Fractured Underworld: The Logic of Fragmentation in Organized Crime

Marco Alcocer*† Lucía Hesles Toscana‡

August 20, 2025

Abstract

Rebel fragmentation is a well-studied driver of violence, yet the fragmentation of criminal organizations (COs)—whose wars are now deadlier than many civil wars—remains largely overlooked. This article develops a theory of criminal fragmentation, arguing that potential defectors strategically weigh two core concerns: economic viability and the likelihood of surviving retaliation from the CO they betray. These considerations shape who fragments, where, and when. Leveraging an original dataset of Mexico's major drug cartels and all their fragments from 2000 to 2018, we find that defections occur across ranks due to leadership turnover or internal disputes. Larger fragments sometimes operate near their originating cartel's stronghold, while smaller ones only fragment in distant areas to withstand retaliation. Fragments operating near their originating cartel form military alliances with other cartels to survive retaliation. We also document key characteristics differentiating fragments from their originating cartels that suggest they may be more violent and predatory.

*We thank Hannah Baron, David Smilde, Guillermo Trejo, David Skarbek, Steve Levitsky, Alisha Holland, Jessica Zarkin, Kaitlyn Chriswell, and participants of the speaker series at The Center for Inter-American Policy and Research (CIPR) at Tulane University, the 2024 Studies of Organized Crime and Politics MPSA Mini-Conference, and the Latin American Discussion Group (LADG) at Harvard University. We also thank Patrick Signoret for inspiring the data collection process, and the research assistance of Karina Velázquez Villatoro and Isaac Del Río Castro.

†Academy Scholar, The Harvard Academy for International and Area Studies

‡ITAM

1 Introduction

Rebel and insurgent groups often fragment and give rise to new splinter organizations (Lidow 2016; Woldemariam 2018). This fragmentation is a key driver of violence and a major challenge to conflict termination, with scholars finding that it heightens the probability of conflict onset, increases violence against the state, rivals, and civilians, intensifies and prolongs conflict dynamics, complicates peace settlements, and jeopardizes post-conflict peace (e.g. Arı and Gizelis 2020; Cunningham, Bakke and Seymour 2012; Perkoski 2019; Rudloff and Findley 2016; Faulkner and Doctor 2021). Like rebel and insurgent groups, criminal organizations (COs) also often fragment—what we call *criminal fragmentation*—and like rebel and insurgent fragmentation, criminal fragmentation has been proposed as a key driver of inter- and intra-CO conflicts and a key mechanism through which government decapitation strategies increase violence (Ríos 2013; Phillips 2015; Calderón et al. 2015; Trejo and Ley 2016; Atuesta and Ponce 2017; Atuesta and Pérez-Dávila 2018; Contreras Velasco 2023; Esberg 2025). Yet, while the violent consequences of leadership decapitation and CO conflicts have received considerable attention, criminal fragmentation itself—its drivers and patterns—remains largely unexplored. Given the proliferation of COs throughout Latin America and elsewhere (CITE) and that wars between COs are now often deadlier than civil wars (CITE), we claim that understanding criminal fragmentation is imperative.

This project seeks to fill this clear gap in the literature by opening the "black box" of fragmentation and asking: What prompts fragmentation and what role do government policies play? What is the underlying logic of criminal fragmentation? That is, who within these organizations leads the defection and what factors shape their decision to fragment? Lastly, how do these factors shape the subsequent patterns of fragmentation—where fragments operate, what markets they are involved in, and whether they form alliances with other COs?

The article first reviews existing theories of rebel and firm fragmentation and shows why they fail to explain criminal fragmentation. We then advance a new theoretical framework

delineating the logic of criminal fragmentation. Our framework highlights how moments of uncertainty prompt potential defectors to weigh two concerns: profitability and survival against retaliation. Four characteristics shape these calculations—relative power vis-à-vis the parent CO, the markets they control, their geographic location, and alliances with other COs. Together, these factors jointly determine who fragments, where they operate, and whether they create criminal alliances. Specifically, we expect smaller fragments to be involved in more localized illicit activities seeing that they cannot compete with their originating CO and to operate further from their originating CO to safeguard themselves from retaliation. Furthermore, fragments operating near the CO the defect from are likely to form alliances with other COs to reduce the costs of retaliation.

A major contribution of this article is data. Systematic data on the genealogy of COs and their characteristics simply does not exist, hence the limited research on criminal fragmentation. We overcome this limitation by creating an original dataset on the nine major drug cartels operating in Mexico at the turn of the century and all their fragments between January 2000 and December 2018 by compiling all existing lists of cartels and investigating each one through extensive qualitative research. We find a substantial overestimation in the number of cartels in existing lists and discuss measurement issues. Through this process, we also collect key information for each cartel, including: date of fragmentation, reason for fragmenting, position of the individual leading defection, geographic strongholds, main illicit activities, formation of alliances when fragmenting, and leaders across time, among other variables.

The data reveals four types of fragmentation depending on who leads defection: (1) high-level members, (2) mid-level members, (3) low-level members, and (4) cartel dissolution where high-level leadership is dissolved and mid- and/or low-level members form their own cartel(s) without a larger CO existing. Countering the prominent explanation in the literature, we find that only 15% of leadership turnovers—most due to leadership decapitation—prompt fragmentation, suggesting cartels are more resilient than recognized.

We find that only 60% of fragmentations were prompted by leadership turnover, with the remaining 40% resulted from internal disputes.

Examining profits, we find that all fragments controlled specific markets *at the moment of fragmentation*, countering narratives that they sought markets only *after* defecting. Larger fragments often compete directly with their parent CO, while smaller ones specialize in subsets or alternative activities, clearly indicating their inability to directly compete against their parent cartel. This pattern suggests that the diversification of drug cartels after 2006 (Alcocer 2022; Herrera and Martinez-Alvarez 2022) facilitated fragmentation. Turning to survival, smaller fragments have strongholds farther from their parent cartel to protect themselves from retaliation, indicating self-selection based on geography. This suggests that the geographic expansion of drug cartels after 2006 (Alcocer 2022) facilitated fragmentation. Finally, only fragments operating nearby their parent cartel's stronghold form military alliances, highlighting that contesting strongholds and surviving retaliation are key drivers of alliance formation during fragmentation.

We highlight three additional findings. First, the large historical drug cartels are least prone to fragmentation. Second, although government kingpin strategies are often deemed failures, we identify 17 cartels that stopped operating as a direct result of leadership decapitation. Third, fragmentation has fueled the rise of militarized criminal leaders and cartels specializing in predatory crimes. Finally, we present case studies of criminal fragmentation in other countries to illustrate the broader applicability of our theory.

