una manera de acceder a estos corrales electorales puede ser una estrategia electoral exitosa. Utilizando datos geoespaciales novedosos, e introduciendo un nuevo conjunto de datos en formato texto sobre predominio criminal en Río de Janeiro, muestro que la concentración de votos está más concentrada en los barrios marginales urbanos y, dentro de estos barrios marginales, aún más concentrada en barrios marginales que tienen un predominio criminal que se mantiene de una elección a la siguiente

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# Criminal Dominance and Campaign Concentration\*

Jessie Bullock†

## Abstract

There are many journalistic and anecdotal account about the prevalence of electoral corrals in Brazil, geographic areas where brokers, politicians, or community leaders influence residents to vote for a specific candidate. In this paper, I investigate one particular type of suspected electoral corral: the *favela*, urban slum. This analysis focuses on the 1000+ favelas in the city of Rio de Janeiro, Brazil. I explore whether or not vote share is indeed more concentrated in urban slums, and then whether or not vote concentration is related to criminal dominance. I contend that politicians in Rio de Janeiro have incentives to work with criminal groups in order to get more votes, and that finding a way to access these electoral corrals may be an election-winning strategy. Using novel, geospatial data and introducing a new text dataset on criminal dominance in Rio de Janeiro, I show that vote concentration is indeed more concentrated in urban slums and, within these slums, even more concentrated in slums that have steady criminal dominance from one election to the next.

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\*Prepared for CAF Working Paper Series.

†PhD Candidate, Harvard University. [jbullock@g.harvard.edu](mailto:jbullock@g.harvard.edu)

# 1 Introduction

In Complexo de Alemão, one of Rio de Janeiro’s largest urban slums and the headquarters of the Comando Vermelho (CV), Rio’s largest drug gang, select candidates are allowed by the drug traffickers to enter the neighborhood to run their campaigns. Once the selected candidates purchase entry, either through bribes directly to the criminal group (money, guns, other contraband, or favors) or through promises of goods and services to the community, they are allowed to run their campaign inside the slum. In the recent 2018 elections, journalists uncovered evidence of candidates’ staff offering to pay for doctor’s visits, government bills, and even cataract surgery for slum residents *if* they promised to vote for the candidate (Corrêa & Araújo 2018). When asked if politicians make good on these ex ante campaign promises, slum residents responded that “As soon as they win the election, the disappear. They throw out the chip in their cell phone, get a new number, and we never hear from them again”<sup>1</sup>.

In 2018, approximately 1.7 million voters in the state of Rio de Janeiro (14.6% of the entire state) live in communities dominated by criminal groups and may be subject to this type of electoral propaganda by the select few candidates that are allowed to enter their neighborhood (Otavio & Araujo 2018). Journalistic accounts show that there is considerable variation in persuasive strategies in slums during the campaign: some candidates may offer promises to residents and simply not deliver as in the example above, some may be the “chosen candidate” by the criminal group and the only one that the residents of the slum are exposed to in their daily life, and some others may be directly endorsed by the criminal groups, who use force or the threat of force to convince voters to vote for their preferred candidate (Araújo & Corrêa 2018).

Despite the increasing frequency of journalistic accounts of corruption linked to organized

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<sup>1</sup>Interview Transcript, August 8, 2017

criminal groups, there is scant scholarly work on this phenomenon, especially quantitative work. It is difficult enough to measure corrupt vote buying, not to mention vote buying that involves criminal groups that conduct their entire business outside of the licit sector. This paper begins to try and measure this phenomenon by tackling one part of the criminal-politician relationship: criminals as gatekeepers that control access to voters.

Two research questions motivate this study and my larger research agenda. Is there evidence that voting is more concentrated in criminally dominated areas? How does consistent criminal dominance affect electoral outcomes in their neighborhoods? Though a corrupt exchange between politicians and criminal groups may be impossible to observe, the consequences of this exchange may be observable at the ballot box. I first look at the concentration of votes for a particular candidate as an observable indicator of criminal groups acting as gatekeepers for the voters in their community or, at a minimum, reducing the number of candidates that voters are exposed to a select few that purchase access to the community from the criminal group. I then look at changes over time in voting concentration in criminally dominated territories. In this paper, I analyze the vote concentration in slums exposed to criminal groups during the federal and state elections in Rio de Janeiro in 2014 and the municipal elections in 2016. Preliminary findings show that electoral returns are 6.7 percentage points more concentrated around the most voted candidate in urban slums than non-slums. Further examining the sample of polling stations where slum residents vote, the vote share for the most voted candidate is 8.2 percentage points higher in areas occupied by criminal groups and the vote share for the most voted candidate increases by 6.2 percentage points from election to election following a period of stable criminal dominance. This provides supporting evidence to the theory that criminal groups, either indirectly or directly, help restrict electoral competition and are the gatekeepers for electoral corrals.

This paper is structured as follows. In the second section, I review the literature on traditional vote buying, and focus on situations where criminal groups play a role in the

vote buying or campaign process. In the third section, I argue that the criminal landscape in Rio de Janeiro and the electoral institutions have created an opening for criminal to be involved in electoral campaigns. In the fourth section, I introduce the data and present estimates of voting concentration levels in slums versus non-slums. Section five presents estimates of the effect of criminal dominance on electoral outcomes. There is a discussion and a concluding section.

