Cartels or Concessions:
The hidden use of state violence in Mexico

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The use of state security forces to facilitate private mineral exploitation in Mexico has resulted in ongoing human rights violations, including the displacement and dispossession of local communities. This phenomenon is driven in part by Mexico's drug war and specifically the 2008 joint Mexico-U.S. security initiative, Plan Mérida. While numerous qualitative data describe this phenomenon, this paper presents the novel quantitative finding that the Mexican government allocates military resources to suppress opposition to private mineral resource exploitation. I utilize a Two-Way Fixed-Effect model to identify the effect of the awarding of a mining concession on the allocation of state security forces. Due to the lack of accessible data on the allocation of military resources, I employ measures of anti-narcotic activities to approximate this allocation. State security forces facilitate mining activity, including aiding in the suppression of local opposition groups, and I find that the awarding of a mining concession in a given municipality-year induces a 9.1% rise in anti-narcotic activity. The absence of any relationship between mining activity and drug cartel presence indicates that this rise in anti-narcotic activity cannot be attributed to narcotic activity. Rather, it reveals the allocation of military resources toward the advancement of private mineral exploitation.

I. Introduction

My research rests upon two important contexts that have shaped Mexico-U.S. relations over the last few decades: Mexico's movement toward free trade and privatization and the Mexican drug war. Theoretically, I assert that these contexts overlap and influence one another. The drug war initiated by then-president Felipe Calderón represented a dramatic change of course from the

previous party's more diplomatic approach to drug-trafficking organizations (DTOs). Deploying thousands of troops within weeks of his election, Calderon's violent crack-down on these DTOs led to an intense escalation of violence and homicide rates that persists, today. Because this phenomenon has been studied heavily, my analysis looks more specifically at the effect of U.S. military assistance in relation to the drug war.

Signed in 2008, Plan Mérida is a Mexico-U.S. security initiative that promised to combat the highly organized DTOs destabilizing the region. It outlined plans to reform Mexico's justice system, train and equip its police forces, strengthen the border between the two states, and systematically dismantle these criminal organizations (Paley 2015; Feeley, 2013; Seelke, 2010). The execution of Plan Mérida, an extension of President Calderón's initial crackdown on DTOs following his election in 2006, catalyzed a marked spike in police and military spending under the banner of the Mexican drug war (Paley 2015).

The initiative was in many ways built on the precedent set by Plan Colombia, heralded at the time by local elites and US officials for successfully galvanizing the nation's economy. However, numerous scholars have since criticized the plan not only for its failure to reduce drug trafficking—which actually increased during this period—but for the forced displacement of indigenous populations and the suppression of unions following the nation's militarization (Gordon 2008).

Ibañez and Vêlez (2008; Acemoglu and Santos 2013) contend that this forced displacement is not a by-product of internal conflict but the result of strategic attacks against populations. This parallels claims that the Mexican government has similarly utilized militarization in response to DTOs to carry out displacements. Paley (2014, pp.112) writes, "the fact that there is a resource rush taking place in tandem with the militarization (and paramilitarization) linked to the drug war is an open secret." This resource rush is in part a product of the free trade agreements, including NAFTA, that opened Mexico to not only marked increases in foreign direct investment beginning in

the 80s and 90s but sought to undo landholding organizations such as *ejidos* and indigenous communities *(*Paley *2014).*

The free trade zones developed primarily under NAFTA induced the rise of *maquiladoras*, factories along the Mexican-American border notorious for their poor working conditions, low pay, and environmental impact (La Botz 1995). These free trade zones catalyzed the introduction of multinational corporations (MNCs) that characterize many of Mexico's industries today, particularly mining. Mexico is rich in mineral resources which require extensive capital to extract and thus encourage foreign direct investment; MNCs possess capital sufficient to exploit Mexico's mineral resources that the government might otherwise lack (Delgado et al. 2005). Today, Mexico is the world's leading producer of silver and among the largest producers of numerous minerals yet much of this mining boom is attributed to the introduction of foreign corporations and the preference for MNCs over domestic firms.

Darcy Tetreault (2015, p.48) argues that the "examination of social environmental conflict around mining in Mexico indicates that neoliberal reforms have facilitated 'accumulation by dispossession.'" First, mineral rights and state-run mining companies are moved to the private sector. The state then assists in the displacement of smallholder farms and indigenous communities, dispossessing them of their "land, water, and cultural landscapes" (p. 48), in order to facilitate private mineral exploitation (Garibay 2010). This relationship between displacement, private interests, and the state is the impetus for the following empirical analysis. First, do state security resources employ violence against local populations to advance private mineral exploitation? And second, do militarization and U.S. military assistance augment these efforts to displace local populations and suppress local opposition groups to mineral resource exploitation?

The awarding of a mining concession in a given municipality-year functions as a proxy for mineral resource exploitation and constitutes my treatment variable. My data are taken from the

EITI's database on mining concessions and encompass every concession given in Mexico through 2019, including a measure of the surface area, its location, and the initiation year of the contract for every observation.

With regard to my outcome variable, I employ various measures of anti-narcotic activities, including kilos of marijuana seized, to approximate the allocation of military and police resources. My outcome variables are taken from Ch (2021). While this dataset contains a number of variables describing drug seizures, arms seizures, and laboratory closures, I will use three primary variables in my main regressions: the total number of kilos of marijuana seized, the total number of detentions, and the total number of drug-trade-related homicides per municipality-year. Marijuana seizures are reported by the military while detentions are reported by the federal police, enabling the identification of a potentially differential effect on allocations. This approximation is inherently imperfect, however, as two factors influence each measure: the intensity of narcotic activity and the intensity of anti-narcotic activity. A high number of kilos of marijuana seized in a municipality-year might reflect either DTO presence police, state security presence, or both.