This article advances the study of criminal fragmentation in three key ways. First, it presents a novel theoretical framework to understand the fragmentation of COs, a topic that remains largely understudied despite its prevalence and importance. Second, it introduces a new dataset on COs that identifies the fragmentation of Mexico's main drug cartels and all their fragments. To the best of our knowledge, this is the first data of its kind. Third, the results provide new insights and patterns that, due to data limitations, had not been previously uncovered or systematically analyzed. These contributions have important im-

plications for existing and future research. First, most studies proxy fragmentation with leadership decapitation or treat its violent aftermath as evidence of fragmentation. Yet we find that only 15% of decapitations in Mexico lead to fragmentation, underscoring the need to reinterpret past findings and refine future work. Second, we offer a much improved measure on the number of *independent* cartels and clarify that most "named" cartels in current lists are internal factions of larger cartels, which underscores the need to reinterpret past findings and refine future work.

More broadly, our study extends insights from work on rebel and firm fragmentation to criminal organizations, non-state actors that are economically motivated, pursue profits rather than state power, often rely on coercion, and that remain relatively overlooked in political science. Yet, understanding when and how these organizations fragment is essential for understanding and analyzing patterns of criminal violence, local governance and criminal market activities, and the reconfiguration of state–crime relations.

2 Rebel and Firm Fragmentation

COs are generally seen as violent non-state actors that are sometimes at odds with the state, which is why they are sometimes compared to rebel groups. COs are also understood as economically motivated non-state actors, which is why they are sometimes compared to firms, albeit operating illegally and in illicit markets or in legal markets through illicit means. Given these comparisons, an existing literature on rebel and firm fragmentation, and the paucity of research on criminal fragmentation, it would be reasonable to believe rebel and firm fragmentation can explain criminal fragmentation. Yet, while COs share certain characteristics with rebel groups and firms, they also differ in key respects. This section discusses the literature on rebel and firm fragmentation to present key explanations, highlight specific insights that may be applicable to criminal fragmentation, and underscore how and why these explanations fall short in explaining criminal fragmentation.

Rebel and insurgent fragmentation, also often termed factionalization, splintering, schism, or breakaway, is the process of rebel groups splintering into separate, independent groups. Another related but separate definition of fragmentation that is common in the conflict literature is the total number of groups in a conflict, the break of alliances between these, and the dispersion of relative power among them (see Bakke, Cunningham and Seymour 2012). We focus on the process of splintering. Survival has been articulated as the first order concern for fragments, particularly given retaliation from the parent group and attacks by rivals (e.g. Woldemariam 2018; Robinson and Malone 2024), which we argue is also a central concern in criminal fragments. As organizations with ideological or political aims, rebel groups fragment for political disagreements that are triggered by internal disputes (Mosinger 2019), external sponsors (Lidow 2016; Tamm 2016), governments exploiting internal divisions (Kenny 2010), and peace processes (Kenny 2010; Wyer 2024). While COs do often face internal disputes, they do not receive support from external patrons, participate in peace processes, or have specific factions receive legitimacy from governments to weaken other factions.[1] This means the underlying causes of rebel fragmentation differ from those of criminal fragmentation.

Despite different underlying causes, both rebel groups and COs rely on coercion and worry about post-defection survival, meaning certain considerations overlap. Importantly, some research assumes rebel splintering is only undertaken by leaders (e.g. Asal, Brown and Dalton 2012; Mosinger 2019), others that splinters are always smaller than the parent organization (e.g. Robinson and Malone 2024; Wyer 2024), and a few that the size of splinters can differ (Kenny 2010; Mahoney 2020), with Mahoney (2020) arguing that larger splinters fare better post-fragmentation. We borrow from these insights to analyze different sized fragments without assuming who fragments or fragment sizes ex ante.[2]

Beyond who fragments, two key factors—access to resources and geography—are noted

[1]Government actors often make clandestine pacts with certain COs that can strengthen or weaken factions within a CO. However, these are not done with the aim of fragmenting an organization to weaken a faction opposed to peace processes as highlighted by Kenny (2010).

[2]Other factors analyzed in the civil conflict literature are organizational structure (Robinson and Malone 2024; Staniland 2018; Joo and Mukherjee 2021) and leadership characteristics (Doctor 2020). While not the scope of this article, future research could look at whether these factors impact criminal fragmentation.

in existing studies, which we argue speak to criminal fragmentation. Some argue that access to lootable resources (Lidow 2016) and decentralized funding (Kenny 2010; Wyer 2024) increase the probability of rebel groups splintering. Geographically, Gates (2002) argues that splinters in ethnic conflicts* need to operate further from the parent organization to have large enough populations under them to recruitment from, while Woldemariam (2018) argues that fragmentation risks increase when rebel groups win or lose territory because it changes the perceptions of survival. Most relevant is Wyer (2024), whose study of the FARC in Colombia argues that during peace processes, mid- and low-level rebel commanders are most likely to fragment in regions key for drug trafficking. While COs do not participate in peace processes, we extend the arguments that geography and access to markets are central for fragmentation.

We use the term firm fragmentation to describe a the process of a firm becoming multiple separate legal entities. Scholarship notes three main pathways to firm fragmentation: i) a decision by the firm to remove certain subunits through divestment, devolvement, split-off, vertical disintegration, or some related strategy, ii) firm employees defecting and creating a competing firm, and iii) governments breaking up a firm. The first does not apply, as COs cannot adopt strategies of legally selling off a subsidiary or, for example, giving shareholders shares of a new spinoff.

In the second case, fragmentation is a strategic financial decision made by the employees that resign to establish a new firm. This is often called a spinoff or employee entrepreneurship, and can result from valuable discoveries that employees want to exploit independently, employees learning how to compete in an industry or acquiring knowledge from their employers and wanting to exploit it by operating independently, strategic leadership disagreements, poor management, or employee perceptions of greater future financial rewards from operating independently (e.g. Chemmanur and Yan 1983; Agarwal et al. 2004; Campbell et al. 2012; Klepper and Sleeper 2005; Klepper and Thompson 2010; Ganco 2013; Gambardella, Ganco and Honoré 2015; Shekhar 2018). Research suggests that some industries are more

susceptible to spinoffs, particularly industries with emerging technologies, strong niches, or conditions that make knowledge and opportunities more easily transferable.

Regardless of the reason, employees defecting can legally set up their own firm and compete with their former firm under state protections, meaning that splinter firms can focus on assuring financial survival and maximizing profitability. Additionally, the geographic concentration of an industry is thought to increase its vulnerability to spinoffs, as dense infrastructure and localized resources lower entry barriers for departing employees (see Chemmanur and Yan 1983; Klepper and Sleeper 2005; Klepper 2007). However, COs operate extralegally and thus potential defectors do not count on legal mechanisms to leave their employers and peacefully set up a rival firm. In the criminal underworld, parent COs can intimidate or simply kill potential and actual defecting members to prevent them from setting up competing firms, making criminal fragmentation much more complex and deadly: CO defectors must worry about both financial *and* physical survival. This means that firm spinoffs may be able to operate in the same place as their parent firm, but operating next to a rival puts criminal fragments in physical danger.

Lastly, governments can break firms up into multiple separate entities, most notably through competition law, which promotes fair competition in the marketplace by preventing monopolies. Governments can successfully fragment firms because these are legal entities that operate in legal markets. Governments, however, are not seeking to assure that COs can compete fairly in illicit markets by preventing criminal monopolies. Still, even if governments were seeking to fragment a CO, the mechanisms differ fundamentally given that these are illegal organizations that operate in illicit markets, and thus governments cannot regulate these other than *indirectly* by targeting members and illicit activities. Nevertheless, the point that governments can play an important role in fragmentation can and has been extended to criminal fragmentation, albeit through different mechanisms (e.g., arresting or killing CO leaders).