## **2 Vote Buying and Criminality**

### **2.1 Vote Buying with Traditional Brokers**

There is widespread evidence on the brokerage networks in Brazilian slums and how political machines are able to effectively demand neighborhood public goods from politicians in exchange for the votes in the community. Generally, the partisan brokers in Latin America provide positive inducements to voters who vote for their preferred candidate as a form of reciprocity (Gingerich 2013, Finan & Schechter 2012, Stokes, Dunning, Nazareno & Valeria 2013). In the Brazilian slums, there is already documented evidence of elevated levels of this behavior. Some community leaders that acted as brokers have been able to get politicians to pay for new neighborhood pools, new buildings, or other political favors before the elections even happened (Gay 1999), while other politicians engaged in targeted vote or even *voter* buying through positive inducements to the individual, and received incredibly high return on investment (Hidalgo & Nichter 2016, Gingerich 2013).

### **2.2 Vote Buying with Criminal Groups as Brokers**

On the contrary, very little recent literature has focused on the role of criminal organizations and militias in elections. Acemoglu et al (2013) show that former AUC criminals in Colombia

were rewarded by politicians for delivering votes with an amnesty deal. This provides some evidence that the AUC were criminal brokers and used their coercive tactics to marshal people to the polls. They argue that the politicians had reduced incentives to fight or eliminate these criminal organizations because of their ability to be electoral brokers. A key part of Acemoglu et al's (2013) theory, however, is the historic linkage between the AUC paramilitaries and President Uribe's party, as well as implicit or explicit linkages between new third parties and the AUC.

In Brazil, Hidalgo and Lessing (2015) argue that strategic electioneering helped Rio de Janeiro's militias rise to power. There is evidence the militias would choose one of their own to run for a particular office, extort residents in a slum or other unoccupied territory, and corral them to the polls. In this case, criminal groups were both the brokers and the candidates.

What both of these examples miss, however, is explaining how these criminal groups became close to or partners with the politicians in the first place. In the case in Colombia, the relationship is path dependent and historic: the historic linkage between the AUC and the President's party explains why both the government and the criminals were willing to enter into this exchange. In Brazil, the candidates were actually former criminals or affiliated with the criminals in one way or another, so they were "homegrown" candidates willing and able to cooperate with the criminals. In Brazil, we also hear about a third kind of politician-criminal relationship that neither has a long history nor is one where the politician is already affiliated with the criminals. These are the gatekeeper, protection racket style relationships between criminal groups and politicians.

### **2.3 Vote Buying with Criminal Groups as Gatekeepers**

By referring to criminal groups as gatekeepers, I specify that they are not brokers or even necessarily politically motivated actors. When organized criminal groups are gatekeepers, I

define them as having control or the ability to control the behavior of a group of people where they operate their criminal business. Just as Charles Tilly talks about the state and state-building in the legal sector as a protection racket, the same concept applies to gatekeeper criminal groups that earn loyalty and protect residents within the legally sanctioned state (Tilly 1985). Classic examples of vote buying with criminal groups as gatekeepers are where criminal groups organize protection rackets and trade favors with political groups. This has been noticed in some of the oldest criminal groups alive today: the Italian mafia (Alesina, Piccolo & Pinotti 2017, Gambetta 1993, Pinotti 2015). Though the relationship between the mafia and certain political parties in Italy has grown considerably since its origin, the genesis of the relationship happened because politicians needed votes, the mafia had the loyalty of the people that they protected from rivals or from the predatory state, and the two parties gradually built trust, one delivering votes and the other turning a blind eye to illicit activity or even aiding it.

Tajima identifies conditions under which modern day protection rackets form in democracies through an analysis of state strength in Indonesia (Tajima 2018). He argues that criminal groups will seek political affiliation in order to get the benefits of being a political ally, offering protection and coercive services in exchange for law enforcement to look the other way. He characterizes these settings as places where the state has the resources to constrain criminal groups, but lacks the institutional features to constrain politicians from engaging with them.

In Brazil, the situation is slightly different. The state has but squanders the resources to constrain criminal groups, and lacks the institutional features to constrain politicians from engaging with them. To be fair, the constraints on politicians have improved in recent years with the high-profile *Lava Jato* trials and new laws like *Ficha Limpa* and tighter campaign finance regulations<sup>2</sup>. As I show in the next section, I believe the aforementioned inability

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<sup>2</sup>The *Lava Jato* trials put a number of high profile politicians, including former President Lula Inácio de

to control the criminal groups and lax constraints on politicians, all under an electoral system that creates perverse incentives, creates a new dynamic between criminal groups and politicians where the *politician* will be the one seeking criminal affiliation for electoral gain. I argue these politicians will seek criminals not to serve as traditional brokers, but rather to serve more as gatekeepers or protection rackets to keep other politicians out of their desired territory and away from potential voters.

### 3 Setting: Rio de Janeiro

In this section, I discuss two factors that complicate our understanding of the role of criminal groups in electoral politics in Rio de Janeiro. The first is the landscape of criminality in the city and state of Rio de Janeiro and how territorial conflict relates to electoral politics. The second is the institutional features of electoral politics in Brazil, and how the single district, open list system creates incentives that I argue make politicians willing and open to establishing protection rackets with criminal groups. I describe the institutional context below and present my hypotheses.

#### 3.1 Criminality in Brazil

An analysis of organized criminal activity in Rio de Janeiro would be incomplete without understanding the unit of analysis: the urban slum, the favela. It is important for understanding the evolution of Rio's criminal groups, but also for understanding the territories they fight over, dominate, and influence voters in the present. Rio's first urban slum, *Morro da Providência*, was constructed in 1897 on a steep hill near the city center and still stands today (Meade 1996). As waves of Brazil's rural poor moved to *Providência* and as new slums were built on Rio's steep hillsides, the word *favela* became synonymous with these informal

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Silva, in prison for money laundering or other white collar charges. *Ficha Limpa* is a regulation barring any candidate from running for office if they have a criminal record of corruption or electoral-related crimes.

