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Hannah Shepard-Moore April 13, 2020

Doing More Harm than Good?: Mexico's Policy of Leadership Decapitation Against Drug Cartels

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Abstract

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This paper centers on the effect of the policy of leadership removal as used against drug trafficking organizations in Mexico on levels of municipal violence throughout the country. Two possible causal links between leadership decapitation and violence are explored: intra-cartel conflict spurred by competition for promotion, and inter-cartel violence sparked by turf wars against the targeted rival perceived to be asymmetrically weakened after a leadership removal. Simple regression analysis provides a positive and statistically significant correlation between leadership decapitation and drug-trafficking related homicides, but more complex regressions fail to produce such results. A two-way fixed effects regression analysis demonstrates a positive and statistically insignificant correlation, and difference-in-differences analysis shows a negative, statistically insignificant relationship. This study then concludes that there exists no statistical evidence for leadership decapitation as a 'smoking gun' in the rising homicides experienced by Mexico in its drug war. Nonetheless, the policy clearly fails to curtail already alarming upward trends in homicide rates. Furthermore, preliminary qualitative analysis conducted in this study suggests that a weak but positive correlation between leadership removals and drug-trafficking related homicides may be more representative of the true relationship given the possible causal paths of violence post-decapitation.

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Chapter 1: Introduction

Shortly after taking the Presidential seat in 2006, Felipe Calderón's administration announced the beginning of Mexico's Drug War through "Operation Michoacán". The administration made known their goal to "strengthen the security of Mexicans and their families in all regions of the country" by combating drug cartels and drug trafficking organizations (DTOs) within Mexico. To do so, the administration set out to "recover public spaces from organized crime," "end impunity for criminals," and effectively disrupt the operations of the drug cartels ("Anuncio sobre la Operación Conjunta Michoacán"). Over the next six years, Calderón sent several thousand military personnel to various states to crack down on drug trafficking activities (Beittel 2020). Military forces replaced local police forces, which continue to be widely underfunded, prone to corruption, and lack the institutional capacity and jurisdiction needed to take on the large-scale anti-drug operations planned by the central government (Astorga & Shirk, 27). Despite— or, as some scholars argue, because of— the momentous military effort put forth by the administration in the war on drugs, homicide rates in Mexico soared from 10,000 per year to nearly 26,000 per year by the end of Calderón's six year term— nearly a 150% increase nationwide. While his successor, Enrique Peña Nieto, achieved a lull in homicides between 2012 and 2014, by the end of his term, homicides in Mexico had resumed their course and reached 36,600 per year ("Defunciones por homicidio"). Clearly, the war on drugs has failed to curtail violence and strengthen the security of Mexican citizens, despite both being key goals set out by the government at the start of the Calderón presidency ("Anuncio sobre la Operación Conjunta Michoacán"). According to state data, DTO-on-state violence accounts for less than 10% of reported deaths, and most homicides committed by drug trafficking organizations are perpetrated against members of other drug trafficking organizations

(G. Calderón et al, 1462). Yet the ever-growing number of *narcomenudistas*, or small time drug-traffickers, means that the line between violent DTO member and average citizen is increasingly blurred (Astorga & Shirk, 19). Still, others are being affected by the rise in violence too; journalists, politicians, police officers, and general civilians are also victims of DTO violence. In fact, the US Congressional Research Center estimated that on average, "from 2017 through 2019, a journalist was murdered nearly once a month" (Beittel, 1). What's more, organized crime groups have expanded operations to extortion, kidnapping, robbery, and other violent crimes affecting the average Mexican citizen that the pre-drug war cartels rarely engaged in (Beittel, 20). Tragically, the military crackdowns against cartels utilized by Calderón and Peña Nieto did not lead to the weakening of Mexican cartels and drug trafficking organizations as a whole (Flannery, 183). Many scholars point to these indicators and more to support the conclusion that the war on drugs in Mexico has been a failure (Beittel 2013; Flannery 2013; Guerrero Gutierrez 2011), but the specific policy reasons why are still up for debate. In response to rising homicides related to DTO activity, and the rising power of drug trafficking organizations themselves, this paper delves into a specific anti-DTO policy, and whether it has contributed to the rising homicide rates in Mexico.

While focusing on anti-DTO operations in certainly not the only way to theorize on how to reduce drug trafficking related homicides, in the Mexican context this point of view may be most optimal for making suggestions for the road ahead, given the many years that the government, police, and military have been entrenched in anti-drug operations. Efforts to reduce the US drug market, improve economic conditions in Mexico, and make genuine reforms to the Mexican policing system are likely also linked to successfully lowering homicides (State Department Interviewee #1), but not much has been done to pursue those efforts, so little data

exists[1]. And, because of the escalation of drug trafficking related violence that the Mexican drug war has entailed, there is no indication that the Mexican government will pursue dramatically divergent policies any time soon (Astorga & Shirk, 30). Economist and former Colombian President Caesar Gaviria argues that large-scale military operations such as Mexico's do not work in the long run, while targeted intelligence and elite counter-DTO operations tend to bring better results (Astorga & Shirk, 34). Some scholars argue that it was this specific choice to target cartel members rather than their operations or other violent crimes that caused this failure to reduce violence. Instead of removing cartel leaders, it may have been best for Calderón and Peña Nieto to have focused on reducing homicides and violent crime, as well as unorganized crime, which would have led to fewer negative externalities (Flannery, 192).

Two principal arguments stand out for why homicide rates have risen to unprecedented levels under Calderón and Peña Nieto: intra-cartel competition and inter-cartel competition. When the leadership of drug trafficking organizations is targeted, it can spark fierce conflict between members of the targeted DTO, and between members of rival DTOs that operate in close proximity to each other. The "willingness of DTO members to signal their comparative advantage through violence" is a key driver for higher drug-related homicide rates after a leadership decapitation of a drug kingpin (Dickenson, 655), as is the splintering of targeted DTOs if promotions are not accepted by the whole organization (Baranda 2014). And as a DTO is plunged into the chaos of internal competition, rival DTOs see an opportunity to gain territory and power from the relatively weakened foe. Spikes of violence after a decapitation are therefore also reflective of "rival traffickers' attempts to usurp territories after crackdowns have weakened incumbent" DTOs (Dell, 1738). Both intra-DTO and inter-DTO conflict trigger increased

[1] Interviewee 1, State Department, 1 March 2021. Interview held in confidentiality by author.

paramilitarization of drug trafficking organizations. Such violent competition has been shown to contribute to militarization of drug trafficking organizations and is theorized to increase homicides in Mexican municipalities (Correa-Cabrera et al, 84).

This paper will therefore aim to discover how effective a key law enforcement tactic, leadership decapitation, is at reducing violence perpetrated by drug trafficking organizations in Mexico. I will then seek to determine why this tactic is effective or ineffective by delving into possible causal mechanisms supported by existing literature and data analysis. Lastly, this paper discuss findings of empirical analysis, and will propose how anti-DTO policy may be improved on the basis of those conclusions.

Definitions and Operationalization

Efficacy of government policy can be a tricky concept to define and measure in any context. But in the context of illicit activities performed by criminal organizations, it can be even more difficult. For this, I turn to comparable research on political organizations such as insurgencies and terrorist groups which are also likely to experience leadership decapitation by government forces. More broadly, the efficacy of state policy in this context consists of the state's ability to gain control over illicit criminal groups. More specifically, two primary definitions are used for to define the efficacy of leadership decapitations against terrorist and insurgent groups, which are closely related. The first is the collapse or defeat of an insurgency of terrorist group (Jordan 2009; Pape 2003; Price 2012), measured by government declarations of victory and near inactivity of armed groups. The reason for measuring efficacy in this way is because terrorist and insurgent organizations exist broadly to oppose the state and contest its power; if vanquished they can no longer do so and the state gains control. The second way that

scholars of illicit political organizations define efficacy of leadership decapitations is the change in lethality and frequency of attacks perpetrated by the group (Johnston 2012). Another *raison d'être* of these groups is to attack specific targets in order to spread terror or gain territorial control, so mortality rates of attacks perpetrated by the group can give an indication of how their ability to carry out a central function of the organization has been affected. This second definition of efficacy also gets at an alternative dimension of policy motivation: the well-being of non-combatant citizens. Certainly, while not all state leadership may aim to protect their citizens, most states running counter-insurgency or counter-terrorism operations aim to limit the ability of these groups to reduce harm on civilians. In this way, states achieve their goal of achieving control over violent political groups by reducing casualties caused by them.

In the context of drug trafficking organizations, defeating a cartel could be a good indicator of the effectiveness of leadership decapitation, if it were not for the fact that other DTOs often fill space left by the defeated group. As Dr. Omar García-Ponce remarked in an interview, every drug trafficking organization can and will be replaced because demand for drugs globally and in the United States is not going away any time soon. Given the potential for great monetary gain, another group will always fill the gap (Ponce-García).[2] The second indicator of efficacy used for terrorist and insurgent groups is not quite optimal for drug trafficking organizations because the operations of drug traffickers are not intrinsically motivated by ideological or ethnic politics, as with terrorist and insurgent groups— rather, they base their operations on turning a profit and meeting market demands. While the state still aims to gain control over the criminal organization and target its primary functions, the lethality of their civilian attacks do not really tell us much about their ability to operate. While some places such

[2] Dr. Omar García-Ponce, George Washington University, 10 March 2021. Interview held via Zoom.

as casinos have been attacked by DTOs ("Monterrey casino attack: Mexican police officer held"), these events are somewhat rare, and as a business, what indicates their level of functionality is the quantity of merchandise (drugs) that they sell, and how much profit they make. But unlike a legitimate business, DTOs are not inclined to publish quarterly reviews of their operations and profits. The illicit nature of their activities means that one would have to essentially work backwards to measure this indicator: measuring the drug consumption in the US by county, determining what the lag time is between sale and consumption, tracing dealers back to suppliers, and calculating the profits of individual cartels from there. Such an endeavor would require an immense amount of resources and time. Given the nature of this paper, and the time constraints it presents, such an indicator is nearly impossible to assess. But while DTOs do not attack specific civilian targets in the way that terrorists and insurgents do, they do target journalists, government officials, and fellow drug traffickers who challenge them (L. Calderón et al 2018), and endanger passerby in their often violent confrontations with security forces and rival DTOs ("Causan pánico balaceras en Reynosa"). And similar to a state's intent with terrorist and insurgent groups, the Mexican government seeks to protect the well-being of its citizens through its anti-DTO operations, including leadership decapitations ("Anuncio sobre la Operación Conjunta Michoacán"). So, despite the inherent challenges discussed in the following section, I have selected crime reduction, specifically homicide reduction, as a more realistic and appropriate indicator of the efficacy of leadership decapitations in the context of drug trafficking organizations.

Defining effective law enforcement by crime reduction can prove especially difficult due to the illicit nature of criminal activity; not all crimes are reported by victims and not all crimes are discovered by police. Given an incompetent or corrupt policing institution, these issues can

be exacerbated and crimes may intentionally be ignored or reported incorrectly (Morris 2012). But scholars of leadership decapitation against drug trafficking organizations seem to agree that homicide reduction is the best definition for effectiveness. The limited existing literature on leadership decapitations in criminal organizations all define effectiveness of the tactic as the reduction of homicides related to drug trafficking activities (Calderón et al 2015; Dickenson 2014; Phillips 2015; Guerrero Gutiérrez 2011). For scholars studying the Mexican context, this makes sense, since the largest visible consequence of the war on drugs there has been a massive increase in homicides from 2006 until the present ("Defunciones por homicidio"). And coincidentally, the government of Mexico also publishes detailed statistical information on homicides, which makes this indicator of efficacy yet more realistic to utilize in quantitative studies.

Homicide reduction still has merits as an important indicator of the efficacy of law enforcement tactics meant to combat DTOs simply because crime rates are a good measure of community well-being. Community well-being is ultimately what drug trafficking organizations disrupt through violent confrontations, drug addiction, and recruitment of community members. Security and community well-being is also what government policies and law enforcement institutions claim to work towards ("Anuncio sobre la Operación Conjunta Michoacán"). The fact that increasing traumatic, violent, and even public homicides have afflicted Mexican communities in recent years due to drug trafficking organizations only adds to need to study homicides as an indicator of efficacy for anti-DTO policy. I therefore find the measure most appropriate to capture the effectiveness of the anti-DTO law enforcement tactic studied to be homicide rates related to drug-trafficking.

In this paper I use the terms 'cartel' and 'drug trafficking organization' many times. The definition of a cartel differs from that of a DTO in that a cartel can constitute many different drug trafficking organizations, which may have "specific assignments such as drug transportation, security/enforcement, or money laundering," according to the US Department of Justice (DOJ 2010). Still, due to the immense fracturing of cartels into smaller ones across Mexico, the line between cartel and DTO is increasingly blurred, and in some places I use the terms interchangeably.

In the first statistical analysis of leadership decapitations of drug trafficking organizations, Matthew Dickenson defines leadership decapitation as "an instance in which a high-ranking DTO member loses his position in the group due to actions by the government security forces" (Dickenson, 661). Leadership removal is characterized by its assumed abruptness, as the exit of the leader is never voluntary, meaning the organization has relatively less time to prepare for the event. Although any type of leadership change may cause violence to erupt (Price 2012), and internal coups and mutinies are possible, the natural death, retirement, or overthrow of a kingpin or high-ranking lieutenant would not be considered to be a leadership decapitation. This study focuses on government policy, and since governments are largely unable to control other types of leadership change, only those directly caused by government security forces are included as a leadership decapitation case. Leadership decapitation in this study will then be defined as the capture or assassination of a DTO or cartel leader or lieutenant by Mexican security forces.

Establishing the relationship between homicides and drug trafficking activities using a quantitative model presents its own challenges, especially in a political environment which has historically given impunity to drug trafficking organizations, such as in Mexico (Morris 2012).

The operationalization of government data relating to drug trafficking activities is difficult because of decades of impunity, poor law enforcement infrastructure, and pressure from DTOs, which means that the data collected by the government cannot fully capture the picture.

A key characteristic of all quantitative analysis is the need to hold "all else equal" apart from the independent variable. While much has been done in this study to optimize the validity of inference given the challenges presented by the Mexican socio-political context, there are still limitations to the data that cannot or have not been controlled for. In a perfect world, social science would be able to work like a laboratory experiment, where all factors stay the same over the period of study except for the independent variable. Rates of crime reporting, impunity, and corruption would not be changed by any factors, and would remain the same in all places and times during the period of study. But such assumptions present immense challenges in the real world. Rigorous controls can be used to hold some things equal, such as poverty, education, and population size, for which data exists. Yet other factors cannot be directly measured, reported, or fully accounted for. Although not all sources of error can be identified and accounted for, I attempt to operationalize homicide data in a way that increases validity given the constraints of this study. The models chosen for this study compare homicides over time and municipality, so any errors in the homicide data that occur over time, and any unseen errors shared across municipalities, will be accounted for. One important error I attempt to account for with these models is the accuracy of homicide data. By comparing government data on homicide rates over time, the rate of change in the error of this data is what matters, not the error itself. While this technique does not solve the problem entirely, since small changes may occur, it makes inference more reliable than if only one point in time were analyzed. In addition to this, I directly control

for some factors that may affect homicide rates in each analysis to more accurately demonstrate a correlation between leadership decapitation and homicide rates.

Chapter 2: Literature Review

There is a wide range of qualitative and quantitative academic literature that aims to determine why certain tactics and strategies have been effective or ineffective at reducing the negative externalities of organized crime activity. In reviewing this vast literature, I first discuss the exacerbating effect of police and military crackdowns on crime rates and organized crime activity. Second, I delve into the leadership decapitation literature, and discuss theories for when and why it is used. Third, I review two important fields of leadership removal literature. For each, I define the key characteristics of these organizations and discuss what makes them more or less susceptible to suffering negative consequences as a result of a leadership decapitation. I attempt to determine what function and importance leaders have in each organization type, and discuss how their absence affects the organization after a decapitation event occurs. I begin by reviewing the largest field of leadership decapitation research: terrorist leadership decapitation. After bridging this literature with studies on insurgency leadership removal, I compare these to the most recent focus of leadership decapitation literature: decapitation of drug trafficking organization leaders.

Law Enforcement's Effect on Criminal Activity

In this section I discuss how scholars on law enforcement and anti-drug trafficking policy in Latin America determine the efficacy of their tactics based on the reduction of criminal activity. The majority of scholars conclude that law enforcement pressure on organized crime

groups, including drug trafficking organizations, ignite retaliation in the form of violent and non-violent crimes perpetrated by DTOs as well as unknown actors.

The most common theme throughout this scholarship is that military operations aimed at reducing criminal activity seem to counterproductively escalate many forms of criminal activity (Bartilow & Eom 2009; Correa-Cabrera 2015; Flores & Villarreal 2015; Osorio 2015). Despite possible good intentions by multiple actors in Latin America, military interventions against criminal activity and drug trafficking organizations have generally failed to keep citizens safe from violence and crime. In Mexico, where local police— seen as incompetent, allied with DTOs, and susceptible to bribes (Astorga & Shirk 2010)—were replaced by military personnel under Calderón, Correa-Cabrera (2015) find a strong positive relationship between the presence of federal military operations and rising drug-related homicides. The effect reaches much further than just Mexico; from 1984-2000, coordinated drug enforcement efforts by the DEA and sixteen Caribbean and Central American states resulted in an increase in violent and property crimes, including "homicides, kidnappings, assassinations and the spread of narco-insurgent violent confrontations against governments and civilian populations" (Bartilow & Eom, 97). Furthermore, the more violent the law enforcement method, the worse the effect on the community: while on average all military interventions in Mexico from 2000-2010 led to greater violence post-intervention, violent enforcement was determined to be twice as consequential as non-violent enforcement when it came to escalating the number of violent confrontations between criminal groups (Osorio, 1417).

One work of scholarship, focusing on Brazil, reports trends of reduction in violence following interventions of the military police in the favelas of Rio de Janeiro (Tealde 2019). However, the conclusions are at best dubious. This study is flawed in many ways, as Tealde

himself recognizes that the "causal evidence… may derive from contamination of the control group" due to the relative proximity of each rival territory and each treated area to each other, and ability of violent actors to move into move into new areas (Tealde, 64). The literature can therefore be summarized by the conclusion that law enforcement crackdowns in Latin America tend to increase, rather than decrease, levels of crime and violence.

Leadership Decapitation: When and Why?

So if crackdowns in crime are demonstrated to be counterproductive, why pursue leadership decapitation against organized crime groups? Part of the answer appears to be that policy-makers are unwilling or unable to recognize the possible pitfalls of the strategy. Scholars of leadership removal have often noted that despite scholarly suggestions that it could act counterproductively, the policy is central to the counter-terrorism and counter-insurgency campaigns of many states, including the US (Johnston 2012; Jordan 2009; Price 2012; Ryckman 2017). Leadership decapitation has been suggested and carried out all over the world against terrorist and insurgent groups— in Angola, Uganda, Israel, Peru, Afghanistan, Turkey, and elsewhere (Abrahms & Mierau 2017; Jordan 2009; Tiernay 2015). The use of leadership removal stems from the belief that leadership is central to the functioning of an organization, and that removal is likely to cause great harm to the organizational structure. According a strategic report released by the Bush administration in 2003, called the United States National Strategy for Combating Terrorism; "The terrorist leadership provides the overall direction and strategy… and thereby breathes life into a terror campaign. The leadership becomes the catalyst for terrorist action. The loss of leadership can cause many organizations to collapse." While the statement recognizes that destroying an illicit organization is not always the result of leadership

decapitation, it suggests its use as an anti-terror tactic, and in 2006 the updated strategic report maintains the same stance (Bush 2003).