3 A Theory of Criminal Fragmentation

We understand COs are structured associations that engage in illicit activities for financial gain. As illegal actors, COs rely on informal systems of rules and mechanisms to control and regulate member behavior, which can be referred to as "internal criminal governance" (Lessing 2021). Internal criminal governance is akin to corporate governance, albeit without being able to rely on legitimate, state-based legal institutions to enforce contracts, adjudicate disputes, or protect property rights. Despite the absence of third-party enforcement, a growing body of literature finds that COs are very effective at creating a wide arrange of internal governance mechanisms to promote organizational cohesion (Lessing and Denyer Willis 2019; Lessing 2021; Pereda 2021, 2024; Piano 2017; Leeson and Skarbek 2010; Skarbek 2010; Skarbek and Wang 2015; Skarbek 2012, 2014, 2024), including specific "mechanisms to promote loyalty and discourage defection" (Kostelnik and Skarbek 2013, 101), which make them highly resilient to internal and external threats (Ayling 2009; Catanese, De Meo and Fiumara 2016; Agreste et al. 2016; Cavallaro et al. 2020; Berlusconi 2022; Pereda and Décary-Hetu 2024).

Scholars note that underlying many of these mechanisms is the threat of violence, with violators being punished harshly. This is perhaps especially true for defectors, as COs face deep losses if members fragment, for example, losing members, assets, territories, and profits. Thus, COs offer potential defectors protection by staying and violent punishment, if not death, for defecting. Moreover, using visible violence against defectors allows COs to credibly threaten other potential defectors and dissuade them from fragmenting (Kostelnik and Skarbek 2013).

Yet, even in the face of lethal threat, CO members sometimes choose to fragment and leave their CO along with a group of followers to form their own independent CO. However, criminal fragmentation remains largely unexplored and undertheorized. To our knowledge, only four existing studies directly examine criminal fragmentation. First, Atuesta and Pérez-Dávila (2018) follow the alternative understanding of fragmentation—the number of groups

in a conflict and the alliances between them—to theorize that breakdowns of alliances (what they call fragmentation) can occur due to betrayals, diverging interests, succession struggles, and broken alliances. They then analyze how instances of cooperation and rivalry correlate with levels of violence in Mexico between 2007 and 2011. However, while related, we focus on the process of a CO splintering into multiple independent COs rather than the breakdown of alliances that forms a more "fragmented" CO landscape. Esberg (2025) does, however, present evidence that kingpin removals are associated with the emergence of new cartels in Mexico, but that increasing territorial value does not correlate with the emergence of new cartels.

Alternatively, looking at the transplantation of mafias (outposts created due to mafia members relocating), Varese (2020) notes that *separation* (a mafia outpost becoming fully independent, which we refer to as fragmentation) is rare and only possible when the outpost becomes larger and more powerful than the mafia it betrays to not fear retaliation, when the outpost disagrees with and rejects harsh impositions by the originating mafia, or when the outpost is expelled from the originating mafia. The author also argues that separation is more likely when the outpost successfully implements the same market activities as the parent mafia than when it is engaged in different activities such as buying and sell goods, which make them more dependent on the parent mafia. Relatedly, Catino (2014) argues that centralized mafias are less likely to experience fragmentation than decentralized mafias.

3.1 Potential Defectors and Moments of Uncertainty

Potential defectors, or those that may contemplate fragmenting, however, are likely certain individuals within COs. The literature tends to assume the those fragmenting are aspiring high-level leaders who break from their CO to lead their own organization. This follows Kostelnik and Skarbek (2013), who argue that as CO members are promoted, they face stronger incentives to defect since they gain more knowledge and responsibilities that they can exploit against their bosses. It also follows Varese (2020), who argues that fragmentation

is only possible when a faction becomes larger and more powerful than the CO they belong to. Indeed, CO leaders or high-ranking members can decide to fragment when disputes with other leaders fail to be resolved internally. However, following insights from rebel and firm fragmentation, we argue that high-ranking or very powerful members are not the only ones with incentives to fragment. Mid- and low-level members (e.g., regional or local bosses) that do not aspire to take over and cannot compete against the CO they belong to but do seek autonomy can also choose to fragment. This, in turn, has implications for the size of the fragment and its power relative to the CO it breaks from. We argue relative size is instrumental for the decision to fragment.

As profit-seeking economic actors, financial incentives likely play a central role in the underlying decision to fragment. However, other considerations, like power, social status, personal vendettas, among other motivations, may be present and also influence the decision to fragment. Still, under business as usual, there are likely few incentives to break the status quo and fragment, even if there are underlying internal disputes, given the internal criminal governance mechanisms that promote cohesion and discourage defection. Studies on the violent consequences of leadership decapitation emphasize that leadership removals can create power vacuums that allow potential defectors to fragment (Ríos 2013; Phillips 2015; Trejo and Ley 2016; Atuesta and Ponce 2017; Atuesta and Pérez-Dávila 2018; Contreras Velasco 2023). The emphasis on leadership decapitation policies is likely why the conventional wisdom in the literature, and especially in the Mexican case, is that the government's kingpin strategy is solely responsible for fragmentation.

However, anecdotal accounts from other countries suggest that leadership decapitation is neither necessary or sufficient for fragmentation. We instead contend that, more generally, shocks, moments of uncertainty, or instances of intense internal disputes likely create windows of opportunities that potential defectors can exploit to fragment. We further contend that these moments are most likely to lead to fragmentation when there are internal disagreements, and thus potential defectors, *and* the windows of opportunities temporarily disrupt

or weaken the internal criminal governance mechanisms designed to prevent defection.

3.2 The Strategic Logic of Fragmentation

To understand the dilemma potential defectors face when considering fragmenting and how it shapes fragmentation patterns, we assume that CO members are rational actors and argue that they care fundamentally about two first order concerns that shape their behavior: profits and survival. Potential defectors thus strategically consider two key questions: (1) Will they be economically viable if they fragment? (2) Will they survive if they fragment? How potential defectors answer these questions, we argue, shape fragmentation and its patterns. Furthermore, we argue that four characteristics of the potential defectors impact how they answer these questions and thus their decision to fragment: their relative power vis-à-vis their parent CO, the illicit markets they operate in, their geographic location vis-à-vis their parent CO, and alliances with other COs. These characteristics jointly shape who fragments, where, the markets they operate in after fragmenting, and their relations to other COs. This subsection outlines the logic of these choices and the observable implications. We present a decision-theoretic model in the Appendix that formalizes the theory to illustrate its logical consistency.