In order to effectively argue that the anti-narcotic activity outcome variables truly approximate state security allocation, I must demonstrate that mining activity does not also drive DTO presence. While mineral resources likely do not influence trafficking routes, the infrastructure development and influx of people associated with mining activities might incentivize DTOs to move to these municipalities in pursuit of profits from extortion, kidnapping, etc. We would similarly see a relationship if mineral-rich areas were more conducive to growing illicit crops, such as marijuana. To estimate DTO presence, I draw upon the approach of Acemoglu and Santos (2013) who use paramilitary and guerilla conflict incidents, referred to as "attacks" (p.3), to effectively map the intensity of these actors in a region. I employ data on drug trade-related homicides as my "attack"

variable and test the effect of the awarding of a mining concession on these homicides. The data on drug-trade-related homicides thus function as a control in my main regression.

I implement two distinct research designs to assess the relationship between mineral resource exploitation and state security allocation. The first is a Two-Way Fixed Effect model that introduces municipality-level fixed effects that account for all time-invariant municipal characteristics that may bias some estimates. This model also addresses confounding time trends as natural resource exploitation, narcotic activity, and anti-narcotic activity vary from year to year. In order to demonstrate that these measures of anti-narcotic activity truly approximate security force allocation and do not capture the effect of greater DTO presence in an area, I will regress mining concessions on drug trade-related homicides.

Next, I implement a Difference-in-Difference design to test for the effect of Plan Mérida on the allocation of state security forces. My treated municipalities for this design are those that were awarded any number of mining concessions greater than zero in 2005; the control municipalities are those that received none. Any differential changes in response to Plan Mérida between these two groups would isolate the effect of the increase in state capacity and state security resources on allocation. Municipality and year fixed effects are similarly included in this model. This second research design builds on the first and nuances our understanding of Plan Mérida's role in resource exploitation.

I anticipate that the receipt of mining concessions will drive the allocation of both federal police and military forces in the absence of an endogenous relationship between narcotic activity and mining activity. I also anticipate a positive and differential effect of Plan Mérida on anti-narcotic activity in municipalities with ongoing mining. I find that the awarding of a mining concession in a municipality-year increases military allocation to that municipality in the following year. This effect is not uniform across security forces, however, as the awarding of a mining concession induces the

reallocation of federal police away from these municipalities. This would indicate a systematic preference for the military in executing displacements through coercion and violence. Next, the introduction of Plan Mérida does induce a differential increase in the allocation of military resources to municipalities with ongoing mining activities. This effect is anticipatory and diminishes over time, indicating that Plan Mérida indirectly increased violence against local groups by encouraging and enabling the Mexican government to increase defense spending. These findings are novel and significant in demonstrating that security forces nominally designated for the drug war are allocated to facilitate mineral exploitation and the suppression of local opposition groups.

II. Literature Review

The literature on the relationship between state violence, internal displacement, and natural resource exploitation with which my research is in dialogue is largely non-empirical. The work of activists, journalists, and scholars—including Dawn Paley, Darcy Tetreault, Micol Siegel, Delgado Ramos et al., and especially those in Mexico continuing to report on these conflicts—provide the foundation and impetus for the theoretical claims made in this analysis. However, their qualitative evidence lack external validity to the extent that they cannot capture the systematic efforts to displace communities nor can they capture the effect of international institutions such as Plan Mérida. Berdal and Malone (2000) remark upon the paucity of empirical literature analyzing the "precise role of economically-motivated actions and processes in generating and sustaining contemporary civil conflicts" (p. 1). Thus, my research seeks to bridge existing empirical analyses on state capacity and violence in Latin America with a focus on conflict surrounding resource exploitation.

This analysis is broadly related to empirical investigations of the relationship between conflict and state capacity, however it introduces novel findings on the role of security agreements in

advancing economic imperialism. Besley and Perrson (2008) importantly find that internal conflict impairs a state's fiscal capacity while Fearon and Laitin (2003) contend that states with low state capacity may benefit from foreign military assistance that increases the state's repressive capacity. Looking at Latin America, Cardenas, Eslava and Ramírez (2013) employ heterogeneous effects of different violent events on state capacity in Colombia and find that events targeting citizens worsen the state's ability to collect taxes. These works test the effect of conflict on state capacity and illustrate the stated purpose of a security agreement such as Plan Mérida.

My work thus draws more from empirical analyses of the impact of domestic and international security institutions on violence and internal conflict. Dube and Naidu (2014) find that U.S. military aid to Colombia led to increases in internal conflict through resource sharing between state military and paramilitary groups. They then establish a theoretical linkage between U.S. military aid and human rights violations and union suppression that parallels the theoretical claims underlying my empirical analysis. In light of the destabilizing effect of DTOs on Mexico's state capacity and the increase in internal violence resulting from the drug war, the relationship between U.S. military assistance and the Mexican government's use of security resources against local populations that underlies my research is comparable. Further quantitative analyses of the linkage between security, U.S. military assistance, and private gain largely pertain to U.S. covert involvement in foreign states. Berger et al. (2013) find that CIA interventions in a foreign state increase domestic importation from the U.S., mostly in the form of direct purchases of American products by foreign governments. This effect did not increase for ideologically-similar regimes indicating the intervention, itself, drove the change. In line with this body of work on the effect of international or domestic security interventions on gains to private interests, my research draws upon the theoretical design of Dube et al. (2011) who use stock prices in Iran, Guatemala, Cuba, and Chile to identify the financial gain to U.S. firms induced by CIA-led coups. However, while I also look at measures of

financial gain, these measures function as a treatment such that violent outcomes are my variable of interest.