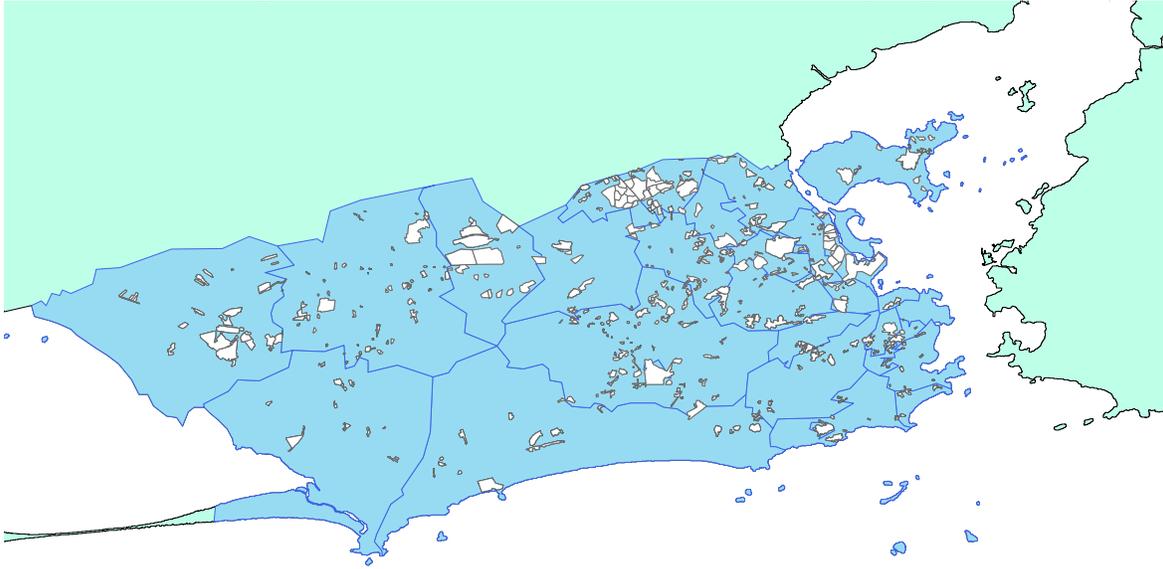
settlements high on the hills. During the first wave of urban migration in the 1920s, rural Brazilians and immigrants moved en masse to the densely populated favelas, characterized by few paved roads, citizen insecurity, extreme poverty, and, importantly, steep, hilly terrain.

The public sector response to the growth of favelas in the early 20<sup>th</sup> century was social exclusion. Today, this is still apparent: the infrastructure is still decades behind in many favelas, and in some areas nearly everything is still operated entirely in the informal sector. Today, there are 700+ favelas in the municipality of Rio de Janeiro and favela residents make up nearly a quarter of the city's 6.3 million people. The favelas are scattered across the entire city, present in both the wealthy, touristic parts of the city and the more homogeneous, lower-income areas. The Brazilian Institute of Geography and Statistics (IBGE) keeps records of all favelas in census data, and collects additional measures in areas they define as favelas. IBGE defines a favelas as “an area that is predominantly residential, characterized by informal employment and low income, precarious urban infrastructure and public services, unpaved roads and irregular buildings, the absence of formal property rights and construction conducted within the formal sector, which does not comply with current legal norms.” (Instituto Brasileiro de Geografia e Estadísticas 2010). Figure 1 shows the location of favelas recognized by IBGE inside the municipality of Rio de Janeiro. All of these conditions make favelas ideal places for criminal factions to conduct business.

The proliferation of organized crime and violence in Rio's favelas during the late 1970s and early 1980s has been attributed to three key societal events: the most brutal years of state violence during the military dictatorship, emergence of the Brazilian cocaine trade and narcotrafficking, and deepening social and economic exclusion of favela residents (Misse 2009, Penglase 2008).

The brutal state repression and increased incarceration rates – both of common criminals and political opposition – during the military dictatorship led to the birth of Brazil's first criminal organization. The *Comando Vermelho* (CV), or Red Command, developed as

Figure 1: Favelas in the Rio de Janeiro Municipality



All white polygons on the map are the favelas in the municipality of Rio de Janeiro, which is subdivided by administrative boundaries. Source: Instituto Pereira Passos, IPP.

political prisoners, usually well educated, taught ideological and organizational lessons to common thieves and prisoners while organizing a mass prison break (Penglase 2008). The leaders emphasized a united opposition against the prison guards, a common enemy, and an end on prisoner-against-prisoner crime. After the fall of the dictatorship in 1985 and as common prisoners were released or escaped, many took the central tenets of the CV back to the favelas where they were from. The CV remained an organization in the Rio de Janeiro state prison where it originated, but membership spread to the favelas and nearby prisons (Penglase 2008, Misse 2009, Imbusch, Misse & Carrión 2011).

Two rival criminal groups grew in the 1990s to compete with the CV: the Third Pure Command (TCP) and the Friends of Friends (ADA). The TCP grew out of a leadership dispute between leaders of the CV and a dissatisfied leader formed his own faction. ADA grew as non-CV favelas residents were witnessing the lifestyles of CV traffickers and the destruction that crack cocaine caused in their communities. ADA, much smaller than the

other two, quickly grew to control one of the city's most desirable favelas, Rocinha, through collusion and corruption with politicians and city law enforcement, specific strategies towards protecting women and children in the favela, and distributing goods to the favela residents where they dominated. One of the most infamous traffickers for ADA, "Nemesis," orchestrated these policies and attempted to signal to law enforcement that ADA was not as violent as the CV, did not engage in the sale of crack cocaine, and was more willing to bargain with the police (Glenny 2015).