Profits: Potential defectors need to have access to a source of income *prior to* or *at the time of* defection that they will continue to have access to after fragmentation. As profit-maximizing economic actors, unless they are facing credible lethal threats, potential defectors have no incentives to defect if they are not at least as well off when fragmenting, which requires access to illicit markets. Moreover, COs require illicit profits to operate, so defectors need to secure their source(s) of income when defecting to establish their autonomous CO. Most importantly, potential defectors need to convince potential followers that they will be at least as well off financially if they follow the defector. Promises of future riches without the leader of the defectors having a secure revenue stream are unlikely to be credible, and thus potential followers will choose not to defect. Additionally, foreseeing that

the CO the defectors betray will most likely attack them and that criminal wars are very costly (financially and otherwise), defectors need to have a secure source of revenue to assure their survival. Delays in acquiring revenue streams could be fatal. This further implies that potential defectors need to already be operating in territories where they control lucrative illicit markets that provide them with financial resources. This contradicts accounts suggesting defectors first fragment, *then* seek other sources of revenue when they fail to compete in the markets that the larger COs dominate.

We further argue that the structure of illicit markets plays a central role in the patterns of fragmentation because they determine the financial viability of fragmenting. High-ranking defectors may be able to compete in illicit markets against their CO of origin upon fragmenting. Yet, depending on the illicit market, mid- and low-ranking defectors may not be able to compete with their CO of origin. For example, large drug trafficking organizations typically oversee drug production, transportation, and smuggling across borders, which mid- and low-ranking defectors may be unable to undertake or compete in. However, these defectors can either control more localized subsets of those activities (e.g., controlling drug production in a region) or engage in alternative illicit activities (e.g., extortion). For large fragments, our argument aligns with Varese (2020), who argues that fragmentation is most likely when the parent CO and the fragment operate in the same markets. For small fragments, however, our argument diverges: we expect small fragments to operate in narrower markets than the parent CO or in alternative markets.

Survival: Potential defectors know that if they defect there is a high probability that they will face retaliation by the CO they break from. Potential defectors will only fragment if they expect to survive and absorb the costs of retaliation. We argue that this is where the size of the fragment plays a central role. The relative strength of the fragment with respect to their parent CO determines the retaliation they can withstand. If a CO leader fragments and creates a new CO with relatively equal strength, they are better able to deal with retaliation, whereas a local boss that fragments and creates a new CO that is much weaker

and smaller than the parent CO will bear a much higher retaliation cost—perhaps even death. This is consistent with Varese (2020), who argues that defectors must accumulate enough wealth and influence to not fear retaliation from the CO they leave. Various factors likely influence a fragment's "strength," including the number of members, coercive capacity, degree of government protection, and financial strength. This means potential defectors need to secure sufficient power *before* or *at the moment of* fragmentation to assure that they can defend themselves from rivals as soon as they break away. Without this, it is highly unlikely that they choose to fragment.

We further argue that two factors impact the cost of retaliation a fragment can withstand: Geographic distance and alliances. First, we argue that geography impacts how COs can project power and thus shape the probability of survival of the fragment. Specifically, geography can hinder the originating CO's to retaliate against the defectors with full force. To make this argument, it is important to highlight a key dimension of the geographic presence of COs. In most cases, COs have a center of operations, or stronghold. This is typically where they have historically operated, where they have built the strongest ties with political, economic, and social actors, and thus where their leaders tend to live. However, COs also often operate in territories outside of their strongholds. Following the literature from civil and international conflict, we argue that geography is a key variable that can counterbalance relative power because projecting military power across geographic distance is difficult and costly. Therefore, for defectors that fragment, distance can make up for some organizational strength by reducing the strength with which a parent CO can retaliate against the defectors. This implies that smaller, less powerful defectors can fragment and survive if they operate far from their originating CO's stronghold *at the moment of fragmentation*. This argument contrasts accounts suggesting that fragments defect and *then* move as they seek other territories to operate (e.g. Esberg 2025). It also differs from Varese (2020) in two important ways. First, the author only looks at members in distant outposts, where we examine potential defectors both close and far from their parent CO's stronghold. Second, the author argues

that only outposts who become larger and more powerful than their CO of origin can defect, where we provide a more nuanced explanation for relative power and distance.

Second, while the literature has largely focused on wars between COs, they also frequently create alliances (Atuesta and Pérez-Dávila 2018; Alcocer 2023). We further argue that potential defectors can countervail an unbalanced power differential vis-à-vis the CO they defect from—to some degree—by strategically forming military alliances with other COs when they fragment. These alliances can take different forms, but most likely entail defectors receiving military support from a CO that is confronting or wants to confront the CO the defectors are betraying. This support can include money, weapons, logistics, soldiers, or related aid. More specifically, these alliances are likely most valuable when the fragment operates geographically close to the CO they fragment from since this is when the parent CO can retaliate with full force. This argument contrasts that of Atuesta and Pérez-Dávila (2018), who argue that alliances are "an altruistic measure" and that fragments "cannot survive without the creation of an alliance" (238-239). We see alliances stemming from fragmentation as instrumental and we do not claim alliances always form or are necessary for survival, but that they are strategically formed given geographic and relative power considerations.

3.3 Testable Implications

This theory yields some central predictions about patterns we should observe. The first set of predictions pertain to the defector and the timing of defection: Fragmentation (1) may be led by high-, mid-, and low-level CO members and (2) should occur during moments of uncertainty that potential defectors can exploit. The second set of predictions stem from the patterns we should observe when defectors fragment: (3) The smaller the fragments are relative to their CO of origin, the more likely it is that they are involved in more localized illicit activities than the larger COs they originate from, either by controlling a subset of their originating CO's activities or by engaging in different illicit markets than their originating

CO; (4) the smaller the fragments are relative to their CO of origin, the more likely they are to have strongholds which are far from the stronghold of their originating CO; and (5) the closer fragments operate relative to their CO of origin, the more likely they are to form military alliances with other COs to reduce the costs of retaliation.

4 Mexico's Criminal Landscape

To test the theory, the article turns to Mexico. Since the late 1980s, Mexico's criminal underworld was dominated by a handful of powerful COs, or cartels, that specialized in trafficking drugs to the United States and operated in regions key to the drug trade. Through the 1990s and early 2000s, these cartels began a series of deadly wars against each other. In response, the newly elected president Calderón declared war against drug trafficking in December of 2006. As part of a broader strategy to combat drug trafficking and drug cartels, the federal government adopted a strategy of leadership decapitation. Through this strategy, the government sought to weaken or dismantle powerful cartels. Instead, cartel fragmentation increased dramatically starting in 2010 and resulted in an ever increasing number of COs operating across the country. Not surprisingly, experts and scholars alike have attributed this fragmentation to the government policy of leadership decapitation (Ríos 2013; Phillips 2015; Trejo and Ley 2016; Atuesta and Ponce 2017; Atuesta and Pérez-Dávila 2018; Contreras Velasco 2023), which has become the conventional wisdom.