Klor et al. (2020) uniquely assess the role of state violence in promoting gains to private interests and analyze a domestic, Latin American government rather than a U.S. intervention. They identify a strong, differential effect of union connection on the victimization of certain firms. This effect was stronger for privately-owned firms than for state-owned firms such that financial gain rather than ideology was again the principal driver. My paper utilizes this quantitative analysis of the state suppression of union-connected firms to support its theoretical causal mechanism and elaborates upon the study of state violence in support of private financial gain. Notably, it is not within the scope of this paper to investigate the differential effect of private versus state ownership though an analysis of the differential effect for MNCs versus Mexican firms should follow

Other quantitative works studying the intersection of Latin American state actors, security, and private gain analyze the persistence of non-state armed actors. Both Ch et al. (2018) and Acemoglu, Santos, and Robinson (2013) assess the Colombian case and seek to explain the absence of a state monopoly of violence and the effect of multiple violent actors in a single state.
As a result, my research presents a novel analysis of the use of state violence against local populations, especially in relation to natural resource exploitation and international security agreements.

III. Theory: Mining and State Violence in Mexico

My research seeks to evaluate the extent to which the desire to protect the interests of private, and often multinational, firms in privatizing and exploiting natural resources influences the Mexican government's allocation of police and military resources. Although some fraction of these resources—troops, arms, vehicles, funds—are certainly utilized in real efforts to combat DTOs, at

least some part of these resources facilitate the suppression and displacement of local communities who actively oppose the exploitation of such natural resources as minerals and gas.

Mexico is among the leading producers of silver, copper, gold, and numerous other minerals. Its mining sector has experienced "spectacular" (Tetreault 2015, p. 48) growth in the last few decades within the context of free-market reforms, in particular NAFTA, that have spurred foreign direct investment. The 1982 debt crisis "marked the turning point from a national development strategy of import-substituting industrialization" (Tetreault 2015, p. 52; Delgado and Del Pozo 2005) with strong state involvement to a neoliberal, market-oriented development strategy. First, the Mexican government responded to the nation's 1982 debt crisis by implementing tax incentives and exemptions still acting today on extractive industries; these incentives were only bolstered by NAFTA's stipulations for completely free trade (La Botz 1995). In the late 80s and early 90s, Mexico initiated the sale of publicly owned mineral resources "with little transparency" (Tetreault 2015, p. 52). This shift to privatization has only been exacerbated by the growing demand for metals by China, India, and the West, the implementation of laws and institutions in Mexico that favor extractive, foreign companies, and the lax enforcement of environmental laws (Garibay 2010).

Mining is regulated under the Mexican Mining Law and Article 27 of the Mexican Constitution; the Dirección General de Minas (DGM) manages the application of this law within the Federal Executive. The Mexican government has given thousands of mining concessions to foreign companies—of which 40 percent are Canadian-owned—that have facilitated the introduction of more advanced mining technologies. These technologies have not only "made economically feasible the exploitation of previously inaccessible mineral reserves" (Tetreault 2015, p. 50) but have enabled mining companies to return to previously exhausted regions. The mining process begins with the petition of a mining concession that enables the holder to "conduct exploration activities" and then exploit, mine, and develop the geographic area designated in the concession; these rights are known

as “underground rights” (Del Bosque 2020). Surface rights are addressed separately, and the company must prove to the Environmental Authorities that an agreement has been met with legal owners of the surface land. The Ministry of Economy may revoke the temporary occupation agreement if mining works do not commence within a year or lapse for more than a year. Notably, this process has been marred by a "host of irregularities” in the 20,958 active mining concessions managed and documented by the Auditoria Superior de la Federation (Tetreault 2015, p. 53). These include unpaid fees, errors in surface areas, and failures to register with the Finance ministry.

These laws provide de jure mechanisms to ensure that those most affected by mining—communities "that tend to be inhabited by poor rural families" (p. 51) engaged in small-scale farming and ranching—can maintain their wellbeing in the face of local environmental destruction directly impacting their livelihoods. Indigenous communities are "increasingly affected as mining operations expand into the relatively isolated areas that they have inhabited since the conquest" (p. 51). As a result, these laws include stipulations for "community harmony" (Del Bosque 2020) and codify the preferred status of indigenous communities to acquire the mining.

The real-world application of these laws looks very different, however. Government officials, political parties, and mining agents find ways to pressure and coerce local communities into ceding their land for small to non-existent compensation and employ violence against opposition movements attempting to move through legal channels (Garibay 2010). Tetreault presents several cases, some of which have gained international attention, that illustrate the conflicts that have arisen between local opposition groups and both private and state agents.

In 2006, a Mexican subsidiary of a Canadian mining company called Cuzcatlân Mining Company initiated exploration activities in the Ocotlân Valley. An opposition movement quickly arose, formally led by the *Coordinadora en Defensa de los Recursos Naturales y Nuestra Madre Tierra del Valle de Ocotlân* (Coordinator in Defense of Natural Resources and Our Mother Earth in the Ocotlân

Valley—CDRNMT). This group held that the concessions granted to the private company disregarded the community's scarce water resources and, in 2009, some 300 community-based activists blocked access to local mining sites. They were then "forcibly removed by federal and state-level police, resulting in over 20 arrests" (Treat 2012). Other forms of human rights violations have been documented since, including "death threats, arbitrary detentions, beatings and two murders" (Tetreault 2015, p. 55).