For lawmakers, leadership decapitation has the tangible benefit of enhancing their public image as tough on crime. In all states, and particularly in democracies, politicians rely on positive public image to stay in office. Politicians then face significant incentives to enhance their public image, and may pursue leadership removal as a result (Interviewee 1).[3] In the United States, the killings of Osama bin Laden and Abu Bakr al-Baghdadi were announced to the nation in dramatic press conferences from which politicians gained significant public rewards. In Israel, "[t]argeted killings present a serious advantage for (state) leaders: they satisfy domestic demands for a forceful response to terrorism" (Byman, 102). Just as citizens in Israel and the US expect their government to fight back against the deadly attacks and terror campaigns that terrorists perpetrated against them, Mexican citizens have historically expected their government to fight back against DTOs that perpetrate violence in their communities in concrete, visible ways. According to two State Department officials I spoke to, utilizing leadership decapitation policy is a way for Mexican politicians to simply show that they are doing something to fight drug trafficking in the country (State Department Interviewee #1, State Department Interviewee #2).[4] Accordingly, President Calderón's administration publicly announced the start of Mexico's war against drug trafficking organizations shortly after he arrived in office in 2006, making it a central part of his agenda ("Anuncio sobre la Operación Conjunta Michoacán"). Likely due to the public praise for his 'hard on crime' stance, Calderón's approval rating soared by 10 percentage points up to 68% in his first year in office (Reuters 2007).

[3] Interviewee 1, State Department, 1 March 2021. Interview held in confidentiality by author.
[4] Interviewee 2, State Department, 2 March 2021. Interview held in confidentiality by author.

Insurgency scholars suggest that in the course of a conflict against an organized crime group, states are most likely to utilize leadership decapitation when they are *losing* the conflict. While the need to boost public image may be a significant factor, the simple need take more drastic, immediate, measures against a foe incentivizes leaders to purse leadership decapitation. Leaders face no incentive to remove rival non-state leaders when the state is dominating in the fight against a criminal group; therefore leadership decapitation is most likely to occur when the state is losing against a non-state adversary (Tiernay, 90). In Mexico, since the end of widespread PRI-sponsored cartel impunity in the 1990's (Astorga & Shirk, 16), the state has continually failed in its attempts to contain the drug trade, signaling that they are dramatically losing the fight against the drug trafficking organizations. This may explain why, starting with Calderón, leadership removal has become a large part of the state's anti-DTO operations. What complicates this situation, though, is that the line between DTO and state is historically blurred (Astorga & Shirk 2010). Some politicians, military officials, and other government employees surely care about enforcing the central government's policy of targeting and weakening DTO operations and members. But as with any government, the phenomenon of "incoherent domination" can occur, meaning that the goals of the state do not align with where and how resources are spent by actors within the government (Wickham, 111). In Mexico, some state actors are on the payroll of a DTO, and do not act with the same interests as the rest of the state. Corrupt actors may actively subvert efforts to identify, locate, and remove drug traffickers targeted by the state, or they may divert efforts towards rival DTOs, allowing the organization they work for to gain comparative power and territory. The result is that the selection of leadership decapitation targets may not always be made with the sole intention of dismantling the drug trade or increasing community well-being. Due to this corruption, the Mexican state also

continues to be disadvantaged in the fight against DTOs. This, in addition to the need of Mexican politicians to demonstrate an effort to hold DTOs accountable, explains the choice to utilize leadership decapitation as a tactic in the drug war.

Leadership Decapitation in Terrorist & Insurgent Groups

The most research on leadership decapitation has been done on terrorist (Abrahms & Mierau 2015; Mannes 2008; Hafez & Hatfield 2006; Hepworth 2014; Jordan 2009; Price 2012; Rigterink 2020) and insurgent groups (Abrahm & Potter 2015; Johnston 2012; Ryckman 2017; Tiernay 2015). Despite the many differences between DTOs and these two closely related types of militant groups, all by nature stand in opposition to state laws and actively undermine the state as a central part of their activities. As Price (2012) notes, being constantly pursued by the state has an impact on the organizational structure of violent criminal organizations which become more cohesive and co-dependent than non-violent, legitimate organizations. It follows that the effects of state actions against these types of criminal organizations will adhere to similar causal paths, and despite their organizational differences, leadership decapitations against terrorist, insurgent, and drug trafficking groups can be compared and contrasted to gain important insights on the effects of leadership removal against DTOs.

In considering the organizational features of terrorist and insurgent groups, the most salient characteristic of these groups is that they face intrinsically different motivations than DTOs. Unlike drug trafficking organizations and certain other organized crime groups, terrorist organizations exist to propagate an ideology by gaining followers with very similar ideological values and persuading them to perpetrate violence and spread terror. Through their violent actions, they seek to put pressure on the state in which they operate to gain something central to

their campaign: sometimes autonomous territory, sometimes governmental power or policy influence ("What We Investigate"). Quite similarly, insurgent groups use violence as a central part of their operations, putting pressure on the state in hopes to achieve nearly identical political goals related to territorial gains or government power and influence. What sets insurgent groups apart from terrorist groups is that they are not necessarily ideological, and while some insurgent groups may use terrorist tactics against civilian targets, they are not defined by them. Still, the motivation of insurgent groups can be classified in relation to dramatically altering the political status-quo of a specific location, as they can seek revolution or reform of a political system, pursue independence from or expulsion of an occupying power, or simply seek to gain wealth by taking political power ("Guide to the Analysis of Insurgency"). The intrinsic motivations of these groups are situated in opposition to that of DTOs, which essentially seek to run their illicit business and earn profits without the hinderances of state laws and policing forces. Therefore, DTOs do not primarily target the state to take political power or territory so much as they defend their operations from the state. One example of this primarily defensive violence is the commonality of "narco-blockades" (*narcobloqueos*) which are violent and forceful attempts by DTOs to prevent the departure of state forces after the capture or execution of a DTO leader in that locality (Baranda 2018a). The original act of violence is taken by the state, and only then does the criminal organization take up arms against it to retaliate or defend its captured leader. Apart from the classification of their use of violence, DTOs differ from terrorist and insurgent organizations in that their success as an organization relies not on a number of attacks or fatalities, pressure placed on the state, autonomous territory recognized, or even political power gained. As a business, their success lies in quantities of illicit substances produced, sold, and ultimately, their profits. This has implications for the distinct role of leadership in each

organizational type, and therefore how the organization will react when the leader is suddenly removed.

When it comes to leadership of criminal organizations, terrorist leaders provide a good reference point for DTOs. Terrorist leaders are more likely than insurgent and DTO leaders to play a central role in the organization through ideology (Price 2012). This can make them more difficult to replace than leaders that do not play a central role through their guidance or establishment of ideology because this role is much more niche and unique as compared to, for example, the organizational importance of a business leader. Additionally, legitimate organizations, such as legal businesses, legislatures, and NGOs, can attract followers based on mostly benefits— stability, salary, upward mobility, etc. Illegitimate organizations do not enjoy stability, and their members are subject to arrest or assassination by government forces or rival criminal groups. Price theorizes that leaders of illegitimate organizations therefore "depend more on charisma to attract, control, and keep followers," making them even more difficult to replace than leaders that do not rely on charisma to ensure the success of their organization (Price, 17-18). While drug trafficking leaders rarely share the immense ideological importance of terrorist leaders, as leaders of violent groups they rely on non-conventional forms of leadership to gain and maintain power. Researchers Marco Alejandro Núñez-González and Guillermo Núñez Noriega discover this dynamic with men who are considered important in the narco-culture (*narcocultura*) that surrounds pervasive drug trafficking in Mexico. Certain traits, or masculinities, are valued more than others and denote how much power and influence these men can have. These characteristics include decisiveness, sensibility, and the willingness to commit violence (Núñez-González & Núñez Noriega 2019). It is therefore possible that leaders of drug trafficking organizations are considered central to the organization in ways that do not tie

directly to operational functions. The importance of these leaders can be further demonstrated by the aforementioned use of "narco-blockades," which are usually attempts to prevent captured leaders from being taken away by state forces. DTO members will go to great lengths to try to prevent this: burning cars and busses, and even capturing state troops involved in the operation against their leader (Baranda 2018a).

But the organizational difficulty implicated in losing a uniquely charismatic or ideological leader may not bring about the positive results that it seems to connote for some cases of counterterrorism and counter-drug trafficking operations. Price (2012) argues that as an unintended consequence of having a leader with unique or niche skills, the decapitation of terrorist leaders can make a martyr of the fallen leader, thereby increasing the number of new recruits to the organization, "allowing these groups to grow in size and popularity" (Price, 11). Furthermore, Abrahms & Mierau (2017) demonstrate that with militant groups of all types, leadership removal tends to increase their targeting of civilians. While the decapitation may hinder their abilities as an organization, it more importantly promotes lower lieutenants "with inferior civilian restraint" (Abrahms & Mierau, 832). These lower-level members are seen as lacking the discipline necessary to attack only the most strategically important targets, in the case of militant groups, military targets, and therefore are more indiscriminate in their use of violence, killing many more civilians after decapitation events occur. In the context of DTOs, lower lieutenants will have similar levels of experience and therefore discipline, likely resulting in a lower understanding of the most precise targets for their use of violence in turf wars or intra-DTO promotional competitions sparked by leadership decapitations. The implications in this context may be that decapitations in all cases, especially in cases of removing lower level lieutenants within DTOs, generates more indiscriminate violence.

For many scholars of terrorist and insurgency, including Abrahms & Mierau (2015), an increase in civilian and overall attacks denotes the failure of the decapitation strategy (Johnston 2012; Price 2012; Rigterink 2020). Other scholars in these fields study indicators of organizational decline or death to determine the success or failure of the strategy (Ryckman 2017; Tiernay 2015; Jordan 2009). But no matter the indicator, the literature on leadership decapitations of terrorist and insurgency groups has yet to decide on its overall effectiveness. Some scholars suggest that leadership decapitation achieves stated goals (Johnston 2012; Tiernay 2015; Price 2012). Both Johnston (2012) and Tiernay (2015) find that leadership decapitation leads to higher rates of government victory and civil war termination, while Johnston presents the additional finding which claims that decapitation events result in lower numbers of attacks and fatalities perpetrated by insurgent groups. Price (2012) joins the authors by asserting that decapitation, and really any type of leadership change, contributes significantly to the death of terrorist groups. Other scholars only partially agree, finding that decapitation only works with certain conditions (Jordan 2009; Mannes 2008; Ryckman 2017; Hepworth 2014). Notably, Jordan (2009) claims that young, small, and religious terrorist groups are more susceptible to collapse after a decapitation event, but demonstrates that violence nonetheless increases after leadership removal occurs. She is opposed by Hepworth (2014) who claims that decapitation causes no difference in the type, target, or frequency of terrorist attacks, and presents some evidence that fatalities reduce slightly after decapitation. Finally, another group of scholars of terrorist and insurgent groups find that decapitation has either no effect (Hafez & Hatfield 2006) or has adverse effects (Abrahms & Mierau 2017; Abrahms & Potter 2015; Rigterink 2020), defined by these authors as higher rates of attacks in general and attacks on civilians.

Leadership Decapitation in DTOs

In recent years, a few scholars have turned their attention to drug trafficking organizations as another target of leadership decapitation. The practice was implemented on a wide scale by Mexico's President Felipe Calderón who served from 2006-2012 when he launched the country's official war on drug trafficking. During this time, Calderón sent several thousand military personnel to combat DTOs and to capture or kill presumed leaders of drug trafficking organizations (Beittel 2020). Mexico's next President, Enrique Peña Nieto, who served from December 2012 to November 2018, continued seeking the 'kingpin strategy' despite the immense increase in homicides experienced under the Calderón administration ("Defunciones por homicidio"). So far, scholars have only studied the first six years of the drug war.

As discussed previously, DTOs differ from terrorist and insurgency groups, mainly in that they function essentially as illicit businesses— this likely has a lot to do with the effects experienced by Mexican DTOs after a leadership decapitation event. I spoke with various subject matter experts in government and in academia to learn more about this distinction, and each of them came to me with an initial caution: despite a widespread portrayal of Mexican cartels as multinational corporations, this does not align with reality. Although organizational structure and the importance of leadership varies from DTO to DTO, all interviewees stated that Mexican cartels are generally less sophisticated, less organized, and less institutionalized than they are portrayed by media and governments. In a way similar to how Price (2012) describes the challenges to illegal organizations as opposed to legal ones, my third interviewee, an academic expert on political violence who has done field research in Mexico (who chose to remain anonymous), emphasized that cartels in Mexico are not nearly as sophisticated as multinational

corporations, despite their high profits, global market, and wide range of influence.[5] In particular, Mexican DTOs are extremely dependent on physical smuggling networks and networks of corruption that date back to the prohibition era. Another interviewee, Dr. Omar García-Ponce, Assistant Professor of Political Science at George Washington University and expert on criminal and political violence, agrees that a reliance on such networks has resulted in a generally low level of organizational development across Mexican DTOs, stating that a drug trafficking operation "doesn't *have* to be that sophisticated" to function and profit.[6] Mexican cartels are limited to basic organizational structures because they exist (mostly) outside of legal institutions, but thrive nonetheless, given the vast networks of impunity and complicity that they create and benefit from. These smuggling networks and networks of corruption work together to in effect circumvent any negative consequences of low sophistication. For example, a cartel does not need sophisticated technology to surpass high-tech detection devices because they can simply bribe and threaten the person operating it. The organizational structure of Mexican DTOs is constructed in a similarly unsophisticated manner, in that the connections between DTO members, and even those between the DTOs that make up cartels, are essentially "marriages of convenience" reinforced by high levels of violence and immense opportunities for monetary gain— not held together by any legal or contractual obligations involved in legitimate businesses (Interviewee 3), or the ideological or ethnic bonds formed in terrorist and insurgent groups.[7]

The effect of this is that Mexican DTOs may experience negative consequences as an organization after a leader is removed: allegiances may change, factions may divide the organization, and violence may erupt (State Department Interviewee #1).[8] Guerrero Gutierrez

[5] Interviewee 3, 9 March 2021. Interview held in confidentiality by author.
[6] Dr. Omar García-Ponce, George Washington University, 10 March 2021. Interview held via Zoom.
[7] Interviewee 3, 9 March 2021. Interview held in confidentiality by author.
[8] Interviewee 1, State Department, 1 March 2021. Interview held in confidentiality by author.

(2011) argues that because Mexican DTOs "do not rely on formal mechanisms to establish their operational structure or facilitate internal conflict apart from personal relationships," they are much more prone to instability shocks when a leader is removed unexpectedly and a power vacuum is left behind (Guerrero Gutiérrez, 14). But these shocks are not necessarily capable of dismantling the organization, or the root problem of the drug trade, as the government intends to. Because DTOs and their members are held together by "profit motive," or the gaining of financial goods from the drug trade (Interviewee 3), rather than legal contractual obligations and relative job stability experienced by legitimate businesses, Mexican cartels are much more likely to splinter than they are to collapse after a decapitation event. Organizations and members are adaptable, so removing a cartel leader can functionally be nothing more than removing "a node from a network" (Interviewee 3).[9] This makes leaders within drug trafficking organizations generally more replaceable than leaders of terrorist or even insurgent groups. Therefore, after a leadership decapitation, other DTO members readily fill new roles within the organization, create their own organizations, or join competitor trafficking groups (Kenney, 44). In fact, although factions and turf struggles exist within every DTO (Interviewee 2), the splintering of DTOs seems to occur more often with the extra push towards fracturing that leadership decapitation gives them.[10] This phenomenon dates back prior to Mexico's official drug war following some of the first leadership decapitations made by Mexican forces against DTOs. After the most prominent leaders of the Guadalajara Cartel were arrested in the late 1980's, the cartel splintered into three new, powerful cartels that still operate today: the Sinaloa Cartel, the Juarez Cartel, and the Tijuana Cartel. While the Guadalajara Cartel ceased to exist in name, it's people, power, and

[9] Interviewee 3, 9 March 2021. Interview held in confidentiality by author.
[10] Interviewee 2, State Department, 2 March 2021. Interview held in confidentiality by author.

influence remained through these splinter groups. The same splintering phenomenon is easily perceived during the Calderón administration from 2006-2012, when the main 5 cartels in the country (Sinaloa, Juarez, Tijuana, Gulf, and Los Zetas) fractured in to 9, creating the Beltrán-Leyva Organization, Cartel Jalisco Nueva Generación, La Familia Michoacana, and the Cartel of the Knights Templar (Montalvo). Along with these large cartels exist dozens of smaller independent drug trafficking organizations, many of which have splintered from larger ones. In essence, while some organizations cease to exist in name, or lose significant power due to splintering, their supply chain networks, networks of corrupt officials, and considerable workforce remain for new groups to utilize (Dudley). Therefore, while punitive tactics such as leadership decapitations may have accomplished the goal of dismantling certain cartels, the fragmentation of these larger drug trafficking organizations into smaller DTOs leads means that the root cause of drug-trafficking related homicides, extortion, and other crimes related to the drug trade itself have not been affected (Guerrero Gutierrez, 1).

The subject matter experts that I interviewed noted that the organizational structure, and therefore the importance of leadership, within a DTO will have an impact on the results of leadership decapitation against them. This line of thinking is similar to how some scholars of leadership decapitation against terrorist organizations (Jordan 2009; Price 2012) predicted differing results after a decapitation based on the type of organization such as religious, nationalist, ideological, or separatist. Upon noting the considerable difficulty of determining the exact organizational details of Mexican DTOs, which are highly adaptable and often fluctuating, my second Interviewee, a State Department official and subject matter expert on Mexican organized crime, stated that certain organizational characteristics have still been identified in some groups. For example, the Sinaloa Cartel is widely considered to be one of the most

organizationally sophisticated DTOs, demonstrated by its legacy as one of the oldest and most consistently powerful cartels active in Mexico today (Montalvo). Due in part to its federation style control structure, far reaching corruption networks, and development of potential replacement leaders, this organization has survived many leadership decapitations through the decades (Interviewee 2).[11] Because of its relatively flat hierarchical structure, the many groups that make up the federation act independently as well as part of the group ("Sinaloa Cartel"). The effect of having "multiple centers of power" is that when organizational damage occurs, whether from leadership decapitation or not, the damage is isolated and the organization survives. Furthermore, the cartel does a good job of training possible replacements for targets of decapitation, meaning that when leaders are removed, occurrences of power vacuums or contestations of leadership are theoretically reduced (State Department Interviewee #2).[10] It stands to reason then, that organizations which do not employ these strategies as well are less likely to survive leadership removal. Those DTOs which depend more heavily on one leader within a hierarchical organization, or which do not develop leaders before decapitation occurs find their chances of survival minimized. Badly weakened in its present form, the Knights Templar (Caballeros Templarios) cartel serves as an example of this. After the cartel suffered several leadership removals in 2014 and 2015 including those of two powerful kingpins, "El Chayo" and "La Tuta", as well as several lieutenants, the organization was left without central leadership and fragmented into splinter groups like "Los Viagras" ("Knights Templar").

When cartels fracture under such law enforcement pressure, they emerge in new areas and continue to fracture into new DTOs across new territories when faced with new decapitation attempts and internal divisions. Guerrero Gutierrez (2011) compiles information from various

[11] Interviewee 2, State Department, 2 March 2021. Interview held in confidentiality by author.

media, government, and internet sources to show the significant expansion of DTO presence across Mexico. For example, in 2007, drug cartels had a presence in only six Mexican states— in 2010 they existed in all but five of Mexico's twenty-seven states. Guerrero, the state most densely populated with drug trafficking organizations in 2010, was only home to one cartel and one local DTO in 2007. In 2010 this had grown to four cartels and ten different local DTOs (Guerrero Gutierrez, 5). Insight Crime's Patrick Corcoran specifically mentions leadership decapitation, among other law enforcement pressures, as a reason for this increased expansion. One decapitation can spark multiple turf wars by initiating conflict in the location of government pressure, displacing the group that loses the turf war, and initiating a new conflict in their new base of operations if there is an existing group there. The result is that "expansion and conflict is a self-perpetuating cycle" in which geographic cartel expansion and inter-DTO violence fuel each other (Corcoran).