The 1990s and early 2000s also saw the growth and expansion of civilian militias across the city. These were composed primarily of disillusioned police, military, and firemen that were frustrated with the security situation and wanted to take justice into their own hands (Hidalgo & Lessing 2015, Imbusch, Misse & Carrión 2011, Glenny 2015). They began behaving more like criminal bandits themselves, extorting citizens for electric, cable television, and utility payments under the auspices of providing protection from traffickers. Reporters have discovered a militia presence in some public housing complexes where they extort the poor for utilities and sometimes even rent payments. Although militias have only started engaging in the drug trade recently, they are no longer condoned by the government and are regarded as a second type of criminal group present in the city, whose criminal behavior is quite different from that of the drug trafficking gangs.

Today, the militias, CV, TCP, and ADA all compete for territory among the many favelas in Rio de Janeiro. Nemesis is in jail, as are many of the stronger leaders for the other trafficking factions. The three drug gangs are similarly characterized by high turnover of leadership, and high levels of violence with rival gangs or militias and the police. The militias have grown considerably in the last two decades, and they too are violent when fighting drug gangs for territory, but have fewer noted conflicts with the police. The birth of the CV under the repressive military dictatorship, the growth of the drug trade and subsequent violence once the CV monopolized Rio's cocaine trade, and the forbearance (or

lack of state capacity) of state actors in favelas towards all criminal groups are all argued to be contributing factors towards the high rates of organized crime in favelas today and how they influence and interact with their communities.

### **3.2 Electoral Institutions in Rio de Janeiro**

Brazil is famous for weak party system institutionalization, which implies that parties may not have easily identifiable ideologies, they may have short birth and death cycles, it is easy for politicians to party switch, and parties can win elections when they are particularistic rather than programmatic (Mainwaring 1998). All of the above is true in Brazil. Executive elections operate on the two round runoff system, and legislative elections are single district, open list, proportional representation. This means that citizens vote for a specific candidate, but the number of candidates that are elected depends on the entire proportion of votes the party gets. The single district legislative elections means that all representatives of the state of Rio de Janeiro, either in their state legislature or that represent the state in the national legislature are “at large,” for the approximately 13 million residents of the state, or do not represent any one particular district.

These electoral rules create confusion and opportunism for a variety of reasons. First, there are simply too many parties. Just this year in the 2018 lower house elections, deputies from 30 political parties won seats across the country. The system is inefficient and makes it difficult for parties to clearly distinguish themselves from each other. Second, because party systems have never consolidated in Brazil and there are so many parties that have similar ideologically vague platforms, voters claim to vote based on the individual candidate rather than follow a party line (Cohen, Lupu & Zechmeister 2017). This means that politicians can misbehave within their party, change their ideological stance once they are elected, or even switch parties entirely – as long as they do not anger their voters and maintain a cult of personality, candidates can (and have!) enjoy high levels of support across a range of

party affiliations and ideological stances. Lastly, because of the freedom candidates have, the plethora of parties to affiliate with, and the (illegal) returns to office that many are aware of, far too many people decide to run for office. In the last ALERJ (the State Legislative Assembly of Rio de Janeiro) election in 2014, 2000+ candidates competed for 70 seats in the state. Four candidates won by a large margin, and the 66 remaining winning candidates won by a few thousand or even hundred votes compared to those that barely lost. This means that the margin of victory is razor thin. For those candidates near the margin, just one favela's votes could make the difference between winning and losing.

Strategically, the candidates would reach more voters targeting campaigns towards the densely populated favelas than any other geographic area. These areas may also be desirable because the voters are poor, and as we know from traditional clientalist literature, poor voters are cheaper to buy than middle class voters. This is where candidates may face the dilemma of engaging with criminal groups: is it worth it to engage with criminal actors if they can secure the vote of a community dominated by criminals? Or if not secure it, at least be one of a small number allowed to campaign inside? I argue that this tradeoff is what Rio de Janeiro's political candidates are considering, and one way we can observe if there actually is a higher return for campaigning in favelas or not is by observing concentration of votes in the ballot box.

Without making any assumptions about criminal groups buying votes, forcing candidates on the voters, extorting them, or anything in this vein, we don't actually know how aggregate voting patterns in slums compares to voting patterns in similarly poor, non-slum neighborhoods. If there are differences in how concentrated vote levels are in favelas versus non-favelas, this could lead to follow up questions about why favela residents vote differently, how criminality may play a role, and how campaigns are run in favelas.

### 3.3 Why Rio de Janeiro?

Given the information laid out above about electoral institutional design and the current state of criminality in Rio de Janeiro, I believe that, despite the risks, there are incentives on the part of the politician to attempt to enter urban slums in Rio de Janeiro to buy votes, and to use the criminal groups as gatekeepers in doing so. I contend that:

**H1:** Voters are more likely to converge around a single candidate when they live in an urban slum.

**H2:** Slum voters that live under clear criminal presence are more likely to converge around a single candidate than slum voters where criminal presence is unclear.

**H2a:** Slum voters that have experienced continued dominance in their criminal group will continue to consolidate their vote around a single candidate compared to their past electoral behavior.

I limit this analysis to the city of Rio de Janeiro initially for a few reasons. First, Rio de Janeiro, unlike other parts of Brazil where vote-buying may be present, has poverty and criminality essentially randomly distributed across the city due to the geographic dispersion of the slums. The urban slums are scattered across the city, unlike São Paulo or some other large cities in Latin America where the urban poor mainly resides in the periphery. This is useful for comparing voters in the sample and reducing confounding. For instance, a member of the urban poor in a slum in the North Zone of the city may be very similar to a member of the urban poor that lives in a lower class neighborhood (but not a slum) in the North Zone of the city. It is possible they have similar household incomes and they take the same bus line in to the center of the city. Leveraging the random placement of slums across the city provides a degree of control over the sample especially with respect to other issues areas that voters care about, such as public services.