These are of course not isolated cases. A recent article published by Carolina Robledo Silvestre in the Network of Mexicans affected by mining (*Red Mexicana de Afectados por la Minería* or REMA) illustrates how frequently regions with extractive industries experience this form of socioenvironmental conflict. Using data from the Observatory of Socioenvironmental Conflict (OCSA) within the Universidad Iberoamericana documenting 597 "megaprojects" (Robledo Silvestre 2021) throughout Mexico in the last three years, she finds that organized communities are resisting 78% of them. In at least 27 of these, community activists have been murdered and in many more have individuals been forcibly "disappeared" (2021). In Sinaloa, a pattern of youth disappearances perpetrated by local police has appeared. Most importantly, she notes that in regions such as Coahuila and Chihuahua, the military occupation of territory is strongly related to extreme violence against the population; this violence, including massacres, disappearances, and "selective assassinations" (2021), is also connected to mineral resources along the border of the U.S.

These qualitative data comprise an important element of the theoretical claims made by this paper. I contend that the awarding of a concession induces at minimum the exploration of the designated region and initiates any of the mechanisms described above to remove those dwelling on the surface or in the surrounding area. The corporation receiving the concession must initiate mining activities within the year. While this is not necessarily enforced given the discrepancies we observe with fee payments, the economic incentive for firms to begin mining as soon as possible

encourages the relatively swift introduction of mining technologies and infrastructure. Local opposition groups do form in response to the awarding of the concession and thus anticipate mining activities in some cases. However, the primary mechanism is the response of local groups to forced displacement and these groups then organize and grow in strength over time (Tetreault 2015). This theoretical mechanism is evident in qualitative data such as those discussed above that demonstrate clearly the introduction of state forces to these communities to quell protests, enforce displacement measures, and even assist in the assassination of local organizers, union-leaders, and activists (Paley 2015).

These state forces are comprised of distinct organizations that operate at different federal levels: Mexico employs a vertical system akin to that of the U.S. in which each level of government organizes its own police and security forces (Secretario Ejecutivo del Sistema Nacional de Seguridad Pública 2019). Under this system, the Federal Executive controls the military and federal police forces, while each state organizes state-level police forces and municipalities local police forces. This paper is only concerned with agents of state security under the Federal Executive, namely the military and federal police forces. At times, these organizations have coordinated efforts yet, during the period relevant to this analysis, most of the anti-narcotic activities reflected in my data were conducted independently (Ch. 2021). As such, I differentiate these organizations in my empirical analysis.

Plan Mérida augmented state capacity and the resources available to these security organizations. Mexico officially announced Plan Mérida in the fall of 2007, though initial discussions between the then-heads of state of Mexico and the U.S. were not publicized (Paley 2015). The initiative sought to combat the transnational organized crime groups trafficking drugs through the region by strengthening borders, reforming the justice system, and confronting gang activity (Seelke 2010). The U.S. provided $1.9 billion to Mexico between 2008 and 2012 (Seelke 2010), though this

was not in the form of cash but rather earmarked for U.S.-made equipment and private contracts. The security initiative "served as a catalyst for a sharp increase in domestic police and military spending in Mexico" (Paley 2015, p.119) as Mexico then matched much of this spending and increased its defense budget from $2 billion to $9.3 billion. This spending helped to mobilize military and federal police forces, as well as implement reforms, (p.119), ultimately escalating violence across the country.

IV. Hypotheses

Regarding the TWFE research design, I hypothesize that the awarding of a mining concession in a given municipality-year will indirectly induce an increase in drug seizures and detentions as more state security resources are allocated to these areas. My research design depends upon my anti-narcotic activity outcome variables successfully approximating state security resource allocation. An increase in marijuana seizures could reflect a higher level of narcotic activity (DTO presence), a higher level of anti-narcotic activity (such as police presence), or some mixture of both effects. I do not anticipate real anti-narcotic activity to be systematically driven by mining activity unless illicit crop growth (marijuana in particular) is systematically more prevalent in areas with mineral resources or DTOs are attracted to mining activity. I thus hypothesize that the awarding of mining concessions will not affect DTO presence. If this holds, then the outcomes of the TWFE model will demonstrate the relationship between mining activity and state security resource allocation with a high degree of validity.

Regarding my second research design, the Difference-in-Difference model, I hypothesize that the increase in Mexico's anti-narcotic resources resulting from Plan Mérida will differentially increase measures of anti-narcotic activity in municipalities with mining concessions as compared to those without. Effectively, the increase in state capacity and thus security resources will be allocated

disproportionately toward the defense of private interests and the displacement of, and violence against, local peoples.

V. Data

The relevant unit of analysis is the municipality-year as my main treatment variable—the receipt of a mining concession—takes the form of a panel dataset with observations at the municipality level. The awarding of a mining concession in a given municipality-year will constitute my treatment variable for both research designs. As mining concessions effectively induce mining activity, they function as a proxy for private mineral resource exploitation. My data are taken from the EITI's database on mining concessions and encompass every concession given in Mexico through 2019, including a measure of the surface area, its location, and the initiation year of the contract for every observation. To compare the two, I aggregated the mining concessions data by municipality-year such that, should several firms receive mining concessions in the same municipality, in the same year, the value of this municipality-year's quantity of concessions would reflect the total number of concessions given, even if to disparate firms. I then aggregated these data at the municipality-year level to produce a count variable describing the total number of *new* concessions given to each municipality in each year. This dataset contains only municipality-years in which a mining concession was awarded and for every municipality-year in which a mining concession was not awarded, I introduced a value of zero. Conversely, my outcome data contain both values of zero and missing values and no changes were made to combine the two.