Such violent cartel expansions are a key to understanding the increasing homicides across Mexico since the beginning of Calderón's administration. The Congressional Research Service concludes that DTOs in Mexico were, at the start of President Peña Nieto's term "more fragmented, more violent, and more competitive than the larger and more stable organizations" that existed six years earlier at the start of Calderón's drug war (Beittel, 18). Unlike terrorist and insurgency groups, which are generally more geographically separated from other rival non-state groups, DTOs exist alongside each other, often competing against each other. With new and displaced actors vying for resources, revenue sources, and market share, the likelihood of violence seems high. DTOs compete for many kind of resources, primary among them territory. Territory brings with it access to resources for their supply chain and transportation of goods, new revenue streams, and access to key markets in the US and across the world. By occupying

territory, DTOs have access to populations and businesses that they can "tax" —extort— (State Department Interviewee #1), local politicians and police officials to be corrupted and added to their network, and important supply chain points such as highways, border crossings, and marine ports.[12] Therefore, DTO members are willing to commit acts of violence against those that threaten their access in this high stakes, high reward game (Interviewee 3).[13]

Unfortunately, and likely because of both the relatively young age of the research and the inherently illicit nature of DTO activity, there is little statistical analysis which seeks to determine the effectiveness of this anti-DTO law enforcement tactic. There exist only four statistical studies on this topic to date (Calderón et al 2015; Dickenson 2014; Phillips 2015; Lindo & Padilla-Romo 2015). Literature on this topic focuses on Mexico, where federal troops have replaced local law enforcement in anti-DTO operations as leadership decapitations have become a central strategy ever since Felipe Calderón began waging war against drug trafficking organizations in 2006. In contrast to the body of scholarly works on leadership decapitation against terrorist and insurgency groups, the empirical literature on leadership decapitations against drug trafficking organizations proposes no statistical evidence that targeting leaders achieves stated goals in all cases, as Johnston (2012), Tiernay (2015), and Price (2012) do. Instead, these authors indicate that such a law enforcement tactic is ineffective in whole or in part. Each support the idea that leadership decapitations against DTOs escalate homicide rates, particularly in the Mexican context, since they all study the first era of the Mexican Drug War under Felipe Calderón, from about 2006-2012. A majority of this scholarship (Calderón et al 2015; Dickenson 2014; Lindo & Padilla Romo 2015) find that leadership decapitation against

[12] Interviewee 1, State Department, 1 March 2021. Interview held in confidentiality by author.
[13] Interviewee 3, 9 March 2021. Interview held in confidentiality by author.

DTOs causes an increase in homicides in the municipality of removal, as well as in other municipalities linked to the DTO or location of capture, with the caveat that Dickenson (2014) reveals a self-admittedly less confident claim that the presence of a bounty reduces homicide rates. Standing alone in the minority camp, Phillips (2015) finds evidence of a decrease in homicide rates post-decapitation in the short term. Despite this initial finding, the study still concedes that "in the longer term… decapitation is associated with no change in violence or an increase" in DTO-related homicides (Phillips, 334).

The predictions of Abrahms & Mierau (2017) in their study of lower level lieutenants rising to the upper ranks of diverse military groups targeted by leadership removal would lead us to believe that the parallel scholarship on DTOs would demonstrate a similar pattern. First, we should see that leadership decapitations in general lead to greater homicide rates. Indeed, my third Interviewee, an academic who studies political violence and has done field work in Mexico, echoes the theory of Abrahms & Mierau (2017) in the context of Mexican cartels, stating that *capos* may be more judicious with violence than those who replace them (Interviewee 3).[12] Second, there may be a distinction to be seen between the removal of higher-ranking leaders and lower-ranking leaders within drug trafficking organizations. In any group of drug traffickers, alliances between members are essentially "marriages of convenience," held together by greed and threat of violence (Interviewee 3).[12] It follows that determining leadership succession would require a significant degree of trust given the uncertainty of many relationships within DTOs. The path of succession, then, can be seen as a scale in which high-ranking officials close to more judicious *capos* would replace those leaders while low-ranking members close to less judicious lieutenants would replace them. Following the Abrahms & Mierau (2017) theory, the removal of relatively lower level leaders should result in a higher escalation of drug related homicides

because their replacements would have respectively less experience, and therefore less discipline and constraint in their use of violence. Despite this, scholars of leadership removal in DTOs demonstrate that violence is greater, or harder to curtail, after the capture or killing of a kingpin, or *capo*. Calderón et al (2015) finds that, overall, leadership removals cause increasing violence, and that the removal of kingpins results in higher drug-related homicide rates than those of lower level lieutenants. Phillips (2015) claims that, generally, in the short term leadership removal decreases homicide rates, but finds that violence is reduced by much less for targeted kingpins than for lieutenants. Despite their opposing findings on general leadership decapitations, both scholars find that violence is harder to curtail after the removal of a kingpin.

Unlike the terrorism and insurgency literature on leadership decapitation, the literature on DTOs makes a distinction between the effect of capture versus kill in a leadership removal operation (Dickenson 2014; Phillips 2015). The capture of a DTO leader is shown to lessen the impact of rising homicides compared to the assassination DTO leaders, likely because captured leaders can still operate their organizations from jail. El Chapo, for example, is said to have still led at least some of the Sinaloa Cartel's operations from prison ("Sinaloa Cartel"). Quite simply, while death is permanent, arrest can be temporary: capos can do as El Chapo did and lead or escape from prison, or they can be released soon after due to a lack of evidence (Muedano). When this happens, open positions are not contested and the group is not challenged by rivals who see them as weakened by the operation. Attempting to avoid this issue, Mannes (2008) removes all leadership arrests of terrorists that did not lead to long term incarceration from the dataset. In the context of DTOs in Mexico, I disagree with this decision because while it restricts the possibility of intra- and inter-cartel conflict, these theoretical causal mechanisms can still affect homicides because capture may still weaken a leaders ability to operate their organization,

and rivals can still see the capture of a rival kingpin as an opportunity to challenge their territory. For both this reason, and for the practical reason that there exist proportionally few assassinations compared to captures of DTO leaders, I include leadership decapitations achieved through capture. But because intra- and inter- cartel competition can be restricted by capture, I project that the killing of targeted leaders is likely to provoke more violence than capture. This is in agreement with the findings of Dickenson (2014) and Phillips (2015) which state that the killing of DTO leaders increases violence more greatly than the capture of such leaders.

Although not a common feature among leadership decapitation studies on terrorist and insurgent groups, a nearly universal methodological feature among the literature on leadership decapitation against DTOs is the use of data lagging (Calderón et al 2015; Lindo & Padilla Romo 2015; Phillips 2015). The purpose is to reveal the dynamics of violence succeeding a leadership removal for anywhere from 3 to 12 months after the event has taken place. This practice helps to determine how long it takes for the violent effects of decapitation to kick in— of if they will at all. For example, if tensions between rival DTOs or factions within a DTO are high leading up to the decapitation event, violence may be more immediate than in cases where tensions are lower to begin with.

Both the base state of the drug trafficking organization and the state in which the decapitation occurs are shown to experience increases in DTO-related homicides due to general leadership decapitations (Dickenson, 666). Yet, some scholars on leadership removal in DTOs record and analyze data only from the location of the decapitation event (Calderón et al 2015; Phillips 2015), likely because these two events are usually the same. Dickenson (2014) and Lindo & Padilla-Romo (2015) challenge this assumption by integrating into their quantitative analyses a comparison between homicide rates of the location of decapitation and location of the

DTO's or the targeted leader's operations. The case of José María González Valencia, "El Chema," a Mexican drug trafficker who was captured in Fortaleza, Brazil on vacation with his family in 2017, demonstrates why it is problematic to assume that the location of decapitation and operation are the same (Baranda 2017). Since González Valencia had no apparent connection to Fortaleza other than his desire to vacation there, there exists no causal link between the loss of his position and homicide rates in the Brazilian city. Instead, it would be expected that violence would rise in Michoacán, where his operations were based. Dickenson (2014) demonstrates the practice of focusing on the location of operation bolsters the causal link between violence and leadership removal through his finding that violence in the base state increases twofold what violence in the decapitation state increases (Dickenson, 673). While this study is unable to include this distinction, future research should call into question the assumption that homicides are affected in the location of removal by assessing drug trafficking related homicides in the location of operation.

Finally, while most scholars do not consider it in their quantitative analyses, repeated decapitations in a given location and the concentration of DTOs in the municipality of capture may each have a significant effect on the violence produced by a leadership decapitation in the present. Repeated decapitations give rival DTOs more chances to violently challenge targeted competitors, and allow more opportunity for the contestation of replacement leaders within the organization. Phillips (2015) supports this by demonstrating empirically that with each increasing leadership decapitation comes greater increases in violence following the most recent decapitation event (Phillips, 331-332). A higher concentrations of DTOs in an area will mean that a greater number of DTOs have a chance to challenge the territory of the targeted group, and therefore greater opportunity for turf wars. This effect may be somewhat mitigated in larger

cities, such as Mexico City which has a population of over 20 million, where resources like drug routes, production facilities, and extort-able businesses are better shared between groups. Nonetheless, large cities are not the only locations with multiple DTOs present, and the simple fact of rival DTOs being in direct contact means that inter-DTO violence will be present along with any intra-DTO conflict that may already be occurring. In this way, the main theoretical causes of violence, inter-cartel and intra-cartel competition, should be exacerbated by both repeated decapitations in the recent past and higher concentrations DTOs in a given area.

Possible Threats to Inference

There are two main threats to the validity of inference in this study: the spillover effect of violence, and the displacement of violence. Violence can relocate following a law enforcement interdiction event and make inference difficult for those studying the change in violence after the event (Tealde 2019). Spillover violence occurs when violence originating in one municipality spreads to one or more neighboring municipality. It may happen when turf wars expand outward from the location of the decapitation event what has caused internal splintering and conflict or inter-cartel competition, This phenomenon is demonstrated by several authors (Lindo & Padilla Romo 2015; Calderón 2014; Phillips 2015) who collectively find that municipalities neighboring ones that experienced leadership decapitation experience increases in violence along with the 'treated' municipality. Similarly, displacement of violence occurs when violence spreads non-contiguously to other municipalities. With DTOs, the most likely scenario is that if losing a turf war against a rival cartel or new splinter group, a targeted group will focus on their base location operations. As discussed above, upon relocating, the targeted group sparks conflict with existing criminal groups in the area as they compete for resources, corruption networks, and territory

(Corcoran). Dickenson (2014) demonstrates the phenomenon through the finding that violence in the state of central operations increased twice that of violence in the state of decapitation. Without the proper controls to measure violence in neighboring municipalities and entities from which the targeted leader primarily operates, it can threaten the validity of statistical analysis.

Chapter 3: Theory and Hypotheses

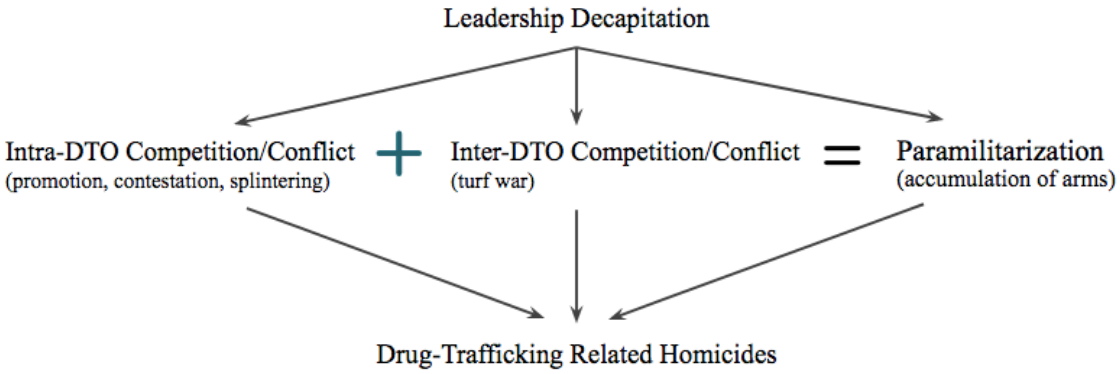
The scholarship on leadership decapitations shows that, whether against terrorist, insurgent, or drug trafficking organizations, leadership removal by government forces is truly disruptive. Leaving behind an unexpectedly vacant seat has consequences for the targeted organization, the stability of the territory they hold, and the civilians living in it. One consequence is that within the targeted organization, chains of vacancies are left as members seek promotion to the next open seat (Friman 2004). This forces the organization to fill many seats at once, and in the context of Mexican DTOs, members are incentivized to commit violence to prove their worth for promotion (Núñez-González & Núñez Noriega 2019). These members may target civilians or rival DTO members to achieve promotion, increasing homicide rates in their area. A second consequence is the contestation of new promotions within the organization, which can lead to splintering and violent conflict within the organization (Baranda 2014). In this case, the newly created organization will fight the original for territory and resources, as was the case with Los Zetas when they split from the Gulf Cartel (State Department Interviewee #2).[14] A third consequence of leadership decapitation occurs outside of the targeted organization: rival groups may challenge the territory of the targeted group if they perceive them as less able to defend it. This is a consequence of "asymmetric weakening" of the rival groups, which is

[14] Interviewee 2, State Department, 2 March 2021. Interview held in confidentiality by author.

common when only one of the DTOs in an area is targeted (Beittel, 23). Asymmetric weakening sparks turf wars between groups, causing ripples of violence through the original location of leadership removal, neighboring municipalities and possibly noncontiguous municipalities in which the targeted group has a presence (Dickenson 2014; Lindo & Padilla-Romo 2015; Dell 2015).

In the same way that inter-DTO competition triggers turf wars, they also trigger arms races when DTOs are confronted with increasingly militarized rival cartels and law enforcement groups. As competition between groups grows, as it has since government forces first started putting pressure on DTOs they once allied with in the 1980's (Astorga & Shirk, 20), incentives to gain competitive advantages over other DTOs rises. This includes access to guns, ammunition, and even military grade weapons like grenade launchers (Álvarez). And, since leadership decapitation efforts are often carried out by elite government forces, such events can contribute to the phenomenon of paramilitarization in drug trafficking organizations. Faced with military threats on multiple fronts, cartels have a greater incentive to gain access to high-grade weaponry given the rising inter-DTO competition and the threat of leadership decapitation from government forces (Dube et al 2013). Paramilitarization of DTOs then increases drug-related homicides due to greater paramilitary capacity, targeting of rival DTOs, and civilians caught in the ever-widening crossfire (Correa-Cabrera et al 2015).

Figure 1: Theory



Furthermore, certain characteristics of a decapitation may alter the levels of competition, paramilitarization, and violence that follow it. The rank of the targeted leader within the drug trafficking organization can affect levels of violence as less experienced leaders institute less judicious and restrained uses of violence (Abrahms & Mierau 2017; Interviewee 3).[15] The concentration of DTOs in an area will have implications for levels of competition and violence given that inter-DTO competition is a key result of leadership decapitation, and that key mechanisms that spur violence— those being inter-DTO competition and paramilitarization— are closer in contact with one another and increases their effect on violence. Organizational structure determines the leader's role within the organization, and therefore the organization's ability to limit infighting, promote competent leaders, and dissuade rivals from attacking after being targeted by a decapitation attempt.

[15] Interviewee 3, 9 March 2021. Interview held in confidentiality by author.

Hypotheses

Because suddenly vacant positions of DTO leaders violent spark intra-group competition, bloody inter-DTO competition including turf wars (Dickenson, 1460), and increased paramilitarization, I hypothesize that leadership decapitations will generally be ineffective at reducing violence. In order to understand how the characteristics of leadership decapitation mentioned above affect levels of violence, other factors are considered. I therefore propose a primary hypothesis on the general effect of leadership decapitations, and several secondary hypotheses which concern nuances discussed in the theory above:

Primary Hypothesis:

H1: Leadership decapitations will be generally ineffective at reducing homicides related to DTO activities.

Secondary Hypotheses:

H2: The removal of high-ranking leaders will have a greater effect on increasing homicides perpetrated by DTOs than the removal of middle-ranking lieutenants.

H3: The method of decapitation will affect levels of violence after the event such that capturing (versus killing) will result in a weaker increase in DTO-related homicides.

H4: When there exists a higher concentration of DTOs in an area there will be higher violence following a given Leadership Decapitation.

Each hypothesis aims to determine the effect of violence post-leadership removal, so each utilizes drug-related homicides as the dependent variable, which is measured by each individual death which is determined to be a result of a non-natural cause ("Defunciones por

homicidio"). Each hypothesis is studied at the Mexican municipality-month level following a decapitation event, or multiple decapitation events. H1 will study individual leadership decapitation events, and each secondary hypothesis will control for a key variable to give a more nuanced understanding of under what circumstances leadership decapitations drive positive or negative results. H2 will control for the organizational rank of the removed member and H3 whether the DTO leader was captured or killed during the decapitation event. H4 will utilize the concentration of DTOs in a certain municipality measured by their location along an inter-cartel territorial border.

Figure 2: Hypotheses and Measurement

	Independent Variable	Measurement
Hypothesis 1	General Leadership Decapitation	Dichotomous Individual decapitation event occurring in a municipality or not
Hypothesis 2	Rank of Targeted Leader	Scale (1-4) Cartel Leader, Specialized and Regional operations, local DTO leader, lower level lieutenant
Hypothesis 3	Method of Decapitation	Dichotomous Capture or Kill
Hypothesis 4	Concentration of DTOs in the Area	Dichotomous Inter-DTO border area or not

The table above explains how each hypothesis varies by independent variable and how each is measured. An original goal of this study was to include each secondary hypothesis in the

difference-in-differences model, but because of a low sample size for each sub-group, H2-H4 will be explored in the Case Study section.

Chapter 4: Data and Methods

Data for this study is taken primarily from Mexican sources including government databases and national, state, and local news publications. While the data on drug-related homicides is directly from a state source, the data on leadership decapitation events is collected and coded by the author using news publications. Some issues were discovered with the data, but this was resolved by constructing multiple analyses using two different sets of data holding different assumptions about it. This study utilizes three progressively more complex regression analysis, simple linear regression, two-way fixed effects regression, and difference-in-differences regression, to provide multiple levels of analysis and insight.