Beyond the policy of leadership decapitation, research has shown that the government crackdown had two other consequences which we believe created conditions conducive for fragmentation. First, the crackdown prompted cartels to diversify their activities beyond drug trafficking and enter other illicit markets such as extorting local businesses, drug dealing to local consumers, property theft, and stealing oil from pipelines, among others (Alcocer 2022; Herrera and Martinez-Alvarez 2022). Second, the crackdown pushed cartels to expand geographically to new territories as they entered new illicit markets (Alcocer 2022). Together,

diversification and expansion gave mid- and low-level members access to new markets that were more local in nature than drug trafficking (*the means*) in territories far from the cartel's strongholds (*the opportunity*).

4.1 Data on Criminal Fragmentation

As illegal organizations, COs operate in secrecy, making data collection particularly challenging. Not surprisingly, a central reason for a lack of research on criminal fragmentation is the dearth of high-quality systematic data. Data including information on each CO, such as their origin, leaders, strongholds, alliances, and activities does not exist. Simply identifying which organizations operate in Mexico is a major existing challenge. For example, Crisis Group report that between 2009 and 2019, 463 criminal groups operated in Mexico, which is more than double the number reported by reputable local media, *El Universal*, during the same period (Esberg 2021). The CIDE Drug Policy Program (PPD) identified 150 organizations operating in Mexico in 2020 (Atuesta and Pérez-Dávila 2021). The Armed Conflict Location & Event Data Project (ACLED) counted 20 "cartels" and 76 "gangs" between 2018 and 2019 (Raleigh, Kishi and Linke 2023). The Uppsala Conflict Data Program (UCDP) found 33 actors that could be classified as COs and 18 factions between 2004 and 2022 (Sundberg, Eck and Kreutz 2012).[3] Moreover, beyond names and location, these sources do not include any additional information on the COs they identify. Thus, if the simple task of counting COs proves to be a major contested challenge, undertaking more comprehensive analysis using CO characteristics is practically unfeasible.

To overcome this data limitation, we create a novel dataset of Mexico's main drug cartels and their fragmentation between January 2000 and December 2018 through extensive qualitative research. See Appendix for details. In short, we first identify Mexico's main drug cartels at the turn of the century (Cártel del Milenio, Cártel de Juárez, Cártel de Tijuana, Cártel de Sinaloa, Cártel del Golfo, Los Cuinis, Cártel de Oaxaca, Cártel de Colima, and

[3]Unlike other sources, UCDP does not state whether each actor they identify is a CO.

Cártel de Sonora),[4] and all cartels included in existing publicly available lists, and then systematically research each one to identify which operated as *independent* COs during our time period and collected key information on each independent CO. We define an independent CO as an organization that operates autonomously without answering to another CO, which entails them having their own leadership, structures, and illicit activities. We identify but do not track cells, factions, or armed wings that operate for or under a larger CO. Thus, even when there are internal disputes between factions of a CO, we continue to consider them as one group unless there is evidence of a definitive and permanent split.

Rather than the hundreds of COs other sources claim to operate in Mexico, we find that the country's nine main drug cartels gave rise to 54 fragments between January 2000 and December 2018.[5] Figure 1 visualizes the chronology fragmentation of Mexico's main drug cartels (see Appendix for list of names and abbreviations). Our extensive qualitative research identified and resolved three key systematic issues present in existing lists that inflate the number of cartels in Mexico: (1) some cartels use or are referred to by different names and each is counted separately, (2) structures within cartels that have names but are not independent are counted as independent cartels, and (3) some cartels that ceased operating continue to be counted in later years.[6] If seeking to identify *independent* COs in Mexico, these issues have resulted in drastically inflated counts of cartels. These findings are consistent with Signoret et al. (2021), whose external data sources identified 290 cartels operating in Mexico between 2006 and 2016, but after conducting qualitative research found that many of those referred to the same cartel or to some faction within a cartel. After accounting for this, they concluded that only 38 unique autonomous cartels operated within this time period.

[4]While drug trafficking was dominated in the 1990s and early 2000s by these groups, it was very decentralized and many smaller networks existed (colloquially called "cartelitos"), for example, Los Numeros in Sonora, Los 30 in Michoacán, and Los Ardillos in Guerrero. There were also small but important COs that were not drug cartels, for example, Los Mazos, Cártel de Tepito, and Cártel de Tlahuac. These groups are excluded from the analysis.

[5]This excludes hyper-localized fragments that we are unable to identify or observe and measure.

[6]See Appendix for details and examples of these issues.

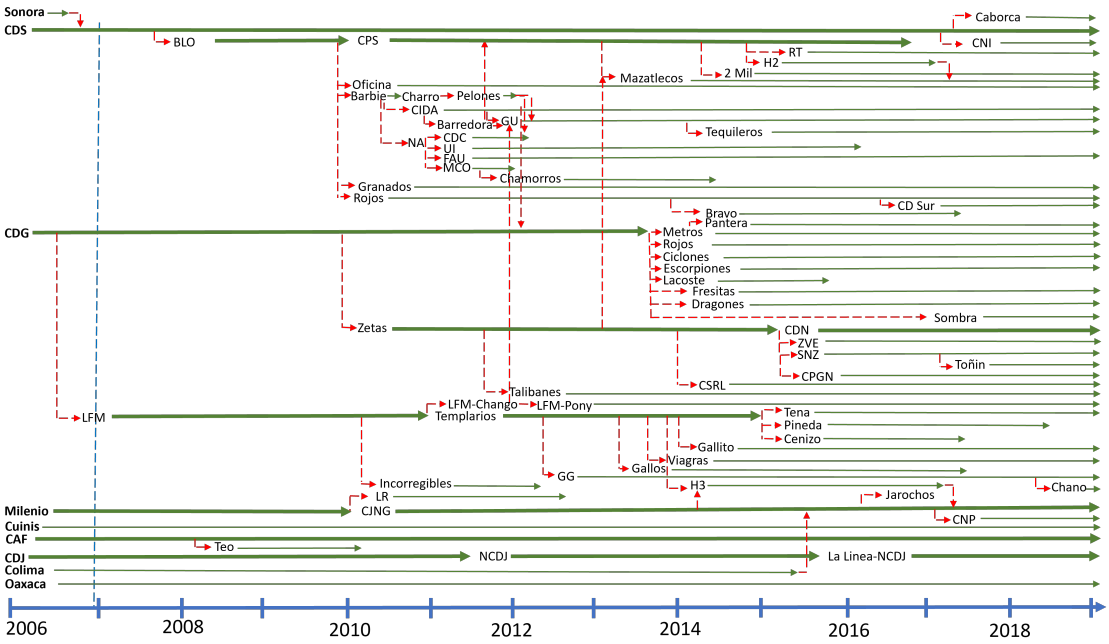

Figure 1: Temporal fragmentation of Mexico's main drug cartels between 2006 and 2018. Initials correspond to individual cartels. Solid green arrows represent years of operation. Dotted red arrows represent fragmentation. Vertical dotted line represents the beginning of the government war against drug trafficking. Original data by authors.

We create brief substantive descriptions of each fragmentation including information on the defector, reason for defecting, and geographic presence and main illicit activities vis-à-vis the originating cartel and include these in the Appendix.