The benefit of this measure lies in its discreteness and reliability: the data reflect the codified and recorded interactions between the state and private actors. While corruption may influence how these concessions are managed, the awarding of a concession as acknowledged by the state is not in question. This treatment also helps to reduce noise in our regression as we can be relatively

confident that only the firms receiving concessions benefit directly from the mining activity; what remains is to identify whether DTOs find indirect ways to benefit from these concessions. A shortcoming is the necessary reliance on the implicit causal relationship between the signing of the mining contract and subsequent mining activities; we assume mining did not take place prior to the contract's execution. However, even if this were true of some cases, lagging the outcome variables as explained below would still capture the effect of the mining activity. Another shortcoming of these data is the potential for a relationship between mineral resources and illicit crop growth. This potential confounder will be ruled out by presenting results conditional on DTO presence described further below.

My outcome variables are taken from Ch (2021) based on information petitions on anti-narcotic activities carried out by the military and federal police forces. While this dataset contains a number of variables describing drug seizures, arms seizures, and laboratory closures across municipality-years, I will use three primary variables in my main regressions: kilos of marijuana seized, number of detentions, and number of drug-trade-related homicides per municipality-year. Marijuana seizures are reported by the military while detentions are reported by the federal police, each at the municipality level. This enables me to identify potentially differentiated allocations of these security forces.

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Quantity concessions	31811	.423	1.863	0	40
Drug trade-related homicides	18985	13.711	60.733	1	3766
Detentions	4693	49.409	132.748	1	4106
Marijuana (kg)	10721	1323.314	10475.907	0	413111.8
Cocaine (kg)	10721	5.145	139.933	0	11810.988
Heroin (kg)	10721	.186	4.03	0	221.4

Methamphetamine (kg)	10721	13.687	328.833	0	24441.25
Small arms seizures	10721	5.62	24.056	0	1007
Long arms seizures	10721	8.884	40.397	0	1502
Laboratories	10721	.137	1.345	0	60
Cartridges	10721	1627.605	15474.355	0	1226205
Population per municipality	31810	46938.782	136096.76	91	1848954

Regarding the treatment variable of mining concessions, we see that there are a total of 31,811 municipality-years within the dataset that contain every concession given from 2005 to 2017. The mean is less than one which reflects the majority of municipality-years receiving no mining concessions and some receiving as many as 40. The control of drug trade-related homicides sees a mean of 13.7 homicides per municipality-year but has a large variation in values as the standard deviation is almost 61 and the reported maximum is 3,766 homicides in a single municipality-year. Detentions has far fewer observations at only 4,693 but, again, has a standard deviation far larger than its mean and a maximum value of 4,106 indicating some municipality-years experience detentions many times greater than the mean. As a result of this variation, I apply logarithmic and per capita transformations to my regressions which I explain below. Finally, the data on seizures of marijuana is very significant as these seizures far outclass, in kilos, those of any of the other drugs or arms seizures reported. The mean of 1,323 kilos seized is almost 100 times greater than the next highest mean. As a result, it represents the most robust measure of anti-narcotic activities.

VI. Research Design: TWFE

I employ two distinct research designs in this paper. The first is a Two-Way Fixed-Effect (TWFE) model with which I test the relationship between mining concessions and the allocation of military and police resources. This initial design seeks only to provide an empirical analysis of the systematic use of state violence enumerated in the qualitative literature. I use military-reported data,

with kilos of marijuana seized as my primary outcome variable, as well as federal-police reported data on detentions. The second is a Difference-in-Difference model assessing the potentially differential effect of Plan Mérida on municipalities with and without mining concessions. This design nuances the previous analysis by offering a novel empirical analysis of the effect of Plan Mérida, an international security agreement, on internal violence in Mexico.

The TWFE model is as follows:

$$\mathbf{Y}_{it} = \gamma_i + \lambda_t + \delta \mathbf{D}_{it-1} + \mathbf{X}_{it-1}\Phi + \varepsilon_{it}$$

Our unit of observation is municipality-years such that *i* represents each municipality while *t* represents each year. γ_i represents municipality fixed effects while λ_t accounts for year fixed effects. I remove biases resulting from time-invariant characteristics of municipalities by introducing municipal fixed effects into the regression. This model then addresses confounding time trends by introducing year fixed effects as natural resource exploitation, narcotic activity, and anti-narcotic activity have all varied over time. $\mathbf{D}_{it-1}$ functions as a count variable in the main regression and as a dummy in a secondary regression. This allows for the identification of a potential "intensity effect" wherein municipality-years with greater aggregate concessions-given experience greater allocation of state security forces than those with fewer concessions. The secondary regression uses a dummy variable for mining concessions in which $\mathbf{D}_{it-1}$ takes a value of 1 when a municipality-year has at least one concession and 0 when it has none. δ is the coefficient demonstrating the relationship between our treatment variable, $\mathbf{D}_{it-1}$, and our outcome, $\mathbf{Y}_{it}$. $\mathbf{X}_{it}$ is the drug trade-related homicides control. Finally, I employ the error term, ε_{it}; standard errors are clustered at the municipal level.