Data Collection: Leadership Decapitations

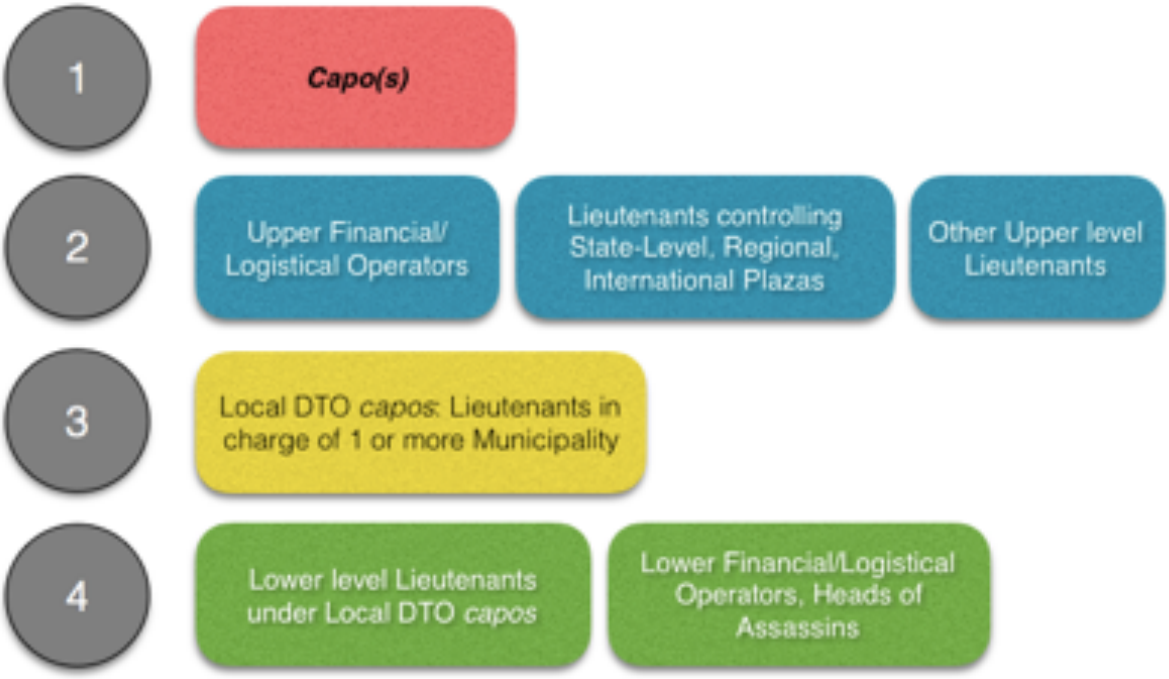
The data on leadership decapitations is collected and coded by hand by the author. Publications on decapitation events are widely available on the internet from sources such as national and local news outlets. Like other academics writing on leadership decapitations in Mexico, I pull my data primarily from *La Reforma*, using the database Factiva, and supplement it with other state and local news publications, including *Milenio*, *El Universal*, and *Proceso*. Key words were searched for in Spanish publications from 01/01/2013 to 12/31/2018 as "cártel" AND "capo OR líder" AND "capturan OR capturado OR arrestan OR arrestado OR detienen OR detenido OR matan OR matado OR abaten OR abatido OR ejecutan OR ejecutado". While *La Reforma* is generally considered to be a reputable news source, there are still valid concerns

about reporting bias in the treatment data. Although While *La Reforma* is a national newspaper, located in the capital, there are significant concerns to be had about the ability of journalists to accurately report the details of leadership removals of DTOs in Mexico for several reasons. First, journalists face immense danger in Mexico, more so than most all other countries in the world: during the scope of this study alone, 80 journalists and media support workers were killed (L. Calderón et al, 36). If threatened by cartels, journalists may feel pressured to not cover certain homicides or certain details. This is generally circumvented in data collection by relying mostly on national newspapers which are less frequently targeted (L. Calderón et al 2018), and by relying on quotes from government officials. But national newspapers like *La Reforma* may still rely on local newspapers for municipal-level news, which increases the bias. The second issue has to do with additional reporting bias from the government. Government officials may not always report leadership decapitation events, whether from ignorance or due to national strategy. Given this possibility, some leadership decapitation events in areas with higher corruption or lower institutional capacity may not be recorded. In this case, some municipalities that experience decapitation may be in the control group, which would cause an inflated mean in the control group and understate the effect of decapitation on drug-related homicides. Additionally, neither government officials nor journalists can be completely sure of every DTO leader's position within an organization. While the date, location, and method of decapitation are all objective and static, rank within an organization of unknown or unclear hierarchy is not. In order to compensate for this subjectivity, data collected for this particular variable has been verified using more than one source to improve accuracy.

From these sources, data on 113 individual cases of leadership removal from were documented. The data on these cases includes the name and epithet(s) of the targeted leader, date

and municipality of the decapitation event, and the cartel the targeted leader belonged to. Additionally, I recorded data on the rank of the targeted leader, the method of decapitation, and the location of base operations, if different from the location of their arrest or death. The rank of targeted leaders is separated into four categories: kingpin (or *capo*), upper level lieutenants and specialized operators, local lieutenants, and lower level lieutenants. Capos are defined as the highest leader in an organization, and are identified in primary sources through their description as being the "highest leader" ('*líder máximo*') of the cartel, or by being identified as the successor to another *líder máximo*. In the second category, upper level lieutenants are those identified as the "right hand man" ('*mano derecho*') to a kingpin, having no specified role other than that. Upper financial and logistical offers are identified by these titles ('*operador*

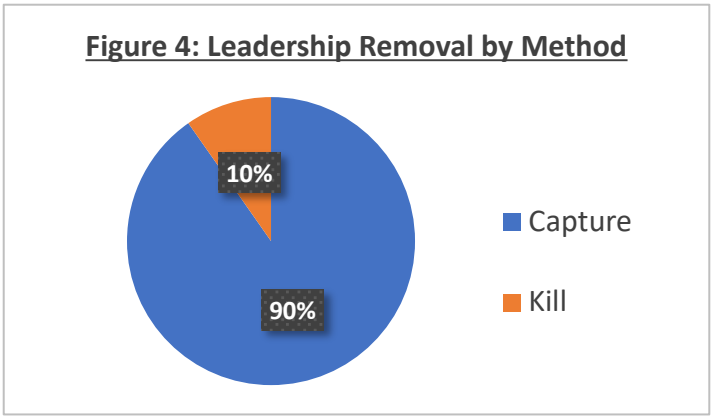
Figure 3: DTO Rank Categories



financiero', '*operador logístico*'). The final class of upper lieutenants are identified by controlling state, regional, or international drug markets, called *plazas*. The third category is simply lieutenants who control municipality-level *plazas*. Finally, the fourth category is made up of lower level lieutenants who answer to municipality-level *capos*, including operators and heads of assassins ('*jefe de sicario*') operating on the municipality level. But because the organization structure of DTOs varies from one to another, these definitions do not represent the power structure of every cartel in this study. They serve instead to provide a general disaggregation of ranks and positions within most cartels and their interactions with each other.

Data Exploration

Of the 113 cases of leadership decapitation against Mexican DTOs, a large majority of cases, 102, were arrests. This could speak to a number of possible causes, such as the fact that many arrests were made in residential areas, the need for the government to retain a positive public image by not directly contributing to violence, or the influence of cartels on the military and state police who may pressure them not to kill members.



Geographically, cases of leadership decapitation were dispersed across the state of Mexico from 2013-2018. Though, some states have a significant amount of leadership removals,

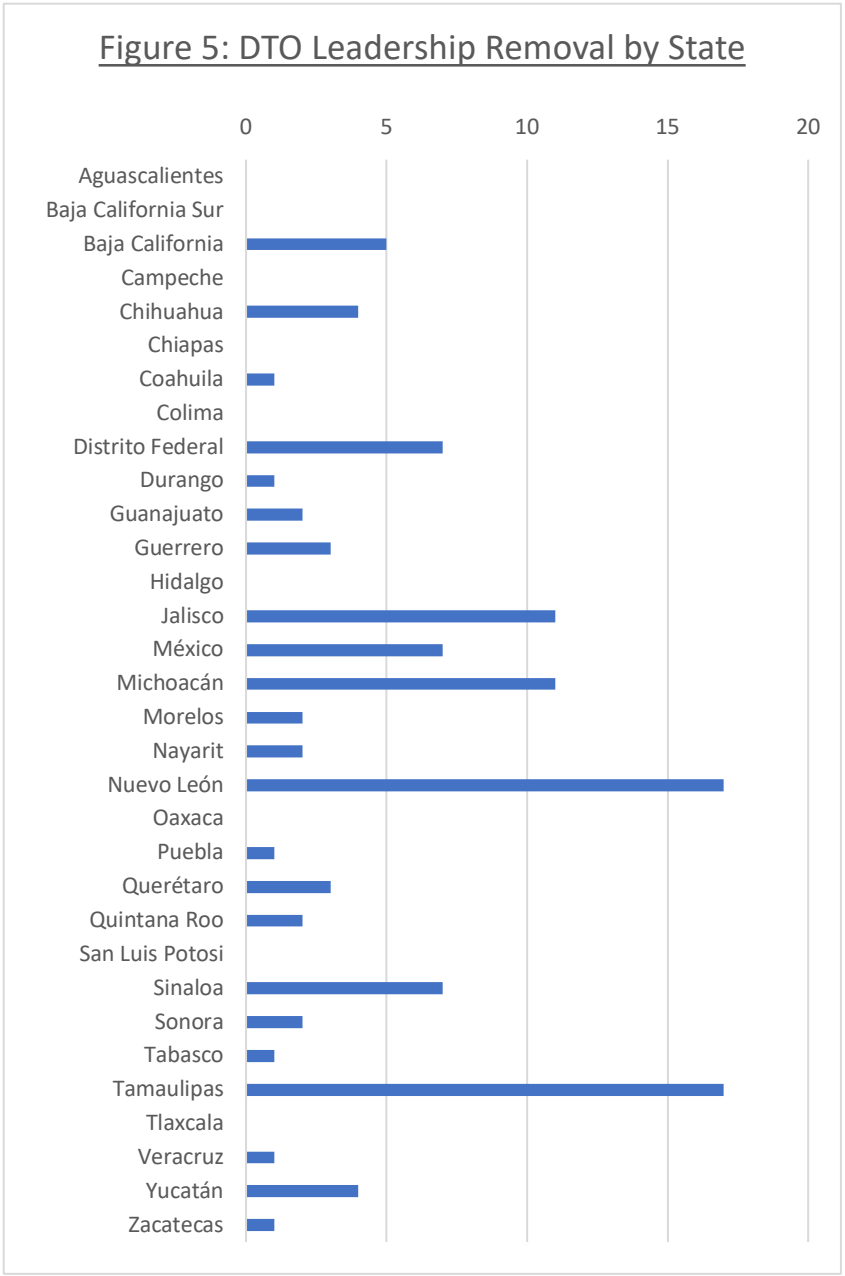
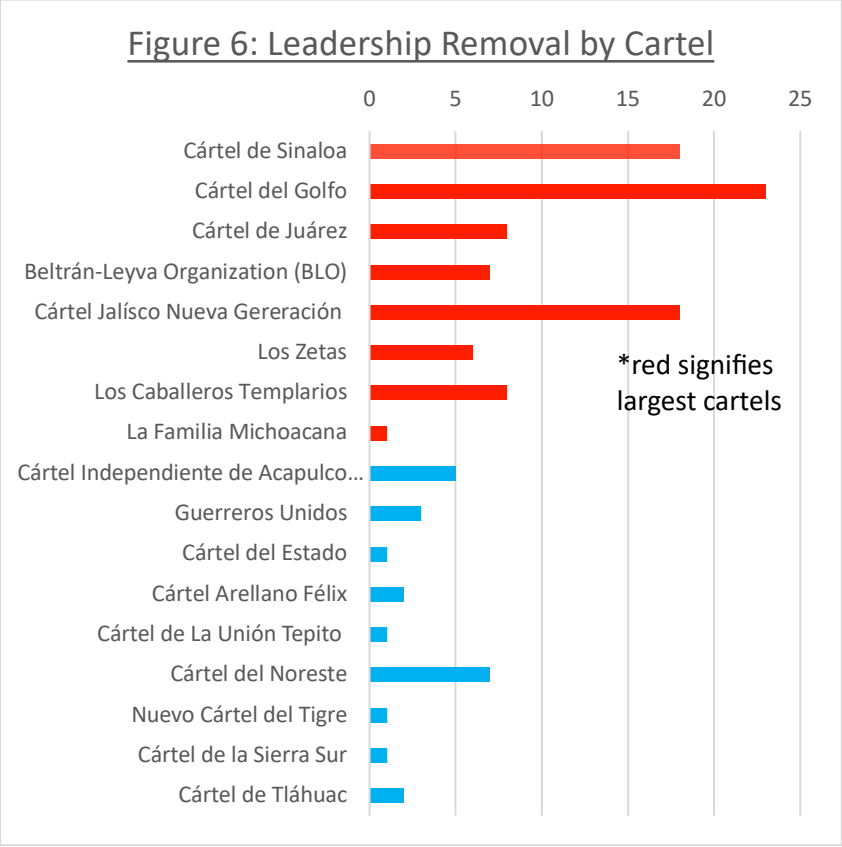


Figure 5: DTO Leadership Removal by State
0
5
10
15
20
Aguascalientes
Baja California Sur
Baja California
Campeche
Chihuahua
Chiapas
Coahuila
Colima
Distrito Federal
Durango
Guanajuato
Guerrero
Hidalgo
Jalisco
México
Michoacán
Morelos
Nayarit
Nuevo León
Oaxaca
Puebla
Querétaro
Quintana Roo
San Luis Potosi
Sinaloa
Sonora
Tabasco
Tamaulipas
Tlaxcala
Veracruz
Yucatán
Zacatecas

while others have none. Both Tamaulipas and Nuevo León, northern states that are dominated by the Gulf Cartel and Los Zetas, respectively, experienced the most leadership decapitations—seventeen each. Michoacán and Jalisco, home to three major cartels (La Familia Michoacana, Los Caballeros Templarios, and Cártel Jalisco Nueva Generación (CJNG)) hold the next highest rates of leadership decapitation with eleven each.

Leadership decapitation cases were concentrated among the largest cartels in Mexico, as the table to the right shows. During the period of study, the Gulf Cartel experienced the most decapitation, an observation linked the fact that its home base, Tamaulipas, experienced a high number of decapitation events. All minor cartels in Mexico experienced five or less decapitations, with the exception of the Northeast Cartel, which saw five of its leaders arrested in one operation. La Familia Michoacana also experienced a low amount of decapitations, likely because by the beginning of President Peña Nieto's term in 2013, the cartel had lost a significant amount of territory and power due to splintering into other groups like The Knights Templar ("Familia Michoacana").



Data Collection: Drug-Related Homicides

Data on DTO-related homicides is taken from the Mexican government's National Institution for Statistics and Geography (INEGI) dataset on deaths in the country. This dataset presents intrinsic challenges given that Mexican politicians, law enforcement personnel, and other government officials have a long history of collusion with drug trafficking organizations that extends to the present day (Astorga & Shirk 2010). There are incentives for any of these officials not to report crimes related to drug trafficking correctly or at all. However, if the rate of cover-ups and faulty reporting is constant throughout the temporal parameters of this study, the effect of increasing or decreasing homicide rates will remain the same— therefore this issue may be avoidable. The INEGI data is the most comprehensive homicide data available in Mexico, and despite the challenges it present, it is therefore the most fitting for this empirical analysis as it records information at the municipality-month. Since the government does not code directly for drug-related homicides, I identify a proxy for this instead. Homicide rates of men aged 15-39 is demonstrated to resemble the population of drug-related homicides, according to a key leadership decapitation study, "after comparing the minimum mean squared error over more than one million regressions" (G. Calderón et al, 1462).

While the INEGI dataset was beneficial for this analysis in that it recorded homicides at the municipality-month level and allowed filtering by gender and age, it also came with challenges. Only municipality-months with any non-zero amount homicides were recorded, meaning that municipalities with zero homicides and municipalities that failed to report any homicides are missing from the dataset. This lack of data also means that in the original dataset, not only municipality-months were N/A, but entire municipality-years and whole municipalities were N/A as well. Given that there are no municipality-months with zero homicides recorded in

the INEGI dataset, the original assumption was that every municipality-month with N/A recorded homicides was in reality zero homicides. However, the fact that some municipalities have N/A homicides recorded for every month from 2013-2018 indicates that for these municipalities the risk of homicides just not being recorded at all may be higher. To compensate, I run two models, one assuming that all N/A values are actually zero's, and the other assuming that some are not, taking the high risk municipality-months out of the equation. For both models, the assumption that at least some N/A values should be replaced with zero's means that the correlation coefficient will tend towards zero— that is, the correlation will be understated— if any N/A values are the result of reporting bias.

Method of Analysis

One impactful characteristic of this study's independent variable, leadership decapitation, is that it is not random: the government forces have specific reasons for targeting leaders. Broadly, as discussed by insurgency scholar Michael Tiernay, leadership removal is likely to occur when the state is losing the right against a non-state foe (Tiernay, 90). More specifically, within the period of time that the state utilizes decapitation, leaders of more publicly violent organizations are more likely to be targeted, as was the case with Los Zetas (State Department Interviewee #1; State Department Interviewee #2).[16, 17] And, due to state resources, the changing DTO landscape, and a variety of other factors, leadership decapitation is also characterized in Mexico by occurring at many different points in time, across many different locations. Quantitative analysis can account for things that do not change the rate of homicide reporting

[16] Interviewee 1, State Department, 1 March 2021. Interview held in confidentiality by author.
[17] Interviewee 2, State Department, 2 March 2021. Interview held in confidentiality by author.

across time and space for the period of study, such as the general lack of reporting infrastructure in Mexico and intimidation and corruption by DTOs, by using time-fixed effects and municipality-fixed effects (G. Calderón, 1466). By comparing homicide rates across time and space, a more plausible correlation between leadership decapitations and homicides can be demonstrated. For example, when a decapitation event occurs, the homicide rate that follows it is compared to the homicide rate that precedes it. Likewise, homicide rates between treated and untreated municipalities at the time of a decapitation event are compared. This accounts for possible threats to inference such as national homicide trends reflected on local levels of violence. Fixed effects cannot, however, account for spatial or temporal characteristics that change over the period of study. If reporting rates increase or decrease over the period of study or between municipalities, this will affect the quantitative results. This is surely a limitation of the study, and future works on this subject should seek to account for changes in reporting rates in order to increase the accuracy of proposed effects of leadership removal on homicide rates.

This study utilizes three different tests to demonstrate a relationship between leadership decapitations and homicides in Mexico between 2013 and 2018. The first is a basic ordinary least squares (OLS) regression, which simply demonstrates the effect of a leadership decapitation happening in a specific municipality. As an exploratory analysis, it does not compare the treatment sample to any control group or counterfactual or account for any time-series effects ("lm: Fitting Linear Models"). The second is a model that is essentially a difference-in-differences model— a two-way fixed effects regression— but has some key differences to the more advanced difference-in-differences. It achieves the goal of accounting for time-specific and municipality-specific confounders, or characteristics that affect the validity of inference, by comparing the effect of the independent variable on the dependent variable across spatial unites

both before and after treatment (Imai & Kim 2020). While this model works well with panel data with only two time periods (one before and one after treatment), some scholars have recently suggested that the two-way fixed effects model does not accurately demonstrate the correlation between independent and dependent variables in datasets with more than two time periods. When treatment occurs at multiple times during the period of study, two-way fixed effects regressions suffer a contamination of the control group by already treated units, so newly treated units are compared to already-treated units, along with not-yet-treated and never-treated units (Callaway & Sant'Anna 2020). In the context of this study, municipalities that experience leadership decapitation, or become treated, are compared under the two-way fixed effects model with municipalities that that have already been treated by leadership removal. When this happens, the demonstrated effect can be distorted from the true effect of leadership decapitation. To compensate for this possible effect, I run a third test which is a true difference-in-differences regression model meant to account for treatment effects for multiple time periods. This model calculates group-time average treatment effects by comparing treated units, or municipalities in this case, to only never-treated or not-yet-treated municipalities.

Scholars have also explored other types of quantitative empirical analysis suited for studying the effects of sociopolitical and organized crime-related variables on DTO-related violence in Mexico. Many choose to utilize negative binomial regression models (Dickenson 2014; Phillips 2015; Ley et al 2019; Correa-Cabrera 2015; Ley & Trejo 2016), which are helpful for dependent variables in large datasets which are distributed on a non-normal curve. Specifically, for dependent variables for which the mean is significantly lower than the variance ("Negative Binomial Regression"). This is the case with DTO-related homicides that, when aggregated by municipality, are clustered around zero and one homicides per municipality and

extend out to over one hundred homicides per municipality. However, a key disadvantage of negative binomial regression in this particular analytical context is that it does not directly compare the results to any counterfactual. Calderón, et al (2015) and Lindo & Padilla-Romo (2015) use a difference-in-differences regression model to demonstrate a relationship between leadership decapitations and violence. The difference-in-differences model is distinct from the negative binomial regression model in that it compares a treatment group to a control group, which essentially acts as a counterfactual in a natural experiment ("Difference-in-Difference Estimation"). The counterfactual can be established in a variety of ways. Given its inherent temporal constraints of this study, the model conducted here will use a relatively simple counterfactual group as the control group: municipalities that did not experience leadership decapitation. However, more complex counterfactuals can be established to create a more accurate comparison. One way is to create a "synthetic" counterfactual, or control group, which is gives more weight to municipalities with similar characteristics to those in the treatment group (G. Calderón et al 2015). While his study does not use a difference-in-differences model, Johnston (2012) uses failed attempts at leadership decapitation against insurgent leaders to serve as a counterfactual to successful decapitation events. This accounts for the fact that locations with no DTO presence, a presence which is likely to increase homicide rates, will have no decapitation events. It also accounts for possible threats to inference discussed earlier, such as changes in homicide reporting, since DTO corruption of crime statistics and reporting is likely to be consistently higher in municipalities with DTO activities, as opposed to those that do not have a DTO presence. Although this data is not currently available, future studies should seek to utilize this type of counterfactual if it becomes available, since it accounts for many changing characteristics of Mexico's municipalities which affect recorded homicide rates and therefore the

accuracy of statistical inference. One key effect of not using a counterfactual/control group that shares more characteristics of the treatment group is that there is a greater difference in reporting bias. Because the treatment group, which likely has a higher DTO presence, will experience higher rates of intimidation and corruption of reporting agencies (police and other law enforcement), the effect of leadership decapitations on homicides will be understated. In this study, then, the impact of using municipalities that did not experience DTO leadership removal as a control group will likely be that the correlation coefficient will tend towards zero.