4.2 Measuring Defectors and Drivers of Fragmentation

Using our qualitative data, we measure the key factors from the theoretical framework. First, to identify the defectors, we collect information on the individual(s) leading each fragment. While Mexican COs vary in structure and how hierarchical and centralized they are, they generally include various levels of leadership and operational roles. We consider three types of defectors, high-, medium-, and low-ranking defectors. We classify individuals leading defection as high-ranking defectors if they are part of the central decision-making structure of the CO they fragment from, including leaders and those immediately around them, and leaders of powerful armed wings (*brazos armados*). We define mid-ranking defectors as those

that hold intermediate positions within their COs, which we measure as regional leaders (*jefes regionales*). Finally, low-ranking defectors operate under regional leaders, and include local leaders (*jefes de plaza*) and leaders of smaller enforcement units (*jefe de sicarios*).

To measure the relative strength or power of a fragment vis-à-vis its CO of origin, we would ideally observe various aspects of each CO, for example, the number of members, economic resources, coercive capacity, and degree of protection from the state, among others. However, this information is neither observable nor measurable. Instead, we use the rank of the individual defecting within the CO they defect from to approximate their relative size. Our categorization therefore includes three categories: (1) "Balanced" when a high-ranking member leads defection, (2) "Moderately uneven" when a mid-ranking member leads defection, and (3) "Significantly uneven" when a low-ranking member leads defection. While this measure is imperfect, we believe it stands on reasonable assumptions and is the best proxy for relative size given data collection challenges.

To investigate the moment of fragmentation, we collect data on leadership turnover and factors prompting fragmentation. Because the literature emphasizes the role of leadership turnover in fragmentation, especially those caused by government leadership decapitation policies, we create a list of all leaders across time for each cartel, along with the reason there was leadership turnover. Alternatively, we also collect information on the factors that prompted each fragmentation. We note that determining the precise motivations for each individual to fragment is difficult given that these are private decisions from individuals operating in the underworld. Rather than speculating *why* individuals leading defection decided to fragment, which is unfeasible for most fragments, we focus on identifying the factor that prompted fragmentation. Thus, for each instance of fragmentation, we collect information on the stated circumstance that precipitated fragmentation.

4.3 Measuring Fragmentation Patterns

To investigate the implications of the strategic logic underlying fragmentation, or the patterns of fragmentation, we collect data on the key factors emphasized by the theory: illicit activities, geographic location of strongholds, and military alliances.

First, to measure which activities fragments were involved relative to their parent CO, we collect information on the *main* activities[7] of each cartel at the time of fragmentation. Most activities are self-contained, but we break down drug trafficking to its components given that it encompasses various activities. Specifically, for cartels involved in drug trafficking, we identify whether they were involved in drug production, drug transportation, drug smuggling across the US border, or all of them. We consider these specific activities as subsets of drug trafficking. We also include drug dealing, or selling small amounts to local consumers, as a subset of drug trafficking. We then create three categories to measure the activities each fragment is involved in relative to the main activities of the CO they fragment from: (1) fragments are involved in the same activities, (2) fragments are involved in a subset of the activities, and (3) fragments are involved in different activities. We illustrate the second category through this example: if a CO that specializes in drug trafficking sees defectors fragment, and this fragment specializes in drug production, we consider this a subset of the activities of the CO of origin.

To test whether geography shapes fragmentation, we identify the strongholds of each cartel at the moment of fragmentation. For larger COs this can entail an entire state, while for smaller COs this can be a region within a state, a few municipalities, or even a single city. We underscore that this measure should not be taken as a definite measure of exact boundaries, but rough geographic boundaries. From this information, we create a measure with four values to estimate geographic distance between the parent CO and its fragment, going from near to faraway: (1) same state and strongholds overlap, (2) same state but

[7] Mexican cartels have diversified and are involved in a host of activities. Identifying them all is challenging, but most specialize in a few activities, which we identify in our data collection.

strongholds do not overlap, (3) strongholds are in contiguous states, and (4) strongholds are in different states that are not contiguous.

Finally, to test whether defectors strategically form alliances that allow them to fragment, we identify whether each fragment created an alliance at the time of fragmentation for the explicit purpose of fighting the CO they fragment from. Accordingly, this measure excludes pre-existing alliances, alliances formed after fragmenting that are not directly related to their defection, and alliances formed for reasons other than fighting the CO they defect from.

5 Research Design and Results

To test the theoretical predictions, we adopt the LNQA method (Goertz and Haggard 2023), which is designed to test a theory by using data on *all* relevant cases. This approach helps to establish regularities rather than average treatment effects. In LNQA, the strength of the theory is "the percentage of cases conforming with the causal claim" (1221). Given that we collect data on all relevant cases, LNQA provides an appropriate guideline for us to establish regularities and examining the degree to which observed patterns conform with the theoretical predictions.

First, we examine the set of predictions pertaining to who leads fragmentation and when. We follow what Goertz and Haggard (2023) call "Y generalizations," where units where the outcome is present, $Y = 1$, are selected and investigated to identify the factors leading to Y. In our case, we analyze cases where the outcome—fragmentation—is present to examine who leads fragmentation and why.

We then turn to the second set of predictions about the patterns we should observe when defectors fragment. Using what Goertz and Haggard (2023) call "X generalizations," where a cause, $X = 1$, is postulated to be followed by an outcome, test whether a cause—fragmentation—is followed by an outcome—control of specific illicit activities, location of strongholds, and military alliances—depending on who fragments.

5.1 Types and Drivers of Fragmentation

We first examine who fragments and when. Generally speaking, we find four types of fragmentation. Drawing from the discussion on the organizational structure of Mexican drug cartels by Trejo and Ley (2020, 134-137), Figure 2 shows stylized examples of the four types of fragmentation we observe depending on who leads fragmentation—high-, mid-, or low-level members. We note that cartels vary in internal structure, with Figure 2 overrepresenting how structured and hierarchical they are. Nevertheless, it provides an analytically useful model to understand different types of fragmentation.