Second, there is considerable variation in which candidates get the most votes from slum residents in Rio de Janeiro. In other words, there is not just one candidate or even

one party that is broadly “pro-poor” that slum residents would clearly vote for across the city. Especially in the lower level races, such as the lower legislative chamber or the state unicameral legislature, it is possible there may be multiple candidates from the same slum competing amongst each other for the votes of their community. The margin for votes is razor thin in the city of Rio de Janeiro. Accordingly, when a candidate does very well in a geographic area, it implies that they must have done something (legal or illegal) to persuade the residents of that area to vote for them.

Lastly, the availability of disaggregated voting data at the urn level and the quality of Google Maps data means that nearly all polling stations have been successfully geocoded in the city. The completeness of this detailed dataset will help with hypothesis testing before expanding the sample to more complicated areas where crime is present but our knowledge of criminal patterns and voting behavior is lower, such as the greater Rio de Janeiro state.

## 4 Measuring Vote Concentration

### 4.1 Data

#### 4.1.1 Dependent Variable

Section 3.2 provides some context about the electoral system and its consequences in Rio de Janeiro, showing how competitive the electoral arena is. It outlines why electoral concentration, the concentration of votes for one particular candidate in an electoral section, is indicative of a successful campaign in a geographic area. This is the dependent variable in this primary analysis. I construct this measure for electoral concentration using urn-level data from the 2014 federal and state elections, and 2016 data from the municipal elections in the city of Rio de Janeiro. All data is publicly available and accessible at the Supreme Electoral Tribunal (*Tribunal Supremo Eleitoral, TSE*)’s [website](#). Each electoral section cor-

responds to one urn, where approximately 300-500 voters are assigned. The results from each section are coded separately in each election year. For every electoral section, I construct a variable representing a proportion of the vote share for the most voted candidate in that section for that office<sup>3</sup>. The variable is a proportion between 0 and 1, where 1 indicates that the candidate won 100% of the votes for particular office in the electoral section. The full dataset includes 12,710 observations in the 2014 election and 7,015 observations in the 2016 election.

#### 4.1.2 Independent Variable

For the primary analysis, I geocode all polling stations in the city of Rio de Janeiro and pair electoral section data with the polling station data<sup>4</sup>. Common polling station locations are schools, banks, or other government buildings that have high occupancy levels and can provide sufficient privacy to each section. I then construct my treatment variable, whether or not voters live in a slum, using two different distance metrics. I use the geographic boundaries of all registered slums in the city provided by Instituto Pereira Passos to define the territorial boundaries of the city's 1000+ slums. If the polling station is inside of an urban slum, it automatically gets coded as a polling station where slum residents vote. If it is not inside but is within 200 meters of the perimeter of a slum, it is also coded as a polling station where slum residents vote. 90% of slums are included in the sample just using these two rules. As an example, Figure 2 shows the Jacarezinho complex, comprising of one large slum and a few smaller ones of approximately 30,000 residents. It is unambiguously dominated by the drug gang Comando Vermelho (CV), and the government only installed one polling station inside of the slum. Most voters in Jacarezinho will go to schools, churches,

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<sup>3</sup>For example, in 2014 I constructed four variables per section: the proportion of votes received for the office of governor, senator, federal lower house, and state unicameral legislature. I did not construct a variable for the office of President.

<sup>4</sup>I am grateful to Frederico Roman Ramos for suggestions in beginning this process with the 2014 data, and Lucas Novaes for the 2016 data.

and banks that are not inside the slum but immediately bordering it - the stations circled in red in Figure 2. There are some nearby stations not circled in red in Figure 2 as well. This is because these polling stations are more likely to be frequented by the residents that live near the boundary of the slum but not inside the slum. In an interview with an Electoral Judge that works with the polling station assignment process, I was told, “Whenever we can put the station inside of the favela, we do. Often there is not a building with good enough occupancy codes inside of the favela to do so. In that case, we put it as close to the border as possible... We do not assign people that do not live in favelas to polling stations inside favelas.”<sup>5</sup> Hence, while it is possible that some slum residents are assigned to these polling stations further away and that I not include in the treated sample, there will be a higher concentration of them in the ones close to the perimeter of the slum. It is more likely that neighboring non-slum residents will predominately be assigned to the polling stations farther away.