One threat to inference that neither the negative binomial regression nor the difference-in-differences model can intrinsically account for is the spillover or displacement effects of violence. Because violence is often spread or displaced to other municipalities or states (G. Calderón et al 2015; Guerrero-Gutierrez 2011; Lindo & Padilla-Romo 2015; Tealde 2019), if the treatment group does not include neighboring municipalities or other municipalities in which the target DTO has major operations, the full effect of leadership decapitations on homicides will not be shown. This statistical analysis does account for the location of capture not being the same as the location of operation, but does not include municipality clustering or base location integration. The effect is that the correlation between leadership removals and homicides will again be understated.

Future studies should also consider robustness checks, such as re-calculating each test with similar dependent variables, if available, to see if the relationship between leadership removal and DTO-related violence still stands. Since homicide rates are not the only indicator of DTO-related violence, possible proxies for drug-related homicides are hospitalizations for severe injuries and missing persons reports. These may avoid, to some degree, issues intrinsic to homicide reporting rates affected by intimidation or corruption by DTOs.

Chapter 5: Results and Discussion

In this section, I discuss the results of each empirical test, as well as their implications. While the initial and more limited ordinary least squares (OLS) regression analysis provides evidence of a possible correlation between leadership removal and homicides that align with most existing literature on the impact of leadership decapitation on drug related homicides, the more complex tests do not. The two-way fixed effects regression model shows similarly positive results— demonstrating that leadership removal leads to greater drug-related homicides— but for the most part loses its statistical significance. Possibly because of the difficulty that two-way fixed effects models have with multiple time periods, the difference-in-differences regression finds an opposing effect: that decapitation events result in an overall decrease in drug-related homicides. But this model too fails to provide statistical significance. Overall, the quantitative results of this study do not point to leadership removal as a 'smoking gun' for the rising homicides in Mexico.

Ordinary Least Squares Regression

At its most basic, linear regression analysis indicates how many greater or fewer homicides are experienced in municipalities with leadership decapitations. This OLS regression demonstrates that municipalities from 2013 to 2018 that experienced leadership decapitation against drug trafficking organizations saw just over nine more homicides than those that did not. At first glance, these results show a possible correlation between leadership removal and homicides since a large and statistically significant effect is shown. Although some targeted

Figure 7: OLS Regression Results

1. Basic OLS Regression

```
Call:
lm(formula = month_hr ~ LD_Eventr, data = data_panel2)

Residuals:
    Min      1Q  Median      3Q     Max
-9.553  -0.471  -0.471  -0.471 130.529

Coefficients:
             Estimate   Std. Error  t value  Pr(>|t|)
(Intercept)  0.470820   0.005866    80.26    <2e-16 ***
LD_Eventr    9.082121   0.268102    33.88    <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

leaders between 2013 and 2019 were captured at the very beginning of the month designated as the month of capture, this model likely suffers from simultaneity bias. And, on its own, the simple linear regression fails to display possible time-specific and municipality-specific confounders. While an OLS regression cannot account for unit-specific confounders, I use leads and lags in the data to create a picture of how the gap in homicides changes between municipalities that experienced decapitation and those that did not. Between six months before and six months after any given leadership removal event, homicides are greater in municipalities that receive the treatment of the actual anti-DTO operation. These results are also statistically significant and display an interesting change over time. While, on average, municipalities that experience leadership decapitation experience greater numbers of homicides than those that do not both before and after the decapitation event occurs, the difference *increases* during the month of decapitation and for nearly every month in the six-month period after.

Key concerns for simple linear regression in this context are that it does not account for selection bias, or municipality-specific confounding factors, and it cannot give an analysis of the change in time past descriptive statistics. More specifically, the correlation shown by this

regression model could be a result of a higher drug trafficking presence in areas that experience leadership decapitation. After all, although not all leadership removals are carried out where their targets base their operations, most DTO leaders are removed where they operate. These municipalities are much more likely to be prone to high levels of violence *before* the leadership removal simply because violent, illicit organizations operate there. Looking at the homicide data, it is apparent that the municipalities with the most consistently high homicide rates are those in

Figure 8: OLS Regression Results over time

Months after Removal	Effect	Standard Error
-6	7.128	0.268*
-5	6.704	0.269*
-4	7.434	0.268*
-3	7.517	0.268*
-2	8.364	0.268*
-1	7.811	0.268*
0	9.082	0.268*
1	7.811	0.268*
2	9.129	0.268*
3	8.505	0.268*
4	9.906	0.268*
5	9.282	0.268*
6	9.294	0.268*

OLS Regression
* All results are statistically significant, where p-value < 0.01

which a major DTO has been founded and has key operations. The chart below demonstrates these municipalities as Tijuana, where the Tijuana Cartel/Arellano Félix Organization operates; Juárez, where the Juárez Cartel/Vicente Carrillo Fuentes Organization operates. More complex regression analysis can more accurately account for such confounders, and therefore give a more accurate picture of how the homicide rate changes following a leadership decapitation event in a given municipality.

Figure 9: Municipalities with Highest Drug-Related Homicide Rates

	Municipality	State	DTO Base
#1	Tijuana	Baja California	Tijuana Cartel/ AFO
#2	Juárez	Chihuahua	Juárez Cartel/CFO
#3	Acapulco	Guerrero	Independent Cartel of Acapulco (CIDA)
#4	Culiacán	Sinaloa	BLO & Sinaloa Cartel
#5	Guadalajara	Jalisco	Cartel Jalisco New Generation (CJNG)

Two-Way Fixed Effects

The two-way fixed effect model goes farther than the OLS model to account for group fixed effects and time fixed effects. The test aims to control for possible confounders that do not change over the period of study for each municipality, and confounders that are common to all municipalities. The model also clusters standard error on the municipality level to account for the fact that there are repeated measurements at the municipality level. One key group fixed effect that this model accounts for is the selection bias discussed above. Another example of a group fixed effect could be the accuracy of homicide reporting, which as mentioned may vary by month, but has much larger differences to account for across municipalities. An example of time

fixed effects could be national homicide trends spurred by national socioeconomic conditions. This model should account for these predicted time-specific and municipality-specific confounders, as well as those that are unpredicted or unobservable.

Figure 10: Two-Way Fixed Effects Results

Months after Decapitation	Decapitation Effect	S.E.
0	1.794	1.556
1	1.119	1.025
2	2.048	1.919
3	1.504	1.172
4	3.041	1.650*
5	2.485	2.102
6	2.577	2.114

* Indicates statistical significance, where p-value < 0.10
Two-Way Fixed Effects model with year and municipality fixed effects.
Standard Error clustered at the municipality-level.

This second model demonstrates a positive correlation between leadership decapitations and drug-related homicides, but unlike the OLS regression, this correlation is much weaker and not statistically significant. When accounting for confounders related to municipality and time, the effect shown in the OLS is reduced by about five homicides per municipality-month. This effect is consistent for every month up to six months following any given decapitation event, and it is robust given that it accounts for both year and municipality fixed effects.

Difference-in-Differences

Because the difference-in-differences model designed by Callaway & Sant'Anna (2020) separates and accounts for fixed effects within multiple time periods better than the previous two-way fixed effect model, it should in theory give a more accurate picture of how leadership decapitations against drug trafficking leaders and lieutenants affect drug-related homicides. The model gives a few different ways to organize and visualize the data, which renders slightly different results. For each test, the effect of treatment is given by the average treatment effect for the treated subpopulation (ATT), which is defined as the municipalities that received treatment after they were treated by leadership removal.

Below, the overall effect of leadership removals on homicides per municipality-month is given by a simple aggregate group-time average treatment effects model.

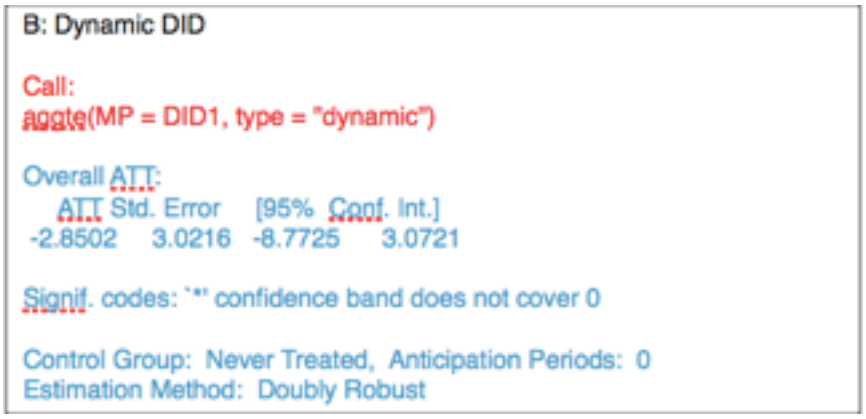
Figure 11: Simple Difference-in-Differences Results

```
A: Simple DID

Call:
aggte(MP = DID1, type = "simple")

Reference: Callaway, Brantly and Pedro H.C. Sant'Anna.  "Difference-in-Differences with
Multiple Time Periods." Forthcoming at the Journal of Econometrics <https://arxiv.org/abs/
1803.09015>, 2020.


Overall ATT:
    ATT  Std. Error     [95%  Conf. Int.]
-1.4778     3.6031   -8.5397      5.5842


---
Signif. codes: `*' confidence band does not cover 0

Control Group:  Never Treated,  Anticipation Periods:  0
Estimation Method:  Doubly Robust
```

This simple difference-in-differences model demonstrates a correlation that is actually *negative*. That is, compared to municipalities that did not receive treatment, when a leadership decapitation occurs, the municipality which received treatment experienced a decrease of around

one and a half homicides per month. This is surprising given that the first two models discussed, one being a common empirical method for difference-in-differences analysis, demonstrate positive correlations. However, the fact that is it a weak correlation and has a much larger standard error means that it is not statistically significant and cannot provide strong evidence for a link between decapitation events and homicide rates. It demonstrates a null effect of leadership removal on drug-related homicides.

Figure 12: Dynamic Difference-in-Difference Results



A dynamic aggregate group-time average treatment effects model renders similar results, as shown in the chart above and the graph below. It demonstrates how the treatment variable, leadership decapitation, affects municipalities that have become treated given their length of exposure. In this case, length of exposure is simply the number of months after a decapitation event in a given municipality. While still statistically insignificant, the results to this test are weakly negative, like the simple difference-in-differences model. This test provides an additional insight through graphical results: around three years after a given decapitation event, there is a drop-off in homicides.

Figure 13: Graphical Results of Dynamic Difference-in-Differences Test

A grouped difference-in-differences test, shown above, aggregates the effects by "group". Each group is defined by the time period in which one decapitation event, or a group of decapitation events, takes place. Since the time variable in the difference-in-difference is arranged as 1 to 72 (with 1 being Jan. 2013 and 72 being Dec. 2018), the groups are also signified by a number from 1 to 72. Overall, when measuring by group, the difference-in-differences model demonstrates a weakly positive relationship between leadership removals and homicides, which is still statistically insignificant. Additionally, what this model reveals is that the effect of leadership decapitation on homicides appears to vary greatly between cases of

Figure 14: Group Difference-in-Differences Results

C: Group DID

```
Call:
aggte(MP = DID1, type = "group")

Overall ATT:
    ATT Std. Error     [95% Conf. Int.]
 0.6192     1.181  -1.6956       2.934


Group Effects:
 group     ATT Std. Error [95% Simult. Conf. Band]
    13 -4.6548    1.3114      -7.7392    -1.5703 *
    14  2.9952    1.7826      -1.1976     7.1880
    16 -2.0702    1.2634      -5.0417     0.9013
    22 -9.1120    1.3456     -12.2769    -5.9472 *
    27 -4.7236    2.0305      -9.4995     0.0523
    30 -22.6661   2.0603     -27.5121   -17.8202 *
    32 -4.5122    0.9557      -6.7600    -2.2644 *
    40 14.9675    2.4774       9.1405    20.7946 *
    44  1.2020    1.3188      -1.8999     4.3039
    46  2.4127    1.4652      -1.0336     5.8590
    51 37.6526    1.1357      34.9814    40.3238 *
    53 -4.0607    2.8052     -10.6587     2.5373
---
Signif. codes: `*' confidence band does not cover 0