I include several transformations to this base model to account for potential-time varying confounders. I employ a per capita transformation on each outcome variable to eliminate any bias related to population density or urbanity which isn't captured by the municipality fixed effects. I then apply a logarithmic transformation to the mining concessions variable to address a potential

relationship between mineral resource-rich regions and drug trafficking routes: while the majority of municipality-years have either 0 or 1 concessions given, a select few have 30-40 which in turn skew the observed relationship between treatment and outcome. A similar distribution is found in both outcome variables and I employ an inverse hyperbolic sine transformation to account for the vast number of municipality-years that have few to no marijuana seizures or detentions recorded in these data. Finally, I apply a logarithmic transformation to the homicides control variable for the same reason.

Of note, I introduce a lag to the treatment variable of mining concessions. I hypothesize that local opposition groups will respond more strongly to actual mining activities, or at least attempts to set up mining activities, rather than the signing of the contract. Qualitative evidence reveals that in some cases opposition groups take issue with land being ceded at all, such as in the CDRNMT's defense of the Ocotlân Valley against a Canadian firm (Tetreault 2015). However, most local opposition groups seem to organize over time and respond to the mining rather than exploration phase which by law must take place within a year (ICLG). As a result, lagging our treatment variable more accurately represents the theoretical mechanism that I seek to demonstrate.

Remaining is the question of to what extent do these anti-narcotic variables reflect state security resource allocation. The lack of accessible data explicitly detailing the allocation of Mexico's military and federal police necessitates that I approximate this allocation with measures of anti-narcotic activity, most importantly kilos of marijuana seized. However, two factors affect this outcome variable: the intensity of narcotic activity in a given municipality (relative DTO presence) and the intensity of anti-narcotic forces. In order for the anti-narcotic activity outcome variables that I employ to truly approximate state security allocations, I must demonstrate that narcotic activity is not driven by mining concessions. To estimate DTO presence, I draw upon the approach of Acemoglu and Santos (2013) who use paramilitary and guerilla conflict incidents, referred to as

"attacks," to effectively map the intensity of these actors in a region. I employ data on drug trade-related homicides as my "attack" variable and test the effect of the awarding of a mining concession on these homicides.

I hypothesize that the receipt of a mining concession in a given municipality-year will indirectly induce an increase in drug seizures, arms seizures, and detentions as more police and military resources are allocated to these areas. Furthermore, I do not anticipate any significant relationship between mining activities and DTO presence.

VII. Results: TWFE

Table 2: TWFE with inverse hyperbolic sine transformation

	(1) *Outcome variable* **Inverse hyperbolic sine of kilos of *marijuana* seized per capita**	(2) *Outcome variable* **Inverse hyperbolic sine of *detentions* per capita**	(3) *Outcome variable* **Inverse hyperbolic sine of kilos of *marijuana* seized per capita**	(4) *Outcome variable* **Inverse hyperbolic sine of *detentions* per capita**
Lagged ln concessions	.091***	-.052*		
	(.023)	(.03)		
Lagged dummy concessions			.086***	-.083*
			(.031)	(.042)
Observations	8353	4339	8353	4339
R-squared	.231	.111	.229	.112
DTO presence control	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES

Standard errors are in parentheses; marijuana seizures reported by military; detentions reported by federal police; ***coefficients are standardized***

**** p<.01, ** p<.05, * p<.1*

I column 1 of Table 2, we find that a one standard deviation increase in mining concessions in the previous municipality-year increases the kilos of marijuana seized by the military by 9.1%. This finding is statistically significant to the 1% level. These results are very promising and support the

hypothesis that military resources are not entirely allocated toward combating drug trafficking but, to some extent, are allocated to protecting private interests such as mineral resource exploitation. In column 2, the relationship between mining concessions and detentions nuances the story, however. We find that a one standard deviation increase in mining concessions in a municipality-year *decreases* the number of detentions by 5.2% in the following year, in that municipality. This finding is statistically significant to the 10% level and stands in opposition to the hypothesized relationship. However, it does not conflict with the first finding given that data on detentions are reported by federal police rather than the military within this dataset. The marked differentiation between the effect of mining concessions on the allocation of military forces and federal police implies not only that military forces are preferred as a method of removing local opposition but that federal police are actually reallocated away from these municipalities, as a result.

In column 3, we employ a dummy for mining concessions awarded in a municipality year in order to test for a potential intensity effect. I find that a one standard deviation increase in mining concessions increases marijuana seizures by 8.6% in the following year. This effect is notably smaller than in column 1 which indicates the presence of a slight intensity effect: municipalities with more mining overall experience a larger state-violence response to local opposition. This effect is statistically significant at the 1% level. In column 4, a one standard deviation increase in mining concessions awarded *decreases* detentions by 8.3%; this finding is statistically significant at the 10% level. One explanation for this effect is that the intensity effect we see on the allocation of military resources approximated by marijuana seizures is reciprocated by an increased withdrawal of federal police.

I find that the additional measures of anti-narcotic activity reported by the military present in the dataset, including arms seizures and seizures of other drugs such as cocaine, neither support nor conflict with these findings. An exception to this, the awarding of a mining concession does induce

an increase in seizures of methamphetamines though this result is only statistically significant at the 10% level. The remainder of the variables provide no statistically significant relationship. This might be explained by the lower incidence of each of these variables, in contrast to my primary outcome variable, such that the variation is not sufficiently high.