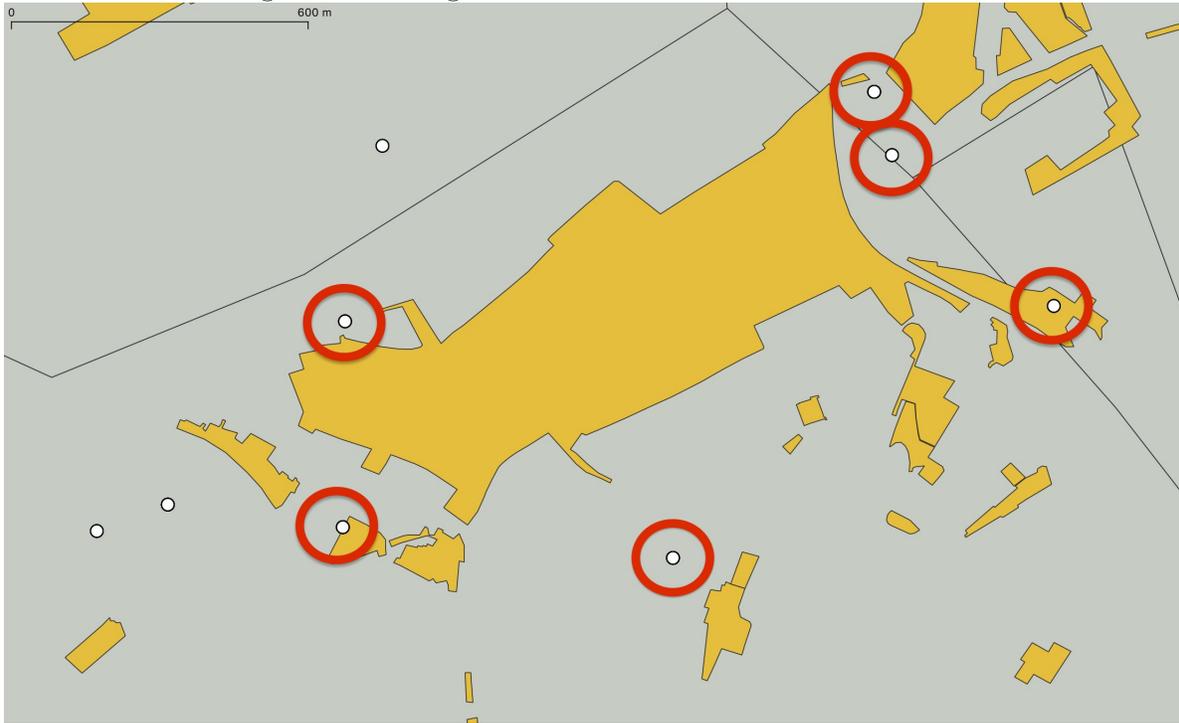
### 4.1.3 Confounding Variables

Much of the literature on vote buying, regardless if it is done in the presence of criminal groups, focuses on vote buying from the poor. This is because buying the votes of the poor is relatively cheaper for the politician or broker trying to buy votes (Stokes et al. 2013). Though some may think that the only places the poor live in Rio de Janeiro are the slums, this is not the case. There are plenty of lower class neighborhoods that are “on the asphalt” instead of in the slums, which are typically located on a hill or cliffside. I use the Brazilian Institute of Geography and Statistic’s (IBGE) census-tract level socioeconomic data for a range of control variables: number of people per household, population density, family income, and employment level. I control for these in the naive models and use them as the pre-treatment covariates to match on in the primary analysis.

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<sup>5</sup>Interview transcript, September 12, 2018.

Figure 2: Polling Station Locations and Urban Slums



The yellow polygons show the Jacarezinho complex in Rio de Janeiro's North Zone of the city. All white dots are polling stations with varying numbers of electoral sections assigned to them. The polling stations circled are the ones I have coded as near or inside the favela, ones that are < 200 meters from the favela perimeter. Source: Instituto Pereira Passos (IPP), Tribunal Supremo Eleitoral (TSE), Google Maps API.

Criminality and criminal dominance are often thought to be associated with violence. However, there are serious confounding concerns with using violence as a measure of criminality. While I have access to data on violent crime from Rio de Janeiro's Institute for Public Security (ISP), it is not appropriate to use as a covariate when measuring the presence of criminal groups. In some slums in Rio de Janeiro that are so well dominated by criminal groups that it is as if a parallel state operates there rather than the official government, there is zero crime. In some that have internal conflict or that are a past or present site of a turf war, the violence levels may be very high. It is also possible that a neighborhood that is not a slums and is not dominated by criminal groups is violent simply because of its location - it could be at the midpoint between two rival groups' territory, near a strategic highway or bus station, or for other idiosyncratic reasons. In short, violence is a poor indicator of criminal

dominance and influence, and that is why it is omitted from this preliminary analysis.

## 4.2 Cross-Sectional Baseline

I first use the variables mentioned in Section 4.1 to estimate a cross-sectional baseline model to evaluate the first hypothesis about concentration of voters during the 2014 election. I use the measure of vote concentration per section per race that I constructed as the dependent variable, and use both the treatment indicator I constructed and a continuous variable representing logged distance to the perimeter of a slum. Table 1 shows three different model specifications. Model 1 and Model 2 both use the polling station indicator I constructed and census socioeconomic controls. Model 2 includes fixed effects and clustered standard errors at the polling station level. Both models show that vote concentration for the most voted candidate in polling stations assigned in or right beside slums is on average 10.2 or 10.6 percentage points higher than those in the rest of the city, holding all else constant. This is statistically significant at the  $p < .01$  level. Model 3 includes polling station fixed effects and the census controls, but operationalizes distance to the polling station as a continuous variable rather than an indicator. The results of this model are negative but not significant.

## 4.3 Matching

I use matching methods to improve the precision of the estimate of vote concentration in slums nonparametrically. Matching methods not just control for possible confounders, but prune nontreated observations that are outliers or are drastically different so the “treated” sample is compared with the most similar “control” sample possible. In this case, when matching on the census covariates, this implies that my non-slum, matched control group will have the most similar socioeconomic profile to those that live in slums. Though endogeneity is less of a concern in this case since it is not plausible that vote concentration level causes a

Table 1: Cross Sectional Baseline: 2014 Elections

	<i>Dependent variable:</i>		
	Vote Concentration		
	(1)	(2)	(3)
Slum Polling Station	0.102*** (0.004)	0.106*** (0.006)	
log(Distance to Slum) (meters)			-0.012 (0.019)
Constant	0.296*** (0.004)	0.321*** (0.050)	0.376*** (0.103)
Polling Station F.E.		✓	✓
Census Controls	✓	✓	✓
Observations	12,710	12,710	12,710
R <sup>2</sup>	0.042	0.181	0.154
Adjusted R <sup>2</sup>	0.042	0.098	0.068

Note: Huber-White heteroskedasticity robust clustered standard errors reported at the polling station level.