Control Group:  Never Treated,  Anticipation Periods:  0
Estimation Method:  Doubly Robust
```

decapitation. For example, the decapitation event that constitutes group thirty experiences a very strong decrease in drug-related homicides post-decapitation, while the decapitation event which constitutes group fifty-one experiences a strong increase in homicides. Both of these cases are statistically significant. There are also groups which experience small changes in homicide rates post-decapitation, such as groups thirteen and fourteen. The variance in the effect of treatment across decapitations demonstrated by this test may help to explain the overall null result of the difference-in-differences tests, as discussed below.

Discussion

Clearly, the data and these empirical tests show no repetition of comparable results that would suggest a real correlation between the two variables. Overall, the more robust models, the two-way fixed effects models and the difference-in-differences model, show a null effect of leadership decapitations on drug-related homicides. Given this reality, there are three possibilities. First, the results are showing an accurate picture of how all leadership removal affects homicides in all municipalities, and the theory proposed in earlier sections is inaccurate. Second, the results are showing an accurate correlation between removal and homicides, but only for the municipalities specifically in the treatment group. In this case, only *part* of the whole picture is being revealed. Third, the results are showing an inaccurate picture of the effect of leadership removal on homicides due to issues with the model itself. I will examine these possibilities below.

The results of both the two-way fixed effects and the difference-in-differences models suggest that there exists no correlation between leadership decapitations and homicide rates at the municipal level, and if there exists one it is very weak. A key reason why this may be is that the effect of treatment varies from case to case. According to the grouped difference-in-differences model, some events are followed by dramatic increases or decreases in violence, while others experience smaller changes. This variance may even out, creating an overall null effect. The drop in homicides after around three years from a given decapitation event could also explain this result. The drop-off may be a result of resolved conflict between or within DTOs, or it may be a result of DTOs leaving the municipality that the decapitation occurred in. These results suggests that the causal mechanisms theorized by previous scholarly works and in this study are generally weaker than previously thought. If true, then either inter- and intra- cartel

conflict does not flare up after leadership removals, or it does not generate much violence. Yet during Calderón's drug war, from 2006 to 2012, three studies statistically significant positive correlations using similar data and models to this study (G. Calderón el at 2015, Dickenson 2015, Lindo & Padilla-Romo 2015). So, it could also be that during Peña Nieto's term, inter-cartel and intra-cartel competition altered to produce less violence after a leadership decapitation event. Given that the period of study here follows six previous years of leadership decapitations in Mexico under Calderón, DTOs may be learning to reduce instability, turf wars, and infighting after suddenly losing a leader. This would explain the fact that the OLS regression found high violence in municipalities that have leadership removals, but the two-way fixed effects and difference-in-differences models showed that this violence did not change over time.

Even if the weak or non-existent correlation is an accurate portrayal of the relationship between decapitation and homicides for the municipalities treated in this study, it may not be the true relationship for all municipalities affected by leadership decapitation. It is likely that the effect is understated. One key reason for this misrepresentation is likely to be spillover violence and displacement of violence, which would cause multiple municipalities to be affected by one decapitation event, rather than just one. The spillover effect of violence is a studied characteristic that unfortunately this study does not address in its quantitative analysis, given its limitations. The lack of a change in violence suggests that violence could be simply moving from the municipality in which the leadership removal occurred to others that are part of the control group. This would not only mean that the treatment group is missing a significant effect of the independent variable, it would mean that the control group is contaminated. If this were true, it could explain, at least in part, the weak correlation between the independent and dependent variables. But the large variation between the effect of removal on treatment groups,

demonstrated by the grouped difference-in-difference test, suggests that spillover does not affect all municipalities equally. If it is a primary actor affecting homicide rates after a decapitation, spillover violence and displaced violence may occur in some municipalities and not others, and to varying degrees.

If the nature of inter- and intra-cartel conflict has not changed since the Calderón administration, the opposition of the results presented by this study to studies focusing on the first six years of the drug war from 2006-2012 (G. Calderón el at 2015; Dickenson 2015; Lindo & Padilla-Romo 2015) means that these findings could be inaccurate. If this is the case, inaccuracy of these results would have to do with the data collected or the models used themselves. One concern is that the sample size for the quantitative analyses are relatively small. While 85 cases of leadership decapitation are used in the OLS regression, the two-way fixed effects and difference-in-differences models condense this number to 58. This number was reduced because of possible confounding characteristics of some decapitation cases, for example only the first decapitation event for a given municipality could be used and therefore some cases were left out of the analysis. Utilizing a relatively low 'N' value could mean that the results are not reliable as they would be if a higher number of treatment cases were included.

Overall, it seems most likely that while the effect of leadership decapitations is somewhat understated due to spillover and displaced violence, the true effect is still weaker than previous studies have concluded (G. Calderón el at 2015; Dickenson 2015; Lindo & Padilla-Romo 2015). Given that these previous studies focused on Calderón's drug war, it is possible that their response to decapitation events changed under Peña Nieto. Six years of dealing with leadership removals by state security forces may have led DTOs to become less prone to infighting and violent contestation of vacant positions after a decapitation event. If so, they would be less likely

to be perceived as weakened by rivals who would otherwise be incentivized to start turf wars following a leadership removal on the targeted group. If true, the real relationship between decapitation events and drug-related homicides would be much weaker than scholars of decapitation under Calderón concluded, but still existent due to spillover violence not caught by the models in this study. Either way though, the evidence put forth supports the prediction of Hypothesis One that decapitation could be generally ineffective at curbing homicides.

Chapter 6: Secondary Hypotheses and Case Study

To investigate the null correlation shown by the quantitative results of this study, I delve into quantitative evidence that suggests possible causal paths of violence that would lead to this result. Alongside this, this chapter includes analysis of the secondary hypotheses presented earlier in this paper. This study originally set out to test each secondary hypothesis with an advanced difference-in-differences model, but given the small treatment group size of each sub-group, such complex quantitative models would not be robust. Rigorous causal process tracing was also considered, but the lack of available evidence on individual decapitation cases proved this to be a troublesome option as well. To compensate for the lack of quantitative and qualitative data regarding each secondary hypothesis, I address hypotheses two through four (H2-H4) with a blend of descriptive statistics, simple difference-in-means tests, and comparative qualitative causal tracing, although limited.

Why Case Study?

This study demonstrates a null correlation between leadership decapitations of drug trafficking organizations and increased homicides, and presents a theoretical framework suggesting that the null correlation may understate a true weak correlation. To further understand

the true relationship between leadership decapitation and homicides from 2013-2018, qualitative analysis can be done. As Lindo & Padilla Romo (2015) note, rigorous qualitative work, such as causal process tracing and a "series of case studies," must be done in all cases to establish "compelling evidence" on a true causal link between eliminating drug kingpins and homicides (Lindo & Padilla-Romo, 3). While an attempt is made in this study to engage in such an analysis, there are real challenges to collecting the qualitative data needed to systematically analyze the aftermath of any one decapitation case. Drug trafficking organizations keep their organizational structure and operations under lock and key to prevent the government and rival DTOs from targeting their leaders and trafficking operations. Even if outsiders, such as local Mexican journalists, government officials, or police officers, know about the internal happenings of the cartels that operate in their areas, they face incredible danger if they speak out (L. Calderón et al, 5). Furthermore, while some journalistic evidence exists on the outcomes of leadership decapitations against DTOs, it is sparse and there is certainly not enough to constitute the kind of robust causal tracing needed to systematically determine if there exists a causal link between removal and homicides. While carrying out a thorough qualitative case study was an original goal of this case study, this lack of available evidence makes it nearly impossible given the restricted time and resources available. Despite this, I attempt to compensate for these challenges by analyzing existing evidence and discussing how a more robust case study analysis would work. In making a roadmap for case study analysis, I lay out the work that still needs to be done, and the evidence that needs to be collected, in order to truly demonstrate a causal relationship (or the lack of one) between leadership decapitation events and homicides in Mexico.

Qualitative case study analysis serves to determine causality between two variables using causal process tracing. Causal process tracing identifies key causal mechanisms in the chain of

events leading from a specified event to its outcome using primary and secondary sources such as interviews with relevant actors, physical evidence, and journalistic productions. By delving deeply into the causal mechanisms that lead from "a" to "b" in a specific case, causal process tracing contributes greatly to the integrity and validity of quantitative studies, demonstrating a causal link (or lack of one) between two variables (Collier, 824).

A rigorous case study in the context of leadership decapitation against DTOs and homicide rates would follow the chain of events beginning with the decapitation event and ending with either an increase in homicides, a decrease in homicides, or no change in homicides. In a perfect world, interviewing cartel members and receiving candid responses about their cartel's response to leadership removal by government forces would best shed light on the impact of leadership removal on homicide rates. Questions would aim to answer the ever-evasive question of how leaders are replaced at different levels of the organization and how often open seats are contested, as well as how such issues are usually resolved. Another important line of questioning would involve how DTOs respond to rivals being targeted by leadership decapitation attempts, including what they seek to gain, how they choose when to respond violently, and when they do, against which targets. This would likely give us a very clear idea of how the motivations of cartel members and the internal structures of their organizations instigate or discourage violent episodes following a leadership removal. Quite obviously, though, such interviews and direct insights are not possible— event if cartel members could be identified and located, and agreed to interview, they would have no incentive to tell the truth. Other proxies may be available, however. Speaking to jailed or ex-cartel members may have the potential to reveal the desired internal motivations and structural incentives, but carrying out such interviews would entail significant risk for both interviewer and interviewee. Even if an interview is

possible, if the interviewee feels threatened by at DTO for interviewing, their candidness may be called into question. The security issues may be mitigated by conducting interviews with only ex-cartel members jailed in the US— where the risk of corruption and cartel influence inside the prison network is much lower ("Extradición a Estados Unidos")— but this population is clearly limited and likely unwilling to talk without incentives. Another plausible avenue of data collection for causal process tracing could be made available through interviews with police and military officials involved in local security operations in areas that both have a strong DTO presence and have experienced leadership decapitations against DTO leaders in the recent past. These individuals should have better access to data on when and if confrontations between or within DTOs occur following leadership removal operations, whether it be departmental statistics that they have access to or personal knowledge from first-hand experience. Questions for these actors would pertain to whether there exist changes in the criminal landscape after leadership removals, and if there are attacks involving DTO members on rival DTO members, civilians, or assassinations of government officials. Such interviews might imply less security risk for both parties than interviewing current drug traffickers, since every interviewee is unlikely to report directly to a DTO, but unfortunately police and military officials have a history of corruption by DTOs in Mexico (Astorga & Shirk, 27). They may be coerced under threat of harm by a cartel, or they may be a willing participant (García-Ponce), but either way, possible links to cartels puts the safety of both interviewee and interviewer at risk and heightens the chance of false reporting.[18] Possibly more plausible are conversations with local journalists who, while they would have more limited access to this information than the police, would perceive similar changes (if any) in violence following leadership decapitations of DTOs in the area.

[18] Dr. Omar García-Ponce, George Washington University, 10 March 2021. Interview held via Zoom.

While not completely incorruptible (Gagne & Dudley) and certainly still at risk of being targeted by DTOs (L. Calderón et al 2018), journalists are generally seen as less influenced by the cartels than government officials.

Causal Paths for the Primary Hypothesis

Qualitative data from Mexican news outlets gathered during the data collection phase of this project shows evidence of how violence fluctuates before and after leadership decapitations, and suggests possible causes for such fluctuations. While the lack of systematic causal process tracing means that these results cannot be conclusive, the data shed light on possible patterns in violence around leadership removals which build suggestive evidence for the null correlation demonstrated between leadership decapitations and homicides above. Based upon the causal paths explored below, I find suggestive evidence of a weak increase in drug-related homicides in the post-treatment period as compared to the pre-treatment period.

A key finding of this qualitative analysis reveals that rates of violence before a leadership decapitation may already be increasing due to existing turf wars initiated by the to-be targeted DTO leader. In fact, as demonstrated by the case of "El Pelochas", leaders may be targeted precisely because they are causing an increase in homicides in their area ("Buscaba capo del CDG controlar NL"). According to this data, the primary cause of increased violence in these cases are turf wars, both within groups and between them. These turf wars can be long-lived leading up to a decapitation event, lasting months before the capture of the leader responsible for them ("Gabriel Ayala Fonseca, de ejidatario a cabeza del narco en Ensenada"). If this is a pattern across a majority of decapitation cases, then it may be the case that the null correlation is caused by an already high rate of violence in the municipality of removal before the event itself. The

existence of this pattern would violate the parallel trends principle of the difference-in-differences design, which assumes that both treatment and control groups maintain the same trend in the outcome variable prior to the treatment event. This would damage the validity of the differences-in-differences model, and reduce the effect on homicides demonstrated by statistical models, explaining, at least in part, why a null correlation was found.

Figure 15: Post-Removal Violence Pattern A

	Pattern: Homicides may already be increasing before removal due to turf war	
DTO Leader Name(s)	Evidence	Interpretation
"El Pelochas"	"The Attorney's Office of Tamaulipas offered a reward of 2 million pesos for the leader, since he was identified as one of the men responsible for the wave of violence that hit Reynosa …" (Source: "Buscaba capo del CDG controlar NL")	Leaders are sometimes removed because they are causing an increase homicide rates before their removal.
"El Tres Animales" and "El Misa"	**Before their capture**, "[b]oth subjects maintained a **criminal war over the control of various zones** of Ensenada (Baja California) in relation to the sale and distribution of drugs. Because of this there have been executions and other violent acts in recent months ordered by 'El Tres Animales' and 'El Misa'…". (Source: "Gabriel Ayala Fonseca, de ejidatario a cabeza del narco en Ensenada")	Violent turf war can exist for many months leading up to leadership decapitation of a lieutenant.
"El Panilo"	Until his capture, "he maintained a **long fight against another DTO** of the same cartel for over a year, which has generated a **wave of violence**… The leader was considered to be one of the principal generators of violence in Reynosa given his dispute of the local drug market…" (Source: "Arrestan a capo en Matamoros")	Violent turf war can exist for many months leading up to leadership decapitation of a lieutenant.
"La Hamburguesa"	Prior to his capture, "'La Hamburguesa,' who had influence on criminal activities in Michoacán and the state of Mexico, is identified as one of the principal generators of	Violent turf war can exist leading up to leadership decapitation of a lieutenant.

	violence in Zacatecas, responsible for various homicides and kidnappings in the region." (Source: "Detienen a capo del Golfo en tiroteo")	
"El señor de la V"	"[Before his capture] a confrontation was reported between members of different criminal groups in a struggle for control of the territory. The Morelos Police intervened in the clash and was able to seize six gunmen, one of them being "El Señor de la V"…" *freed on this date, captured again 10 months later (Source: Jiménez)	Leaders may be caught participating in violent turf struggles before their final capture.

While violence can certainly increase prior to a decapitation event, the qualitative data show that there are many avenues for violence during and after the event. These include homicides resulting from clashes between security forces and DTO members during a decapitation operation, narco-blockades (in Spanish, *narcobloqueos*) sparked by decapitation, post-decapitation turf wars, and contestation of replacement leadership.

One helpful finding of this analysis is that leadership decapitations may happen during military operations completely unrelated to the goal of capturing a DTO leader. According to one account of the removal of "Comandante Fili", security forces killed the *capo* when clashing with DTO members following the rescue of the cartel's kidnapping victims. This suggests that, to some extent, leadership decapitations can be more random than previously thought. While the decapitation still occurred in an area of DTO operation— implying selection bias— the decapitation was not planned, according to the report ("Acribillan en Matamoros a capo de Cártel del Golfo"). This would slightly enhance the validity of the qualitative data given that it follows the assumption of random selection more than previously thought. Police and civilians are both put in harm's way during decapitation operations due to the fact that both DTOs and security forces are highly militarized.

Another important finding is that homicides due to leadership removal are caused, in some cases, by deaths of civilians or police officers killed during the decapitation operation itself. Some scholars of leadership decapitation against DTOs (Dickenson 2015; Phillips 2014) take measures to avoid simultaneity bias by lagging data, concerned that violence occurring during or directly after the treatment event cannot be attributed to the treatment. If treatment takes days or weeks to affect homicide rates, then some unrelated cases of violence could be included in the treatment group. If this is true, not accounting for simultaneity bias would cause a cross-contamination of pre-treatment and post-treatment groups, altering the effect of decapitation on homicides shown by the quantitative models. But this is not the case with the difference-in-difference model used in this study: it recognizes the beginning of treatment as the first day of the month of decapitation. While this implies issues for turf wars and other violent confrontations occurring in the month of decapitation before the event itself, the post-treatment period is not contaminated by homicides committed during and shortly after a leadership decapitation because, as this qualitative data shows, such homicides are likely the result of the decapitation event. The evidence opens an immediate causal path between leadership removals and drug-trafficking related homicides.