VIII. Evaluating DTO Presence

Table 3: Testing drug trade-related homicides

	(1)	(2)
	Outcome variable is ln drug-trade related homicides per capita	
Ln mining concessions	-.012	
	(.017)	
Lagged Ln mining concessions		-.027
		(.017)
Observations	18985	17687
R-squared	.09	.084
Municipality and year fixed effects	YES	YES

*Standard errors are in parentheses**; coefficients are standardized***

*** p<.01, ** p<.05, * p<.1*

I implement the same logarithmic and per capita transformations used in my main regressions and test both a contemporary and a lagged effect. In column 1 of Table 3, we see that there is a slightly negative effect of the receipt of a mining concession in a municipality-year on drug trade-related homicides with a magnitude of .012. This effect is not statistically significant, however, and the R-squared is similarly quite low at .09. When we lag mining concessions, the effect becomes even smaller with a coefficient of -.027 and an R-squared of .084. The non-existence of a relationship (in fact, it is slightly negative) between mining activity and DTO presence very importantly

demonstrates that the anti-narcotic outcome variables reflect the intensity of anti-narcotic activity rather than narcotic activity; from the lack of DTO presence in these areas, we can infer that DTOs do not seek to profit from mining activity systematically nor do these activities benefit DTOs. As such, the coefficients in Table 2 only reflect the impact of the awarding of a mining concession on military and federal police allocation.

IX. Research Design: Difference-in-Difference (DiD)

This design tests for the potentially differential effect of Plan Mérida, which functions as an event, on our treated group: municipality-years with mining concessions. In order to better account for time varying biases, I consider a municipality-year to be treated if it received any number of concessions greater than 0 in 2005. This treatment helps to reduce noise in the analysis of the effect of Plan Mérida on state security allocation by looking only at municipalities with and without active mining. In light of the laws pertaining to mining concessions and the length of term of these contracts (Del Bosque 2020), each of the municipalities in which concessions were awarded should be experiencing full mining activities by our event year of 2007. This event year reflects not the signing of Plan Mérida but rather the anticipatory effect of talks promising U.S. military aid in 2007 that then galvanized Mexico to further increase its defense budget and deployment of security forces. Regardless of whether the increase in state capacity was a direct or indirect effect of U.S. aid, this research design will identify any differential allocation toward mining activity resulting from Plan Mérida.

The DiD regression model is as follows:

$$\mathbf{Y}_{it} = \alpha + \gamma \mathbf{D}_i + \lambda \mathbf{Post}_t + \delta(\mathbf{DXPost})_{it} + \varepsilon_{it}$$

Our unit of observation remains municipality-years such that *i* represents each municipality while *t* represents each year. $\mathbf{D}_i$ again takes a value of 1 if the municipality received any number of

mining concessions in 2005 and a value of 0 if it received none. $\mathbf{Post_t}$ takes a value of 1 if the municipality-year is during or after 2007. $\mathbf{(DXPost)_{it}}$ interacts our treatment variable with the event year. Standard errors again are clustered at the municipal level. α represents the average level of the anti-narcotic activity outcome variable in municipality-years that are not treated and are prior to 2007. $\alpha + \gamma$ is the average level of the anti-narcotic activity variable for treated municipalities prior to 2007. $\alpha + \lambda$ is the average level of anti-narcotic activity in non-treated municipalities after 2007. Finally, $\alpha + \gamma + \lambda + \delta$ is the average level of anti-narcotic activity in treated municipalities after 2007.

The interaction term is the difference in the difference of the average levels of anti-narcotic activity in non-treated municipalities before and after 2007 and the average levels of anti-narcotic activity in treated municipalities, before and after. As with the first research design, I include natural log and per capita transformations on the outcome variable of kilos of marijuana seized. I again apply logarithmic transformations to both the drug trade-related homicides control and the mining concessions treatment. For the theoretical reasoning specified in the previous research design, I lag the treatment variable. This design enables us to identify a causal effect of the event without requiring the control and treated municipalities to be identical in terms of other pre-treatment characteristics beside mining. However, it in turn necessitates that the Parallel Trends assumption is satisfied.

X. Results: DiD

Table 4: Difference-in-Difference regression using Plan Mérida as the event

	(1) *Outcome variable* **Natural logarithm of kilos of marijuana seized per capita**
Post 2007	-.225***
	(.054)
Treatment: lagged ln mining concessions in 2005	.304***
	(.101)
Post 2007 x Treatment	.292***
	(.099)
Observations	8353
R-squared	.046
DTO presence control	YES
Fixed Effects	YES

Standard errors are in parentheses; ***coefficients are standardized***

**** p<.01, ** p<.05, * p<.1*

Of note, I tested this effect only using the data on kilos of marijuana seized as the outcome variable and did not include a regression using detentions as an outcome. This is due to the lack of sufficient variation in the data on detentions: of the roughly 4000 municipality-years with detentions, only 8 occurred prior to the event year. In column 1 of Table 4, I find a positive differential effect of Plan Mérida on the kilos of marijuana seized in treated municipalities. Interacting the event year of 2007 with the treatment, we find that municipalities awarded mining concessions in 2005 experienced .29 standard deviations more kilos of marijuana seized than non-treated municipalities. This finding is statistically significant to the 1% level. However, parallel trends do not hold prior to the event year and this effect seems to occur only in 2007 as the difference between treated and non-treated closes after this year.