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

polling station to be near or close to a slum, these matching methods will be useful in further refining the magnitude of the point estimate from the naive calculations in the cross-sectional analysis.

I use fixed ratio matching, since its primary purpose is to reduce the bias of the estimator in larger samples. Rather than set arbitrary cutpoints or set arbitrary numbers of the control observations to prune, I use the matching frontier method, which algorithmically optimizes the tradeoff between pruning observations and minimizing the variance given the data and the control covariates (Iacus, King & Porro 2009, King, Lucas & Nielsen 2017). Table 2 shows the point estimates of vote concentration for the most voted candidate in each section, after preprocessing observations and reducing the sample size to approximately a 50% ratio of

treated to control units. This means that in this  $n = 3000$  sample, approximately half of the units are in or on the boundary of a slum, and the others are not but have similar socioeconomic covariates. In both model 1 where I included the census covariates in the regression and model 2 which is just a regression of the polling station treatment on vote concentration level, the matching-based estimates show that vote concentration is on average 6.7 to 6.8 percentage points higher in polling stations in or near slums. The estimates for coarsened exact matching (CEM) and Mahalanobis matching, also popular matching methods but not shown here, were similar to those in Table 2.

Table 2: Matching Estimators: 2014 Elections

	<i>Dependent variable:</i>	
	Vote Concentration	
	(1)	(2)
Slum Polling Station	0.068*** (0.006)	0.067*** (0.006)
Constant	0.234*** (0.008)	0.252*** (0.004)
Census Controls	✓	
Observations	3,000	3,000
R <sup>2</sup>	0.044	0.040
Adjusted R <sup>2</sup>	0.043	0.040
Residual Std. Error	0.160 (df = 2994)	0.161 (df = 2998)
F Statistic	27.881*** (df = 5; 2994)	126.135*** (df = 1; 2998)

Note: Huber-White heteroskedasticity robust clustered standard errors reported at the polling station level.

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## 4.4 Discussion

I conduct several robustness checks. I subset the sample by type of electoral race, for which there are four: governor, senator, federal deputy, and state deputy. Though the effect size is

smaller in magnitude, even the state deputy races show considerable sized differences in vote concentration in favelas than non-favelas. This is important because there are often more than 1,000 candidates for state deputy. Winning half, a third, or even a quarter of the votes in one electoral section is a sizeable amount. I also subset the data by dropping all “white” or “null” ballots cast. In Brazil, where voting is mandatory, many people that elect to not vote for anyone can cancel their vote or choose to leave it blank at the polling station. I recalculate the vote concentration variable in each section so the denominator is the number of votes cast for a real person, not the number of total ballots cast. The prevalence of voting white or canceling one’s vote does not seem to be correlated with residing in or near a favela: this barely changes the point estimates.

The biggest limitations when evaluating this first hypothesis are related to the assignment process of voters to polling stations. Electoral judges and public servants that work for the electoral registry confirmed that it is possible that favela residents may vote in polling stations where non-favela residents vote. They also said, though, that non-favela residents are not assigned to polling stations inside favelas and the majority of voters at polling stations on the periphery of favelas tend to be favela residents. For this reason, I think the slum polling station indicator I coded still accurately represents polling stations where the majority of voters live in the favela. If there are slum residents voting at other polling stations I did not code as slum polling stations, then it is likely the point estimates are biased downward and the point estimates I am reporting are conservative. This is especially true in the case of the matching point estimates, which compare slum polling stations with similarly low income non-slum polling stations.

A second limitation is that the concentration of votes for the most-voted candidate is a coarse measure. It does support my hypothesis **H1** that the ballot box returns in polling stations located near slums are more concentrated for the most voted candidate than they are in polling stations farther away from slums. If we accept that the slum voter polling

station indicator accurately represents the polling stations where slum residents vote, then we learn that votes do appear to be more concentrated among residents of slums, but we still do not know why. I try to shed more light on this in the next section. While these results do not yet explain why slum residents' voting behavior is different than their counterpart non-slum residents, this analysis is the first known attempt at quantifying this difference.

## 5 Measuring the Effect of Criminal Dominance

I then analyze the possible effects of criminality on voting patterns for slum residents. This is a fundamental first step towards uncovering plausible corruption and measuring the existence of electoral corrals under criminal groups. In this section, I introduce a new dataset I have created that measures criminal presence in urban slums.

### 5.1 Data

The source of this dataset is an unofficial blog that reports daily on crime in Rio de Janeiro. *Crime News Blog* reports in-depth on the dynamics between factions and police in Rio de Janeiro daily. I have scraped all articles from the blog's inception in January 2015 to present, and have coded each post for location and the factions involved. I created tags to link each faction to the favela being discussed to measure criminal dominance during that specific point in time. Since the blog only started in January 2015, unfortunately it does not help provide information about the criminal landscape during the 2014 elections, but this information can be used to analyze the 2016 municipal elections. I measure criminal dominance for the 20 months from the beginning of the dataset (January 2015) until August 2016, right before the 2016 electoral campaign started. If I find only one tagged faction per favela, I code this favela as experiencing criminal dominance. Using these coding rules, I find that 124 of 1018 favelas in the municipality (using the 2016 Instituto Pereira Passos registry of favelas),

or about 12.2%, experienced this type of criminal dominance. I then created an indicator variable for the polling stations within 200 meters of the perimeter of these 124 favelas.