Figure 16: Post-Removal Violence Pattern B

	Pattern: **Homicides may go up *during* leadership removal**	
DTO Leader Name(s)	Evidence	Interpretation
"Comandante Toro"	"In a new episode of violence in this border town, police pursuits of criminals and confrontations between security forces and organized crime members caused panic among citizens. [The operation] left one assassin dead, one passerby wounded, and two people detained."	Clashes between DTOs and police can affect civilians at the time of leadership removal.

	(Source: "Causan pánico balaceras en Reynosa")	
"Comandante Fili"	"The leader of the local drug market, identified as "Comandante Fili, presumably died in a gun fight with the marines while with other members of the group … Other versions of the events indicate that the marines were liberating people kidnapped by the criminal group… which triggered clashes with the Gulf Cartel members." (Source: "Acribillan en Matamoros a capo de Cártel del Golfo")	Clashes between DTOs and police can affect civilians at the time of leadership removal. Leadership decapitation may not always be planned.

The use of violent *narcobloqueos* appear to also contribute to post-treatment homicides, at least to some extent. These blockades consist of roadblocks, burning vehicles, and other violent measures to either prevent the exit of a captured DTO leader from the location of capture or retaliate again a successful decapitation operation. Security forces are put in possibly harmful situations when confronting DTO members, volatile burning vehicles, and sometimes mobs looking to take them hostage (Baranda, 2018b). In at least one case, a uniformed officer was killed during one of these events. Civilians are also put in harm's way as DTO members directly interact with them when burning their cars and busses as part of a narco-blockade. They are also in the immediate vicinity of any clashes between security forces and DTO members that are initiated by the *narcobloqueo*, increasing the chances that a civilian is killed. This is important because most *narcobloqueos* occur in the hours or days following a decapitation operation—demonstrating further that simultaneity bias is not an issue with homicides occurring directly after leadership decapitations. The fact that both decapitation operations and *narcobloqueos* are shown to produce homicides is interesting, considering that a null effect of decapitation events is found on homicides. The reason for this may be that the number of homicides caused by these violent events are relatively small, and do not affect overall homicide rates. It is also possible that levels of violence before the decapitation were increasing in such a way that, despite the

additional homicides caused by the decapitation event, no perceivable change in homicide rates appears between the before and after periods.

Figure 17: Post-Removal Violence Pattern C

	Pattern: Homicides may increase after removal due to *narcobloqueos*	
DTO Leader Name(s)	Evidence	Interpretation
"El Gafe"	"The capture… set off this morning at least 20 *narcobloqueos* and the burning of vehicles in Altamira, Madero, and Tampico. They left one police officer dead and two injured." (Source: "Y ahora fue Tampico: cae capo y bloquean")	Confrontations caused by *narcobloqueos* can turn deadly for police officers.
"El Inge"	"According to reports, he was captured by the State Police. Afterwards, armed persons fired on a convoy of police officers patrolling the streets of Nueva Italia, which sparked a violent confrontation between them." (Source: "Cae capo de CJNG y arman bloqueos")	Perpetrators of *narcobloqueos* use deadly force against police officers following leadership removal.
"El Ojos"	"The clashes and acts of violence did not stop after the death of "El Ojos", leader of the Tláhuac Cartel… various suspects stopped busses… and took their keys while accomplices soaked the interiors with gasoline. Before the flames started to burn the passengers were able to abandon the vehicles and run to safety." "The Capital Police dispatched nearly a thousand riot police [and other security forces]… there were clashes between uniformed officers and the suspects reported." (Source: García & Hernández)	*Narcobloqueos* sparked after removal put police and civilians in harm's way. This could lead to greater homicide levels.
"El Abuelo"	"His capture set off *narcobloqueos*, the taking hostage of soldiers, and the burning of vehicles… Followers of "El Abuelo" organized to try to rescue him… and some even took members of the army hostage." (Source: Antonio Baranda 2018b)	*Narcobloqueos* sparked after removal put security forces in harm's way.

Unlike violent decapitation operations and narco-blockades, turf wars and internal power struggles can affect levels of violence for weeks ("Detienen a sucesor de Nacho Coronel en Culiacán"). As predicted by the drug-trafficking literature addressed in this study, violent turf war can be a causal path between a decapitation event and homicides. This likely occurs when control over local drug markets is restructured or challenged within a DTO or between them. Deadly force is employed by groups to defend or gain territory, and homicide rates may increase within the as a result. The case of "El Contador" demonstrates that violent struggles over territory and resources can commence very shortly after a decapitation event, and is not restricted to rival DTO members. Such turf wars can occur between factions of the same DTO, as well as between DTOs and the police, following a leadership decapitation, acting as a causal path between the removal and drug-trafficking related homicides ("Desatan balaceras tras caída de capo").

Figure 18: Post-Removal Violence Pattern D

	Pattern: Homicides can increase after removal due to inter- & intra-DTO turf wars	
DTO Leader Name(s)	Evidence	Interpretation
"El Contador"	"**Just hours after the capture** of 'El Contador'… the border town of Matamoros was flooded with **clashes** and violent pursuits between criminals and the authorities. According to unofficial sources, the shooting was between factions of the same criminal group that disputed control of the local drug market after the capture of 'El Contador'." (Source: "Desatan balaceras tras caída de capo")	Violence can erupt within a DTO nearly immediately after a decapitation event involving a lieutenant. Violence spurred by intra-DTO turf war.
"El Changel"	"[Military officials] revealed that the capture of 'El Changel' was the **detonator for violence generated in recent weeks** in	Violence can last for many weeks a after the removal of a lieutenant.

	municipalities of the Valles Region of Jalisco." (Source: "Detienen a sucesor de Nacho Coronel en Culiacán") "This capture could be the cause of the **violence over the rearrangement of control** over local drug markets in the state of Jalisco…" (Source: "Cae 'El Changel', supuesto sucesor de 'Nacho' Coronel")	Violence spurred by turf war.

The final causal path produced by leadership decapitations is the violent contestation of replacement leadership. This path is distinguished from other turf wars and power struggles because it stems from the contestation of a specific role, not the loss of allegiance held by a faction loyal to the targeted leader or contestation of territory from rival DTOs, as is possible with in the previously discussed causal path. Here, violence can occur within the upper hierarchy of a cartel (Goi) or throughout the organization (Baranda 2014). This evidence shows that decapitation directly triggers to additional violence, but this does not mean that homicide rates would not increase if the decapitation event did not happen. While this counterfactual situation is possible, the first causal path discussed demonstrates that turf wars within and between DTOs can exist without a decapitation event to act as a trigger.

Figure 19: Post-Removal Violence Pattern E

Pattern: Homicides can increase after removal when replacement is contested		
DTO Leader Name(s)	Evidence	Interpretation
Juan Manuel Rodríguez Rodríguez	"When Rodríguez assumed the position of *capo*, his authority was not accepted by other factions of the group, which generated fractures within it and intensified violence principally in Reynosa and Tampico." (Source: Baranda 2014)	The authority of replacement *capos* can be contested and generate violence.

"El Chapo"	One month after El Chapo's last capture, "Internal struggles for power between factions of the Sinaloa Cartel may have led to an increase in violence in western Mexico, the latest example of internecine conflict that has plagued the crime group for years… The recent ambush was reportedly carried out by Dámaso López, known as "Licenciado," who allegedly targeted two of El Chapo's sons as well as Ismael "El Mayo" Zambada, another top leader of the Sinaloa Cartel." (Source: Goi)	Violent internal struggle for power following leadership decapitation can lead to regional violence.

Taken together, there are more causal paths from leadership decapitation to homicides after (and during) the decapitation event than before. Working in tandem, all five possible causal paths should cause an increase in violence. Existing turf wars and power struggles would be exacerbated by new territorial contestations and internal fractionalization while homicide rates would be expanded by violent decapitation operations and narco-blockades. Accordingly, the evidence for these post-treatment causal paths suggest that there is a direct link between leadership removal and homicides.

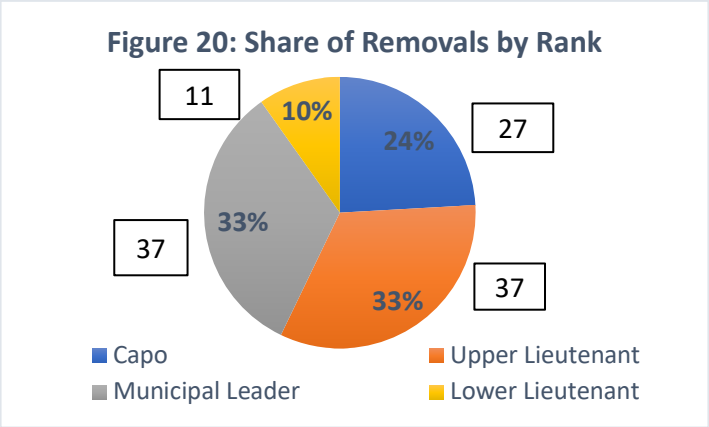
This qualitative evidence cannot provide more than suggestive evidence though. It does not determine how continuous the pre-treatment causal path is through post-period. It can only be assumed that evidence for each causal path represents a significant portion of all cases (that is to say, it occurs in enough cases to influence the overall trend of violence), but this is not a certainty. The evidence available, as it stands, is suggestive of a weak increase in drug-trafficking related homicides in the post-treatment period as compared with the pre-treatment period resulting from high violence before the decapitation event and a slight increase from that rate caused by a violent decapitation operation, *narcobloqueos* that follow, or restructuring of control within or between organizations.

Causal Paths for the Secondary Hypotheses

Ideally, comparative case study would be utilized to determine how specific characteristics of the targeted leader or the organization they belong to influence homicide rates. Comparative case study would best answer the questions put forth in the secondary hypotheses proposed by this study. These hypotheses pertain to the dynamics of inter-cartel and intra-cartel competition following a decapitation event based on the rank of the targeted leader (H2), the method of decapitation (H3), and the concentration of DTOs in the municipality of decapitation (H4). Ultimately, these hypotheses can help us get a better understanding of the primary hypothesis, and the null correlation demonstrated by the quantitative models. This comparative study would compare causal processes between two distinct decapitation cases which would be very similar across most characteristics—such as year and month, urban v. rural location, etc.--except for the key characteristic of the secondary hypothesis being studied. It would then isolate the events that differ between them and analyze to what extent they comparatively affect drug trafficking related homicide rates. While, as mentioned above, such a systematic review is not possible in this context, I demonstrate evidence of possible causal paths of violence using journalistic evidence from Mexican newspapers and related publications. I supplement this evidence using descriptive statistics and difference-in-means tests to put forth suggestive evidence on causal linkages between leadership decapitation and drug related violence.

Hypothesis Two

Hypothesis Two deals with the rank of the leader targeted by the decapitation operation. It predicts that homicides will experience a greater escalation after the removal of lieutenants compared to that of a kingpin due to their comparative lack of judiciousness with violence. To test this hypothesis, I compare two groups of leaders with different ranks: kingpins and municipality-level leaders, who are effectively mid-level lieutenants within the organization. While this does not account for all leaders represented in the decapitation dataset in this study, they represent similar sample sizes, and are, importantly, distinct in their roles. Although upper level lieutenants and municipal leaders make up the exact same proportion of all leadership decapitations from 2013-2018, their roles may be too similar to compare in simple difference-in-means test because there is so little detailed information known about the internal structure of every DTO and its proposed variance. Therefore, a greater distinction between roles is needed to ensure that the groups used in the difference-in-means test properly represent higher-ranking and lower-ranking positions. Utilizing a comparison between kingpins and municipal leaders provides this distinction between roles because kingpins generally have a degree of control over all municipalities where the DTO holds territory, while municipal DTO leaders are in charge of managing one, or a few, municipal drug markets, or *plazas*.



A difference-in-means test of 50 decapitation cases provides evidence to support Hypothesis Two. The test is constituted of 25 cases of decapitation per category, and includes in

the analysis the number of homicides in the month of decapitation, as well as each of the six months after decapitation, rendering total observation number of 175. It demonstrates that between 2013 and 2018, Mexican municipalities that experienced a decapitation of a mid-ranking lieutenant operating a DTO at the municipality level saw greater levels of violence than those that experienced the decapitation of cartel kingpins. Within the 6 month period after a leadership removal takes place, the difference in means between homicides following a lieutenant's removal and homicides following a *capo's* removal is on average 4.06 homicides per

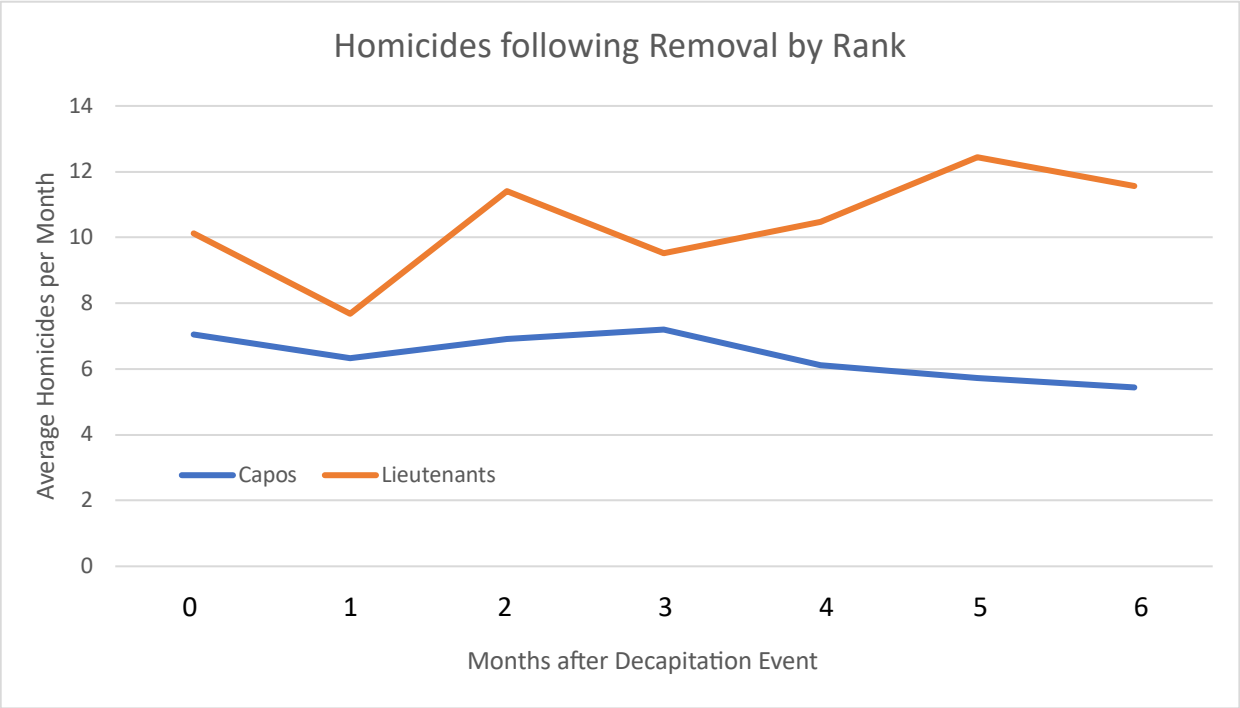
Figure 21: Difference-in-Means test by Rank

RANK

Overall

t-Test: Paired Two Sample for Means

	Capos	*Lieutenants*
Mean	6.394285714	10.4571429
Variance	120.8493924	648.732348
Observations	175	175
Pearson Correlation	-0.04254017	
Hypothesized Mean Difference	0	
df	174	
t Stat	-1.90810981	
P(T<=t) one-tail	0.029011833	
t Critical one-tail	1.653658017	



municipality-month. This difference is supported by a p-value of 0.029, which is significant at the 5% level. This trend continues across each month over time up to six months after a given decapitation event: in each month the removal of lieutenants results in between 1.4 and 6.7 more homicides than the removal of kingpins. This supports the prediction stated by H2, since homicides are shown to be greater in cases of a comparatively lower-ranking members being removed.

Qualitative evidence suggests a weaker pattern. It shows that there are multiple possible paths of drug-trafficking related violence both before and after the removal of kingpins and municipal DTO leaders. It is clear from the qualitative data that lieutenants often instigate violence before their removal, since all cases of pre-decapitation violence were spurred by municipal DTO leaders. Possibly due to the fact that mid-level lieutenants operate on the municipality level, it seems that municipal DTO leaders often spark territorial conflicts after a

decapitation event. While, as the data demonstrates, the removal of *capos* also sparks violence post-decapitation, it may be largely for a different reason: contestation of their replacements. This provides suggestive evidence of a greater proportion of post-decapitation violence in cases of kingpin removal being intra-DTO violence.

While these patterns within each group provide insights into the nuances of drug-trafficking related violence surrounding leadership decapitation events, they do not demonstrate whether violence experiences a greater escalation after the removal of either kingpins or mid-level lieutenants. The only evidence to suggest a relationship of this kind is that between the DTO leaders studied, a large majority of cases were linked to municipal DTO leaders, identified in this study as mid-ranking lieutenants within the organization. This is relevant in reference to the number of decapitations recorded for each category, which was relatively equal. The

Figure 22: Description of Violent Cases by Rank

	Description if… Cartel Kingpin	**Description if…** Mid-Level Lieutenant (Municipal Leader)
"El Pelochas"		Instigated wave of violence pre-capture; bounty offered
"El Tres Animales" and "El Misa"		Maintained turf war for months leading up to capture
"El Panilo"		Maintained turf war for months leading up to capture
"El señor de la V"		Caught participating in gunfight with rivals before final capture.
"Comandante Toro"		One DTO member dead, one civilian injured during decapitation event
"Comandante Fili"		Died in firefight between fellow DTO members and marines
"El Gafe"		Narco-blockade post-capture killed one police officer, injured two more

"El Inge"		DTO members fired directly on security convoy patrolling the area post-capture
"El Ojos"	Civilian vehicles burned; ~1000 police dispatched, violent clashes between them reported	
"El Abuelo"		Security forces taken hostage, civilian vehicles burned
"El Contador"		Intra-DTO clashes post-capture over territorial control
"El Changel"		Violent clashes over territory reported
Juan Manuel Rodríguez Rodríguez	Rejection of his leadership (upon replacing another) sparked intra-DTO splintering and violence	
"El Chapo"	Post-capture, one kingpin attacks the others, causing regional violence	

evidence illustrates that the proportion of violent cases following a municipal DTO leader's removal is higher than the proportion of violent cases following a kingpin's removal. This suggests that the removal of municipal DTO leaders may lead to greater violence than that of cartel kingpins. However, this evidence only holds if the sample collected here is representative of the population of decapitation cases from 2013-2018 in Mexico. We can then only very tentatively accept Hypothesis Two given the suggestive evidence demonstrated by the proportions of cases following removals of kingpins and municipal DTO leaders.

Hypothesis Three

Hypothesis Three deals with the method of decapitation, which can be achieved through capture or execution at the time of removal. The hypothesis predicts that capture will render lower levels of violence than execution because complete decapitation from the organization is

not guaranteed by capture, and therefore inter-DTO and intra-DTO conflict may be less likely to occur. To test Hypothesis Three, I compare the group of decapitation cases achieved though capture to the group achieved through execution. To start, the sample size of each group presents a challenge in this case because executions only make up 10% of all decapitations recorded. The small sample size of DTO leader killings compared to captures may have an impact on the validity of inference made by quantitative or qualitative analysis. Likely because of this issue, conflicting results from the difference-in-means test and qualitative case study inconclusive results for Hypothesis Three.

Due to the limitations of Excel, in order to conduct a difference-in-means test, the sample size of each variable must be equal. To accomplish this, I randomly select nine capture cases to compare with the nine documented execution cases. I run this test with other variations of the

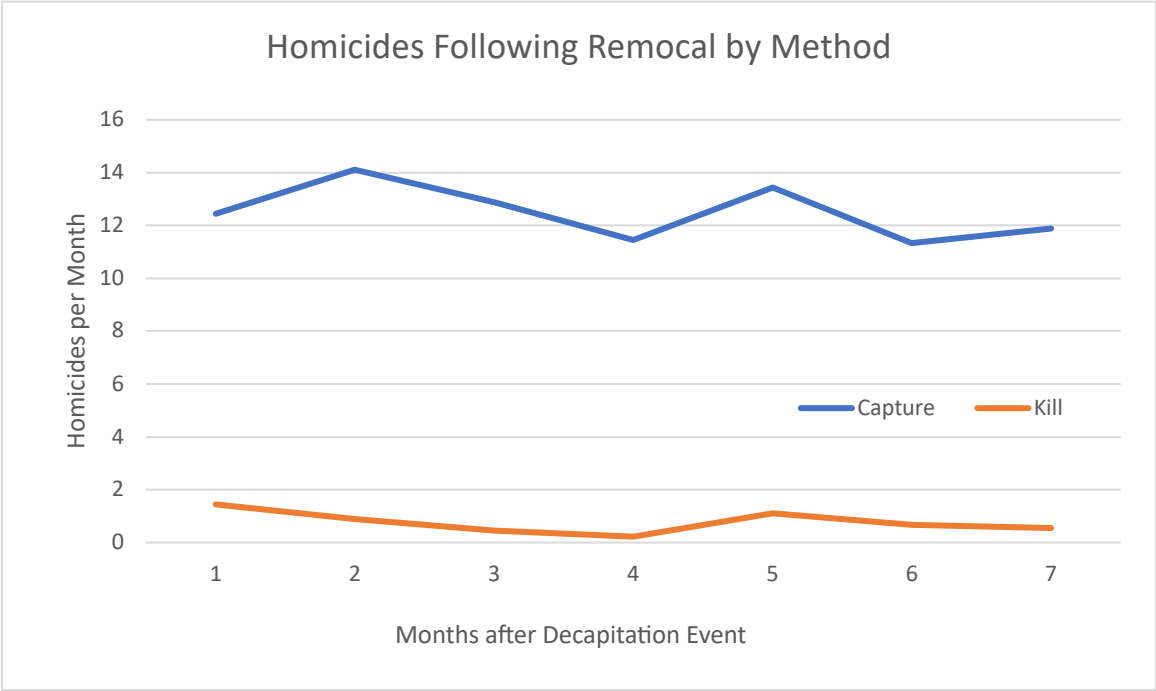
Figure 23: Difference-in-Means Test by Method

METHOD

Overall

t-Test: Paired Two Sample for Means

	Capture	*Kill*
Mean	12.5079365	0.76190476
Variance	326.415259	1.92626728
Observations	63	63
Pearson Correlation	-0.161052	
Hypothesized Mean Difference	0	
df	62	
t Stat	5.08301767	
P(T<=t) one-tail	1.8357E-06	
t Critical one-tail	1.66980416	
P(T<=t) two-tail	3.6713E-06	
t Critical two-tail	1.99897152	



random sample of capture cases (see Appendix), and each one demonstrated the same pattern. The difference-in-means tests composed of 18 decapitation cases each illustrate that captures precede greater levels of violence than executions do. The difference between groups is statistically significant, supported by a p-value of 1.8E-06. The difference is also quite large, averaging 11.75 homicides per municipality-month, and ranging from 10.7 to 13.2 homicides per municipality-month over the six months following removal. This is in conflict with the prediction of Hypothesis Three, and the findings of Dickenson (2015) and Phillips (2014), which state that the killing of DTO leaders increases violence more greatly than the capture of DTO leaders.

One possible explanation for this conflict could be that there is a higher incidence of rural areas being the location of capture for executions (5 rural, 6 urban) than for captures (16 rural, 79 urban). Cities have more resources for drug production, drug shipment, and other lucrative crimes such as extortion and kidnapping that bring in revenue, and therefore more resources to

fight over. If decapitations happen in the country, there may be fewer incentives to start conflict. Perhaps the gap in homicides can be explained at least in part by the difference in location. The case study evidence shows that within only six known urban-area decapitations achieved through execution, three of them showed up as having violent aftermaths in the qualitative data. This suggests a high rate of violence post-decapitation for urban areas.

When disaggregated between violence occurring during a decapitation event, and violence occurring after it, a loose pattern emerges. The qualitative evidence suggests that during a decapitation operation, violence may be higher for execution than for capture. Both cases documented of violence during a decapitation operation resulted in the death of a DTO leader. Perhaps the violent nature of operations in which execution (as opposed to capture) occurs