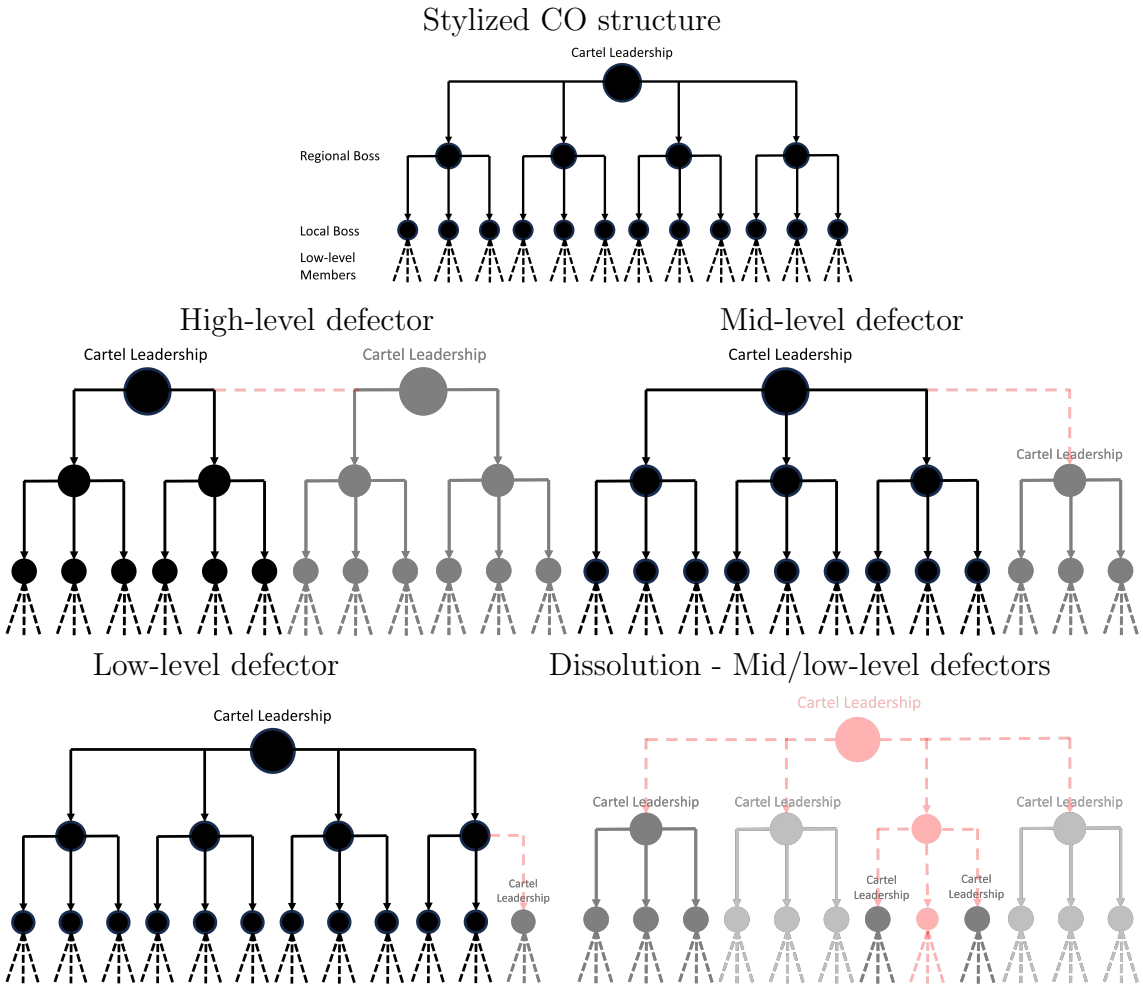

Figure 2: Stylized CO structure and types of fragmentation by leader of defection. Black structures denote CO of origin, red dotted line denote fragmentation, red nodes denote leadership vacuum, grey structures denote fragmenting COs.

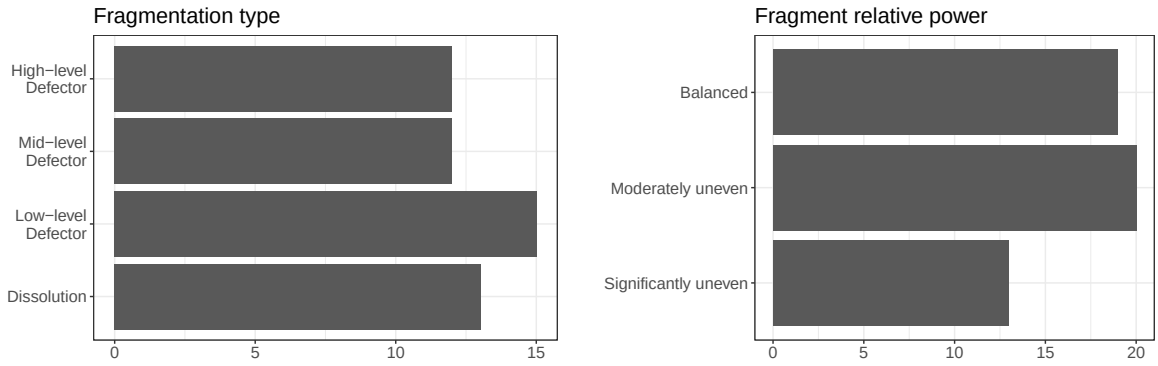

Figure 3: Number of fragments by type of fragmentation (left) and relative power of fragment vis-à-vis CO of origin or other fragments under dissolution (right).

Figure 3 shows the distribution of fragmentation types categorized by their relative size vis-à-vis their CO of origin.[8] Results show an important pattern: only about 25% of defections are led by high-level members, meaning that fragmentation is primarily driven by mid- and low-level leaders. Moreover, when then categorizing fragmentation types by the relative size vis-à-vis their CO of origin or other fragments under dissolution, we see that only about 33% of fragments are of similar sizes than those who they compete with. This suggests most fragments need to seriously consider their survival given retaliation from their originating CO.

Turning to the moment of fragmentation, we first examine whether leadership decapitation explains fragmentation as is assumed in existing literature. Figure 4 shows the number of leadership turnovers by reason for turnover and whether it prompted fragmentation. The results are surprising: Only 15% of leadership turnovers resulted in fragmentation. These results highlight that fragmentation following leadership turnover is actually very rare and that government policies are neither necessary nor sufficient to explain fragmentation. They also clearly demonstrate that existing research assuming that leadership removal leads to fragmentation or using leadership decapitation as proxies for fragmentation significantly

[8]This contrasts the approach of Atuesta and Pérez-Dávila (2018), who argue four types of fragmentation: "(i) loss of reputation; (ii) through heterogeneous factions; (iii) successions within the same organization; and, (iv) broken alliances" (247). However, these authors consider the breakdown of alliances and coalitions as fragmentation.

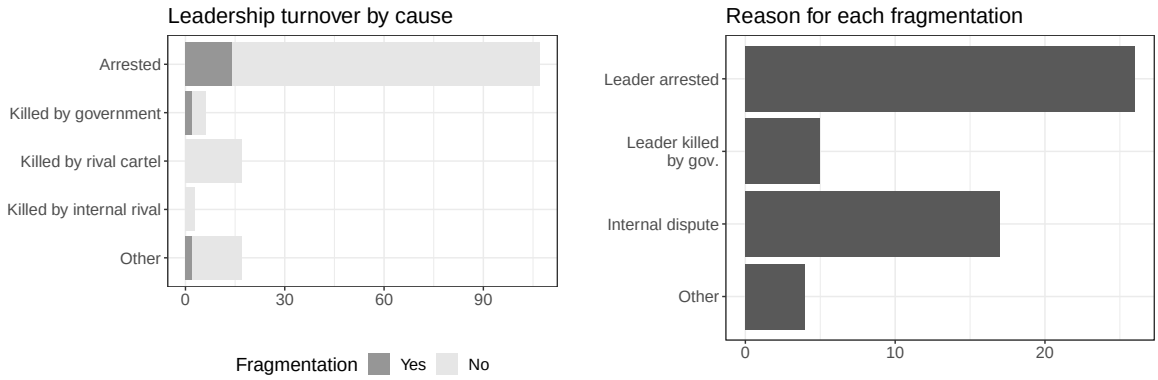

Figure 4: Leadership turnover and whether it resulted in fragmentation (left) and reasons for each fragmentation (right).

overestimate the effects of leadership removal on fragmentation. Moreover, our qualitative data shows that a significant number of arrests and killings of leaders by government forces claim that internal or external cartel rivals provided information to government agencies on the location of these leaders. If these allegations are true, they mean that many leadership decapitations are not always exogenous shocks but rather endogenous to inter and intra-cartel dynamics and cartel-government relations.