## 5.2 Matching

To evaluate **H2** and **H2a**, I again use matching methods, but this time restrict the entire sample to just those polling stations inside or on the perimeter of slums. Within this subset, I compare the electoral returns of those who have lived in or near territory that has experienced significant criminal dominance with those that live in or near territory that is ambiguous. I use matching methods to reduce bias and account for the possibility that the level of criminality in a neighborhood is endogenous to the likelihood of that neighborhood being an electoral corral with high levels of vote concentration. Conditioning on observed socioeconomic levels and an additional control, log population of the nearby favela, can help minimize the risk of endogeneity. I include the total favela population in this group of controls to control for possible endogeneity related to the size of the favela: more populous slums may be more desirable targets for politicians and criminal groups to control (both legally and illegally), and may also be related to the probability of criminal dominance occurring there. Though conditioning on observables, in the absence of a randomized instrumental variable, does not eliminate the possibility that an observed variable can cause bias, I selected this group of pre-treatment covariates that I believe are most likely to affect the probability of criminal dominance.

I again use coarsened exact and fixed ratio matching methods, choosing the sample size to balance the bias-variance tradeoff from the matching frontier algorithm (King, Lucas & Nielsen 2017).

### 5.3 Results

The results are shown in Table 3. This table compares electoral returns in polling stations near favelas that had experienced significant criminal dominance with returns in polling stations near favelas that had not. In Model 1, the most parsimonious, we see that the coefficient on the criminal dominance indicator is positive and indicates that in polling stations near clearly dominated territories, vote share is eight percentage points more concentrated than vote share in polling stations near slums that do not have clear criminal dominance. Model two includes socioeconomic and demographic controls and finds that the magnitude is similar. Both models present heteroskedasticity robust standard errors.

Table 3: Effect of Criminal Dominance on Vote Concentration in 2016 Elections

	<i>Dependent variable:</i>	
	Vote Concentration	
	(1)	(2)
Criminal Dominance	0.086*** (0.017)	0.082*** (0.019)
Constant	0.143*** (0.009)	0.101*** (0.024)
Census Controls		✓
Observations	300	300
R <sup>2</sup>	0.085	0.124
Adjusted R <sup>2</sup>	0.081	0.106
Residual Std. Error	0.135 (df = 298)	0.133 (df = 293)
F Statistic	27.514*** (df = 1; 298)	6.925*** (df = 6; 293)

Note: Huber-White heteroskedasticity robust clustered standard errors reported at the polling station level.

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

An alternative to vote concentration in just one election is the change in vote concentration from the penultimate election. I use the same sample of polling stations inside or near favelas but remodel the dependent variable to be the change in vote concentration from

the 2014 election to the 2016 election for each section.<sup>6</sup> Though this measure is imperfect, because it is modeling concentration for the most voted candidate in a state-level race to a municipal-level race, it can provide a rough benchmark of how homogeneous the voting is in a section from one election to the next.<sup>7</sup> Table 4 shows the results. The criminal dominance coefficient can be interpreted as the change in vote concentration in an electoral section from 2014 to 2016 when that section is in or on the perimeter of a favela that has been consistently dominated by criminal groups. In both the baseline model and the model with covariate controls, the vote concentration in electoral sections near criminally dominated areas increases by six percentage points from 2014 to 2016 when compared to electoral sections near slums with ambiguous levels of criminal dominance.

## 6 Discussion and Conclusion

The models in Tables 3 and 4 lend supporting evidence to hypotheses **H2** and **H2a**. Under the presence of criminal groups, voters do vote in greater proportions for the one single candidate that wins the majority of the vote share in their section than voters in areas that do not have as strong of a criminal presence. This also lends supporting evidence to the hypothesis that, not only are favelas electoral corrals, but that favelas dominated by criminal groups are more effective corrals, voting for the preferred candidate in their area in even greater numbers. If this is the case, for politicians, figuring out how to run a campaign in a favela, especially a favela dominated by criminal groups, may be an election-winning strategy.

There is much work to be done on this topic in the future. First, careful qualitative

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<sup>6</sup>There is continuity in the section assignment process. That is, if a person is assigned to one section in 2014, they are not reassigned to another unless they change their registration address, move, or if they are removed from the voter registry.

<sup>7</sup>In coding this panel data, I match executive races (Governor and Mayor) and legislative races (state and city council legislature).

Table 4: Effect of Criminal Dominance on Change in Vote Concentration from 2014 to 2016

	<i>Dependent variable:</i>	
	$\Delta$ Vote Concentration from 2014 to 2016	
	(1)	(2)
Criminal Dominance	0.062*** (0.017)	0.068*** (0.019)
Constant	-0.177*** (0.009)	-0.185*** (0.024)
Census Controls		✓
Observations	300	300
R <sup>2</sup>	0.024	0.097
Adjusted R <sup>2</sup>	0.021	0.078
Residual Std. Error	0.188 (df = 298)	0.183 (df = 293)
F Statistic	7.369*** (df = 1; 298)	5.232*** (df = 6; 293)

Note: Huber-White heteroskedasticity robust clustered standard errors reported at the polling station level.  
\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

evidence should be gathered, through both interviews and journalistic accounts, to evaluate the plausibility of criminal groups in the areas I identified influencing the electorate or restricting competition during the campaign season. Second, this is one of the first projects on criminality in Brazil to attempt to measure criminal dominance this way. Rather than using reported crime statistics or violence as a metric of criminality, I introduce this new data that uses text and machine learning methods to report on criminal dominance, which is not easily observable. This metric can continue to be refined, improved, and used to describe specific facets of criminality that are difficult to measure. Third, we can learn more about this topic as panel data is created. The data from the 2018 election, which is more directly comparable to the 2014 election, is forthcoming from the Tribunal Eleitoral Supremo (TSE). There have been many changes in the criminal landscape since 2014, and even since the 2016 election just two years ago. A careful examination of the changes in faction dominance and

voting patterns in urban slums is an important next step to understanding the extent of possible vote-buying in favelas, and the likelihood they may involve criminal groups in some capacity.

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