Table 5: Interacting mining concessions with years

Natural log of kilos of marijuana seized per capita	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Concession x 2006	.473	.081	5.84	0	.314	.632	***
Concession x 2007	.705	.081	8.69	0	.546	.865	***
Concession x 2008	.6	.078	7.66	0	.446	.753	***
Concession x 2009	.586	.076	7.68	0	.437	.736	***
Concession x 2010	.558	.071	7.86	0	.419	.698	***
Concession x 2011	.59	.072	8.21	0	.449	.731	***
Concession x 2012	.557	.068	8.24	0	.425	.69	***

Mean dependent var	0.026	SD dependent var	0.993
R-squared	0.251	Number of obs	8353.000
F-test	56.952	Prob > F	0.000
Akaike crit. (AIC)	15521.057	Bayesian crit. (BIC)	15689.786

**** p<.01, ** p<.05, * p<.1*

The coefficient for the interaction of the mining concessions treatment with 2007 is .705. This effect decreases to .600 the following year and then plateaus at between .557 and .590 after this. All of these findings are significant at the 1% level, but we do not have enough data prior to the event year to satisfy the parallel trends assumption. If it were satisfied, we might posit that Plan Mérida augments the allocation of military resources to facilitate mineral exploitation.

XI. Conclusion

In light of the numerous and ongoing qualitative data reporting the use of state security forces against local populations in order to advance private mineral exploitation, it is imperative that we begin to apply empirical analyses to this phenomenon. Empirical analyses of state capacity, conflict, and private interests in Latin America have informed the theory and design underlying my

analysis. However, none have sought to empirically demonstrate the effect of Mexico's drug war and U.S. military assistance on the use of state security forces to displace and dispossess local communities. Employing the Two-Way Fixed-Effect model, I find significant and novel evidence that private mineral exploitation affects the allocation of military resources. Anti-narcotic activity is an imperfect measure of military and federal police allocation and thus I demonstrate that differences in anti-narcotic activity observed in municipalities with mining concessions are not driven by narcotic activity. The absence of differential DTO presence in these municipalities strongly indicates that greater military presence explains the difference in our outcome variables and thus measures of anti-narcotic activity do proxy military allocation.

This finding is nuanced by the opposing effects of the awarding of mining concessions on military and federal police allocation. The negative relationship between mining concessions and the detentions variable reported by the federal police demonstrates that federal police are systematically allocated away from municipalities with mining concessions. This effect could be theoretically robust in that the state and private actors prefer to employ military actors to suppress local opposition groups and federal police are reallocated to avoid redundancy or complication; similarly, they may be seen as less effective or less discrete. That said, while this effect is significant, it is not significant to the same degree as the relationship between marijuana seizures and mining concessions. Marijuana seizures are the best indication of anti-narcotic activities and detentions may simply produce a noisier effect. This limitation should be addressed in future empirical analyses that continue to examine whether outcome variables such as detentions capture systematic uses of state violence. More importantly, further modes of identifying DTO presence must be developed to increase the validity of this, and future, analyses.

The Difference-in-Difference design builds upon the findings of the TWFE model and seeks to identify a potential effect of Plan Mérida as an event. I find that there is a positive and

significant effect of the plan on marijuana seizures in municipalities with mining concessions. While this seems to confirm my hypothesis, the actual significance of this finding is not completely clear. The effect of Plan Mérida is noticeable in 2007 and then subsides in subsequent years indicating that the initial increase in state capacity had an effect that diminished over time. This effect is muddied by the limited data prior to 2007 regarding anti-narcotic activities. To some extent, the presence of a large effect in 2007, the year in which talks were initiated, demonstrates that the drug war and Plan Mérida are closely tied. The increase in the allocation of military resources to aid mineral exploitation was likely a product of the *expectation* of U.S. military aid but, because it anticipates the signing of the initiative, could be due to Mexico's increase in its own defense budget. This of course still confirms that U.S. military aid had at least an indirect effect on violence against local populations in Mexico. The lack of data for these variables prior to 2007 means we cannot currently satisfy the parallel trends assumption necessary for the Difference-in-Difference design; this limitation can feasibly be addressed with new data that would help to further control for differences between treated and control groups. This empirical analysis is an important foundation for continued research and, in particular, begs the analysis of the potential preference for MNCs over domestic firms with regard to mineral exploitation. Mining concessions are an excellent treatment and very difficult to conceal but I believe this research design can and should be applied to other sectors. This research will be essential in providing the empirical evidence necessary to demonstrate that the extensive qualitative data on this subject truly reflect the systemic efforts to displace and dispossess local communities within the context of U.S. intervention.

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Appendix

Table 6: TWFE with logarithmic transformation

	(1)	(2)
	Marijuana	Detentions
Mining concessions	.091***	-.058*
	(.023)	(.03)
Observations	8353	4339
R-squared	.225	.119
DTO presence control	YES	YES
Fixed Effects	YES	YES

Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

The findings from our second regression demonstrate that the results of the first regression are robust to using a logarithmic transformation. The logarithmic transformation largely mirrors the inverse hyperbolic sine transformation. We find that again mining concessions induce a 9.1% increase in kilos of marijuana seized in the following year. This is still significant at a [1% confidence range/level?] though the R-squared has fallen slightly to 22.5%. The coefficient for detentions has actually increased in absolute value to a 5.8% decrease in the following year with a slightly greater R-squared of 11.9%. We can conclude that these transformations do not alter the relationship greatly as they are highly consistent.

Table 7: Additional anti-narcotic activity outcome variables

	(1) Cocaine	(2) Meth	(3) Heroin	(4) Small arms	(5) Long arms	(6) Laboratories
Mining concessions	-.001	.074*	.012	-.036	-.04	.023
	(.019)	(.04)	(.01)	(.043)	(.048)	(.016)
Observations	8353	8353	8353	8353	8353	8353
R-squared	.015	.025	.005	.137	.202	.02
DTO presence control	YES	YES	YES	YES	YES	YES
Municipality and year fixed effects	YES	YES	YES	YES	YES	YES

Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

Coefficient Plot: Interaction with years