Figure 24: All Cases of Decapitation Achieved by Execution

Decapitation Case (Kill)	**State**	**Municipality**	**Location Type**
"El Ingeniero"	Jalisco	Valle de Juárez	Rural
"El Ojos"	Distrito Federal	Tláhuac	Mid-Sized City
“Comandante Toro”	Tamaulipas	Reynosa	Mid-Sized City
"El Chayo"	Michoacán	Tumbiscatio	Rural
"El Kike"	Querétaro	Colón	Rural Town
"El Quino"	Puebla	San Gregorio Atzompa	Rural
"Comandante Fili"	Tamaulipas	Matamoros	Mid-Sized City
“El H9"	Nayarit	Tepic	Mid-Sized City
"El H2"	Nayarit	Tepic	Mid-Sized City
"El Benjamón"	Morelos	Jiutepec	Mid-Sized City
"La Marrana"	México	Luvianos	Rural Town

creates higher homicide rates during the event. In both documented cases, the executed leader and other members of their DTO were involved in violent shootouts with police before the leader

was killed. Such confrontations imply mortal danger for DTO members, security forces, and civilians that live in the area. This would suggest that, during decapitation events, operations that end in execution render higher homicide rates. Yet, even immediately after a decapitation event, violence initially appears to spike more greatly for cases of capture. There are simply far more documented cases of DTO-state violence, turf wars, and internal power struggles. All turf wars documented after decapitation happen in cases of capture, as do all cases of internal power struggle. Yet the cases of *narcobloqueos* show that the sample may not be representative of the population, especially given the small proportion of executions to captures. While the majority of violent cases caused by narco-blockades occur after captures, the evidence shows that they can still occur after the death of a leader. Although after the death of a leader, blockades and confrontations with security forces no longer hold the utility of rescue, the case of "El Ojos" demonstrates that very violent *narcobloqueos,* like the one following his execution that caused the local authorities to dispatch nearly a thousand security forces, can still occur after cases of decapitation achieved through execution.

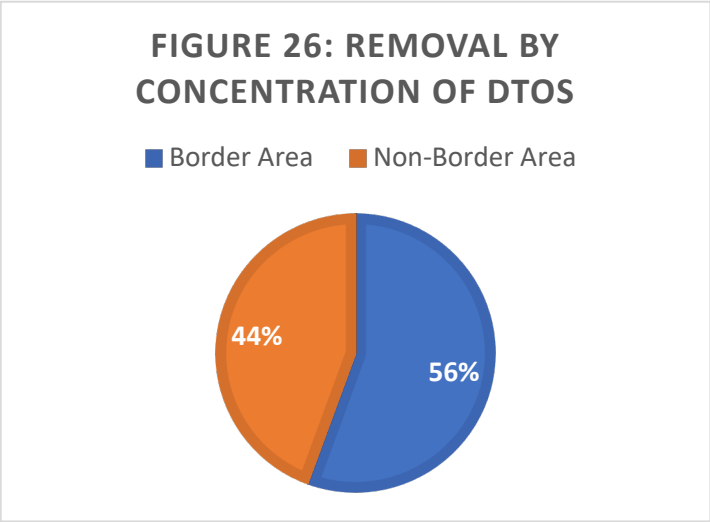
Figure 25: Post-Removal Cases of Violence by Method of Decapitation

	Location if… Captured	**Location if…** Killed
"Comandante Toro"		Mid-Sized City
"Comandante Fili"		Mid-Sized City
"El Gafe"	Mid-Sized City	
"El Inge"	Rural Town	
"El Ojos"		Mid-Sized City
"El Abuelo"	Rural Town	
"El Contador"	Mid-Sized City	
"El Changel"	Mid-Sized City	
Juan Manuel Rodríguez Rodríguez	Mid-Sized City	
"El Chapo"	Small City	

Although this qualitative data provides a better illustration of how violence may be sparked by capture or execution, it does not provide enough evidence to suggest that one causes a greater or lesser trend in homicides than the other. And, while the location of removal may help explain the conflict between the prediction of Hypothesis Three and the findings of the difference-in-means test, it does not reveal much about the dynamics of death vs. capture regarding leadership decapitation. Overall there is no indication that either death or capture is more effective at reducing post-decapitation homicide rates. I conclude then, that there does not exist enough evidence to reach a conclusion in reference to Hypothesis Three.

Hypothesis Four

Hypothesis Four deals with the concentration of DTOs in an area at the time of decapitation, and predicts that higher concentration of DTOs results in higher homicide rates caused by the decapitation event. This is based on the theory that DTOs are often in conflict for resources linked directly to territory, such as smuggling routes, production facilities, and civilian populations. By using data from the US Drug Enforcement Agency (DEA) during the period of study, I define the concentration of DTOs at the time of leadership removal through two different categories. A high concentration of DTOs is expected in 'border areas' where the geographic territory of two or more major DTOs come into contact, while low a concentration of DTOs is expected in a 'non-border area' where the surrounding territory is dominated by one major cartel. Upon comparing these groups I find insufficient evidence of a difference between post-decapitation violence in border areas vs. non-border areas.



The number of leadership decapitation cases is well distributed across border and non-border areas. Slightly over half (55) cases were carried out in areas where DTO territories come into contact, while slightly less than half (44) occurred in places dominated by one major cartel. This does not mean that other smaller cartels do not exist in non-border areas; this definition simply best fits the data utilized, which demarcates the territory of major cartels such as the Sinaloa Cartel, Los Zetas, and CJNG.

A difference-in-means test of 72 decapitation cases shows a significant difference between homicides rates following decapitations in border areas and non-border areas. Decapitations in border areas are demonstrated to experience 12.3 greater homicides per municipality-month than those in non-border areas. A very low p-value (1.3E-13) makes this difference statistically significant, and the difference between the means of each group is still perceivable within the six months after decapitation. This pattern initially supports the prediction set out in Hypothesis Four.

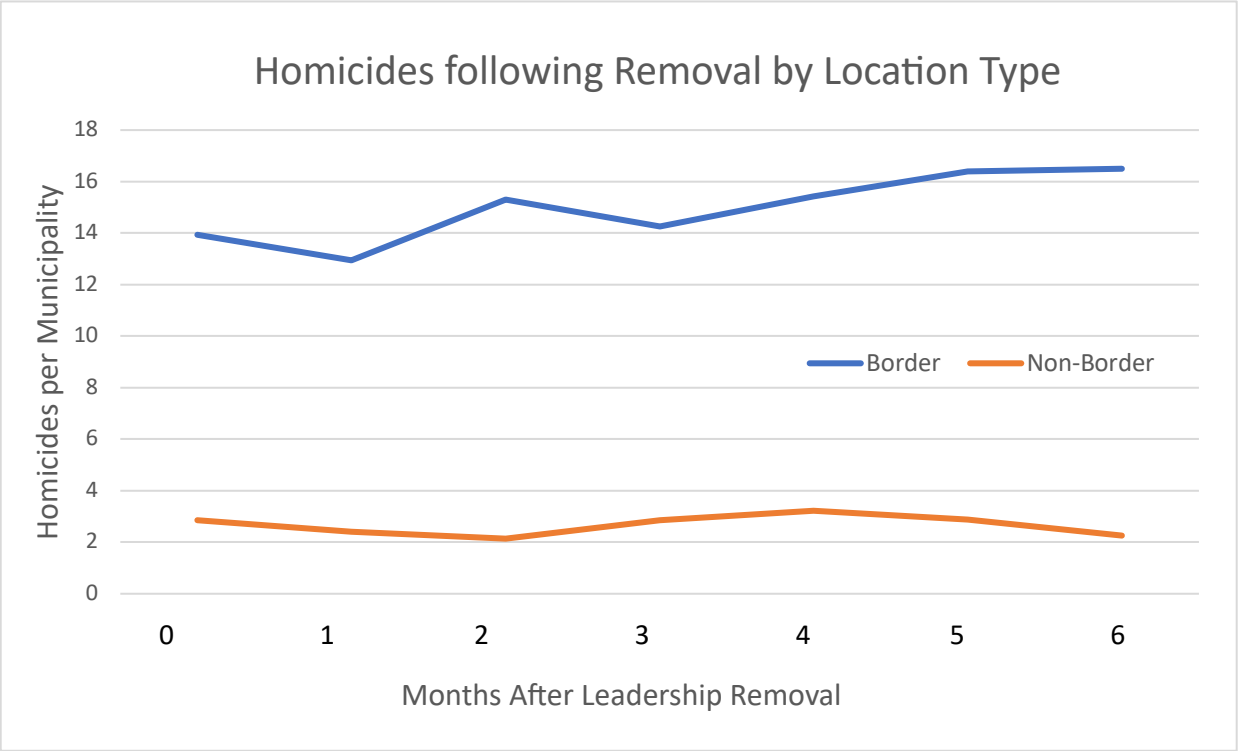
Figure 27: Difference-in-Means Test by Concentration

CONENTRATION

Overall

t-Test: Paired Two Sample for Means

	Border	*Non-Border*
Mean	14.96428571	2.66269841
Variance	595.5883608	17.7303959
Observations	252	252
Pearson Correlation	-0.12065311	
Hypothesized Mean Difference	0	
df	251	
t Stat	7.730572474	
P(T<=t) one-tail	1.29152E-13	
t Critical one-tail	1.650947025	
P(T<=t) two-tail	2.58304E-13	
t Critical two-tail	1.969460227	



With violence demonstrated to be higher in border areas by the difference-in-means test, documented cases of violence in the qualitative analysis should be expected to be high in these areas as well. Surprisingly, most violent cases documented pre- and post- decapitation occur in non-border areas, suggesting that a portion of violence may occur there. The qualitative data here demonstrates that despite a possible divergence in homicide rates between the two groups, violence does not stop in non-border areas. Instead, it takes the form of violence between security forces and DTOs and between members of the same cartel. For example, within the eight leadership decapitation cases in non-border areas, three are documented as producing intra-DTO violence in the post-treatment period. This suggests that intra-DTO conflict in places dominated by one major cartel could follow a significant, if small, proportion of decapitation cases.

Figure 28: Description of Post-Removal Violence by Concentration of DTOs

Border Area?			Cartel of Targeted Leader	Type of Conflict Documented
"El Tres Animales" and "El Misa"	Yes(?)— Sinaloa Cartel/AFO *AFO is a minor DTO		Tijuana Cartel/ Arellano Félix Organization; and Sinaloa Cartel	Inter-DTO
"El Panilo"		No— Gulf Cartel Territory	Gulf Cartel	Intra-DTO
"La Hamburguesa"	Yes — Gulf Cartel/Zetas		Gulf Cartel	Unknown
"Comandante Toro"		No— Gulf Cartel Territory	Gulf Cartel	DTO-Security Forces
"Comandante Fili"		No— Gulf Cartel Territory	Gulf Cartel	DTO-Security Forces
"El Gafe"		No— Gulf Cartel Territory	Gulf Cartel	DTO-Security Forces
"El Abuelo"		No— CJNG Territory	CJNG	DTO-Security Forces

"El Contador"		No— Gulf Cartel Territory	Gulf Cartel	Intra-DTO
"El Changel"	Yes —Sinaloa Cartel/BLO		Sinaloa Cartel	Unknown
Juan Manuel Rodríguez Rodríguez		No— Gulf Cartel Territory	Gulf Cartel	Intra-DTO
"El Chapo"		No— BLO Territory	Sinaloa Cartel	Intra-DTO

The quantitative evidence shown here demonstrates that violence escalates far more greatly in areas in which the territory of major DTOs meet. Yet the qualitative evidence is only able to speak to the presence of violence in non-border areas. Although it makes a case for DTO-State violence and intra-DTO violence playing a significant role in post-decapitation violence in non-border areas, it does not prove the absence of violence in border areas. This lack of compatible evidence means that the results of this hypothesis test are inconclusive.

Discussion

Upon concluding a qualitative analysis of the primary hypothesis, I suggested that the true relationship between leadership decapitations and drug-related homicides may consist of a weakly positive correlation between the two variables in the post-treatment period compared with the pre-treatment period. I evidenced causal paths relating to violent decapitation operations, *narcobloqueos* that follow, and restructuring of control within or between organizations to illustrate this relationship. By delving into the secondary hypotheses, I gain some insights into how violence may fluctuate given certain characteristics of a decapitation event. Hypothesis Two provides tentative suggestive evidence of a greater increase in drug-related homicides after the capture of relatively lower-ranking lieutenants, but provides the more reliable insight that within cases of kingpin decapitation there may be a greater proportion of

intra-DTO violence due to contestation of leadership. Although Hypothesis Three and Hypothesis Four fail to produce a conclusion, they still provide valuable insights. Hypothesis Three suggests that the degree to which the location of removal is urban or rural may play a role in determining the trend of drug-related homicides produced by leadership removals. Hypothesis Four suggests that post-decapitation violence in areas dominated by a single major cartel is still present in a significant, even if small, proportion of cases due to DTO-State violence and intra-DTO violence. Future quantitative and qualitative work on leadership decapitations on DTOs should take this new dimension of the location of capture into consideration by comparing across urban and rural settings. Additionally, future work should take measures, including increasing the sample size of the data, to integrate all of these factors into complex quantitative models that can account for various heterogeneous effects and still maintain validity.

Chapter 7: Conclusion

This paper is the first to utilize data from the *sexenio* of President Peña Nieto to study the effects of leadership decapitation in the post-Calderón drug war. At face value, the quantitative results of this study demonstrate a null effect of leadership decapitation on drug-related homicides from 2013 to 2018, yet it is likely that the effect of leadership decapitations is understated due to spillover and displaced violence. Although limited, a qualitative analysis of violent events occurring pre- and post-decapitation suggest that violence may not increase to a large degree after a leadership decapitation due to the fact that inter-cartel and intra-cartel violence is already influencing drug-related homicide rates in many areas with a drug-trafficking presence. That said, qualitative analysis also illustrates how leadership decapitation can still

spark new conflicts within and between DTOs when new appointments and territorial control are contested in the absence of the targeted leader.

Given the limitations of time and resources implicated in this study, further research needs to be done to fully understand the effect of leadership decapitation on drug-trafficking related homicides both during the Peña Nieto administration, and in general. In terms of quantitative testing, future work should incorporate rigorous measures to capture the effects of spillover violence. These measures should include clustering municipalities in the treatment group so that municipalities contiguous to the municipality of removal would be included in the treatment group. This technique would avoid the effect of decapitation events being understated. Future researchers studying this topic should also consider attempting to account for displaced violence occurring in non-contiguous municipalities in which the targeted DTO has critical operations. This would certainly involve much more time and research than simply clustering municipalities geographically because the landscape of territorial control between DTOs is constantly changing in Mexico, but it may be worth it to see how a leadership decapitation event affects areas not contiguous to the municipality of decapitation. Additionally, the location of removal needs to be called into question as the place where homicides are most affected. Future research should assess drug trafficking related homicides in the location of operation rather than the location of decapitation, when these locations differ. Last, further quantitative work should aim to increase the validity of inference by considering a few additional steps. One step would be to increase the sample size of treated municipalities by either clustering municipalities or studying a larger range of time. Researchers may also consider testing placebo-based outcomes by running the same quantitative tests with crimes not related to drug trafficking, such as domestic violence, to ensure that homicide rates do not change due to a change in overall crime

rates, or reporting rates. Similar robustness checks may be done by testing decapitation events against proxy variables for drug-trafficking related homicides such as hospitalizations for severe injuries or missing persons cases filed. This would act as an additional control for fluctuations in crime reporting. Implementing one or more of these steps may afford difference-in-differences models more validity of inference, and a correlation may be clearer and more comprehensive.

In addition to these improvements to quantitative work, future studies on leadership decapitation in Mexico should take steps to include thorough qualitative case study analysis and causal process tracing. Given resources available for security and travel, researchers should consider interviewing with one or more of the types of actors discussed in the chapter on case study. At the very least, causal process tracing should include speaking with local journalists and Mexican intelligence officials who can shed light on the day-to-day changes in the criminal landscape after a decapitation event. Ideally, case study would be done comparatively so that the effect of certain characteristics of the targeted leader or DTO could be assessed. Doing so could help bring out the possible nuanced effects of leadership decapitation, and may identify some cases in which it is more effective than in others.

The implications for this policy of leadership decapitation resulting in a null effect or a weakly positive effect on violence loom large for political actors such as the US government and the Mexican government. Even if the trend in violence does not increase, both countries should seriously assess if the amount of money, manpower, and resources they put into leadership decapitation of drug trafficking organizations is worth it given the likely null effect it has. Since after over 12 years of fighting the drug trade, homicides rates continue to climb and the drug trade is still thriving in Mexico, it may be time to rethink whether using a heavy-handed military

response is best for the well-being of those affected by the drug trade. Given the results of this study, these resources may be better put to use elsewhere.

I sat down with Dr. Omar García-Ponce, Professor of Political Science at George Washington University and expert in criminal and political violence, to speak about possible policy alternatives. He spoke specifically about the need to redirect a portion resources being used now to target DTO leaders towards lowering the demand for drugs— rather than the supply of it— and addressing the socioeconomic reasons why more and more people are getting involved in the drug trade (Astorga & Shirk, 19). Redirecting these resources away from leadership decapitation appears to be an important step to better fighting drug trafficking because even if the Mexican state takes down one drug trafficking organization, as long as the demand for drugs remains high, new actors will always replace the old ones, given the highly lucrative nature of drug trafficking (García-Ponce).[19] Therefore reducing the demand for drugs by decreasing chemical dependency through public health- and mental health-based solutions would strengthen any operations aimed at reducing the supply of drugs to global markets. Domestically, Mexico can address the socioeconomic issues, such as unemployment and low crop values for legal crops compared to illicit ones, that lead people to work for drug cartels as dealers, assassins, and producers/farmers (García-Ponce).[17] Giving people legal alternatives to make a living may be part of the solution to significantly reducing the workforce that cartels have access to, and reducing the harm to the Mexican people that drug cartels are able to perpetrate.

The policy alternatives mentioned above target DTOs by contracting the market they sell to and diminishing the workforce they can utilize. There may be other ways to more directly address drug trafficking violence, since DTOs harm the populous in other ways more closely to

[19] Dr. Omar García-Ponce, George Washington University, 10 March 2021. Interview held via Zoom.

the *raison d'être* of cartels-- profit. To gain revenue, DTOs increasingly engage in crimes such as extortion, kidnapping, and petroleum theft (State Department Interviewee #2).[20] Targeting these operations and making them harder to carry out may have an effect on both weakening DTOs by cutting off key domestic revenue streams and increasing the well-being of Mexican citizens targeted by them.

Building the institutional capacity of the security apparatus in Mexico is a long term solution to weakening the drug trade. This strategy was agreed upon by Dr. García-Ponce and both of the State Department officials I interviewed. One official described the change needed as "sustained, deep, transformational," meaning that DTOs will only be held accountable when reforms are enforced over a long period of time, occur in all parts of the Mexican state, and remove old barriers to accountability such as impunity networks (State Department Interviewee #2).[16] These changes would range from properly paying, training, and equipping local police, to fixing the issue of police corruption and impunity afforded to drug cartels.

If such reforms and policy alternatives could be implemented, DTOs would be faced with a much harsher climate than they are currently faced with. This study demonstrates that under Peña Nieto, leadership decapitation has failed to curb drug trafficking violence, and past studies (G. Calderón et al 2015; Dickenson 2014; Lindo & Padilla-Romo 2015; Phillips 2015) have suggested that under Calderón, leadership decapitation was similarly ineffective. Given the many policy alternatives discussed above, it is this author's belief that resources should be diverted away from leadership decapitation and towards anti-DTO policy that addresses the root causes of drug-trafficking related violence and the key revenue streams that make drug trafficking profitable. I suggest that the United States and Mexico rigorously support the police reforms

[20] Interviewee 2, State Department, 2 March 2021. Interview held in confidentiality by author.

discussed above, and implement these changes in tandem with a public health solutions to reduce demand for drugs in the US and a socioeconomic approach to reduce the drug trafficking workforce in Mexico. Only by implementing this targeted yet interdisciplinary approach do both Mexico and the United States have a real shot at reducing the drug trade's effects on both states' populations.

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Dr. Omar García-Ponce, George Washington University, 10 March 2021. Interview held via Zoom.

Appendix A

OLS Regression accounting for year.

Months after Removal	Decapitation Effect	Standard Error	Year Effect	Standard Error
-6	7.122	0.268*	0.026	0.003*
-5	6.698	0.268*	0.032	0.003*
-4	7.427	0.268*	0.038	0.003*
-3	7.508	0.268*	0.043	0.003*
-2	8.354	0.268*	0.048	0.003*
-1	7.800	0.268*	0.054	0.003*
0	9.070	0.268*	0.057	0.003*
1	8.305	0.268*	0.057	0.004*
2	9.118	0.268*	0.056	0.004*
3	8.494	0.268*	0.056	0.004*
4	9.895	0.268*	0.056	0.004*
5	9.271	0.268*	0.054	0.004*
6	9.283	0.268*	0.052	0.004*

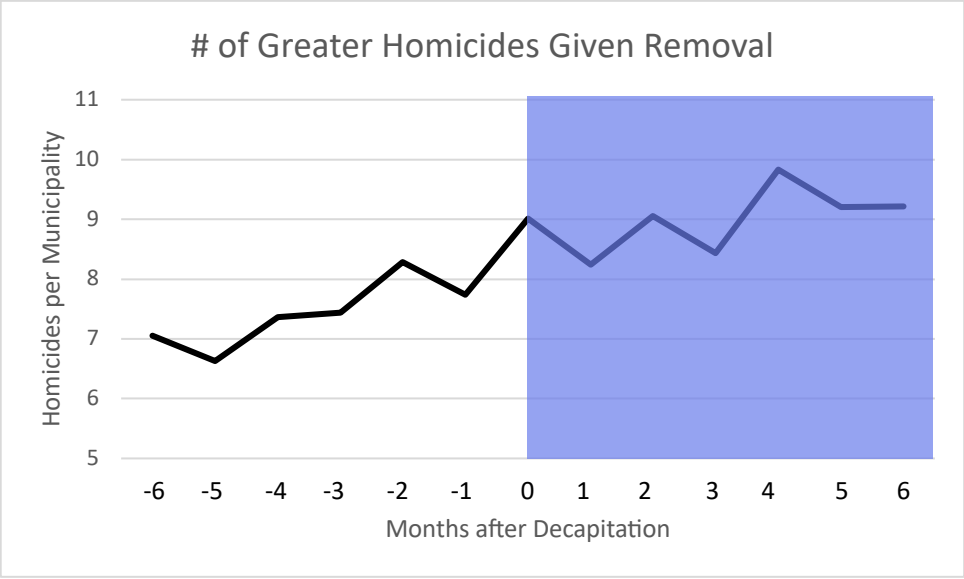
Appendix B

Linear Regression, Two-Way Fixed Effects utilizing data from all municipalities *except those that do not report any homicides from 2013-2018.*

OLS Regression:

Months After Decapitation	Decapitation Effect	Standard Error
-6	7.053	0.288*
-5	6.629	0.288*
-4	7.359	0.288*
-3	7.441	0.288*
-2	8.289	0.288*
-1	7.735	0.288*
0	9.007	0.288*
1	8.242	0.288*
2	9.054	0.288*
3	8.430	0.288*
4	9.831	0.288*
5	9.206	0.288*
6	9.218	0.288*

* Indicates statistical significance, where p-value < 0.01



OLS Regression Accounting for Year:

Months after Removal	Decapitation Effect	Standard Error	Year Effect	Standard Error
-6	7.047	0.288*	0.030	0.004*
-5	6.621	0.288*	0.037	0.004*
-4	7.350	0.288*	0.044	0.004*
-3	7.431	0.288*	0.050	0.004*
-2	8.277	0.288*	0.056	0.004*
-1	7.723	0.288*	0.062	0.004*
0	8.993	0.288*	0.066	0.004*
1	8.228	0.288*	0.066	0.004*
2	9.041	0.288*	0.065	0.004*
3	8.417	0.288*	0.065	0.004*
4	9.817	0.288*	0.064	0.004*
5	9.194	0.288*	0.063	0.004*
6	9.206	0.288*	0.060	0.004*

* Indicates statistical significance, where p-value < 0.01

Two-Way Fixed Effects:

Months After Decapitation	Decapitation Effect	Standard Error
0	1.794	1.555
1	1.118	1.025
2	2.048	1.918
3	1.503	1.171
4	3.040	1.649*
5	2.484	2.101
6	2.575	2.113

* Indicates statistical significance, where p-value < 0.10
Two-Way Fixed Effects model with year and municipality fixed effects.
Standard Error clustered at the municipality-level.

Appendix C:

Multiple random samples for difference-in-means test focusing on decapitation method.

Second Sample	*Capture*	*Kill*	Difference
0	9.222222222	1.44444444	7.77777778
1	10.11111111	0.88888889	9.22222222
2	7.777777778	0.44444444	7.33333333
3	8.666666667	0.22222222	8.44444444
4	8.555555556	1.11111111	7.44444444
5	8.222222222	0.66666667	7.55555556
6	8.555555556	0.55555556	8