Beyond looking at leadership turnover, we analyze the moment of fragmentation for each cartel to identify the postulated reason behind each defection, with results shown in Figure 4. We find that 60% of fragmentations were prompted by government leadership decapitation policies. In sum, the conventional wisdom that government kingpin strategies explain fragmentation in Mexico is not fully supported by the evidence.

In cases where leadership decapitation strategies were not directly responsible for fragmentation, we find a wide variety of circumstances prompting fragmentation. We find that key internal betrayals are responsible for five instances of fragmentation, the death of a leader by natural causes prompted one, intense moments of internal disagreements resulted in five, internal disagreements that do not initially appear as severe resulted in seven though we have less information on these, financial disagreements seem to have motivated two, the killing of a defector's brother resulted in one, and opportunism due to intense government

pressure targeting CO leaders led to one.

5.2 Patterns of Fragmentation

Turning to the patterns of fragmentation, we examine the prediction that fragments will have control over illicit markets when they fragment, with smaller fragments controlling more localized markets, and fragments strategically using geography and alliances with other COs to assure survival given their relative size vis-à-vis their originating CO.

5.2.1 Securing Profits

One key implication of the theory is that fragments should control illicit markets *before or at the moment of* fragmentation, with smaller fragments being more likely to be involved in more localized illicit activities. Figure 5 shows the activities relative to their originating CO for different fragment types and distance from their originating CO. First, evidence clearly suggests that fragments do control specific illicit markets before or at the moment of fragmentation rather than seeking markets after fragmenting. Second, most fragments are involved in either a subset (47%) or different activities (17%) than their CO of origin, indicating that in most instances, defectors choose not to or are unable to directly compete against their originating CO over entire illicit markets. Third, we see a clear pattern wherein smaller fragments are more likely to be involved in subsets or different activities than their originating CO. These other activities tend to be more local than drug trafficking, with some of the most prevalent being drug dealing to local consumers, extortion of local businesses, oil theft, theft, and kidnapping for ransom. These results highlight two key aspects of illicit markets in Mexico: (1) the extensiveness of drug trafficking allows defectors, particularly smaller ones, to fragment when involved in a subset of the larger market, and (2) large drug cartels diversifying their activities during the 2000s facilitated fragmentation by giving mid- and low-level potential defectors access to alternative local illicit activities they could exploit to fragment.

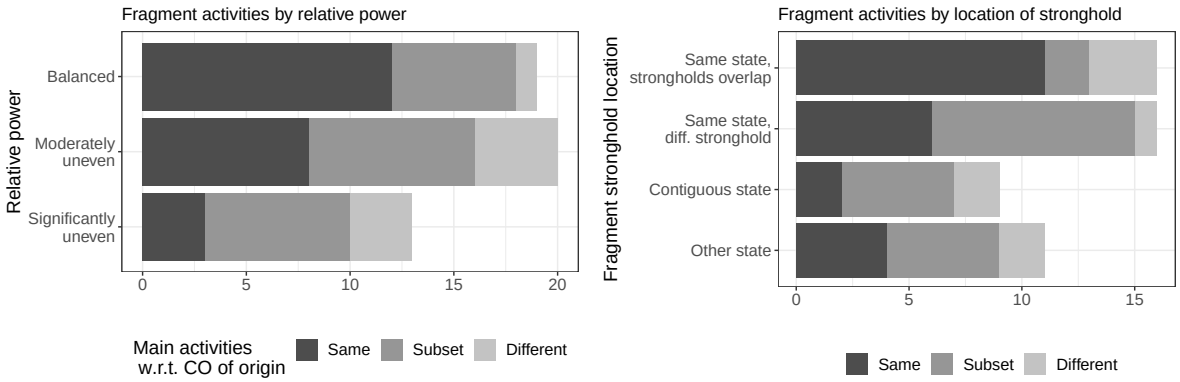

Figure 5: Main activities of fragments relative to CO of origin at moment of fragmentation by balance of power (left) and location of stronghold (right).

Additionally, we find that most fragments sharing strongholds with their CO of origin are involved in the same activities. Alternatively, engaging in a subset of the originating CO's illicit markets is most likely when fragments do not share strongholds. Relatedly, with one exception, all fragments involved in the same activities and operating in the same state as their originating CO are either large or medium fragments, showing that larger fragments, not smaller ones, tend to compete with their CO of origin. Lastly, most small fragments specialize in a subset of or different illicit activities than the originating CO.

5.2.2 Assuring Survival

A second key implication of the theory is that survival is central, with potential defectors being more likely to fragment when they operate further from their originating CO, particularly smaller fragments, and forming military alliances, particularly when they operate near the CO they fragment from.

Figure 6 shows the geographic location of fragment strongholds relative to their CO of origin by their relative power. The pattern is clear: the smaller the fragments, the further their strongholds are relative to the CO they betray. While about half of fragments with similar power share strongholds with their CO of origin, only about 20% of medium fragments do, and *no* small fragment do. This clearly suggests that geography plays a key

role in the strategic self-selection of potential defectors into fragmentation, with lower level potential defectors discounting the possibility of fragmenting the closer they operate from their CO's stronghold due to the inherent risk. This further indicates that the geographic expansion of drug cartels that began in 2007 (Alcocer 2022) created conditions that facilitated fragmentation, as it created more regional and local bosses controlling territories beyond the stronghold of their cartel.

To further probe these survival incentives, Figure 6 shows different types of fragments by the geographic location of their strongholds and whether they formed alliances when they fragmented to fight their CO of origin. The results are stark. Only fragments whose strongholds are in the same state as the CO they defect from form military alliances to survive fragmentation. Specifically, 8 of the 10 large fragments that share strongholds with their CO of origin form military alliances when they fragment, while 4 of the 5 medium fragments do. That means 12 of the 15 (80%) fragments who share a stronghold with their CO of origin form alliances to survive fragmentation. Moreover, 25% (4 of 16) of those in the same state but without overlapping strongholds also form alliances to fight their CO of origin when they fragment. No fragment with strongholds in states outside the state where their CO of origin has its stronghold creates these alliances. This provides very strong evidence that these military alliances are key when fragmenting near the CO of origin for both large and medium fragments.

Together, these results indicate that potential defectors strategically consider their size relative to the CO they seek to betray given survival concerns, and that geography and military alliances are central parts of this calculus. Geography can make up for weaker power differentials and allow mid- and low-level members to defect when further from their originating COs' stronghold, while alliances can reinforce high- and mid-level defectors whose strongholds are in the same state as the CO they betray.

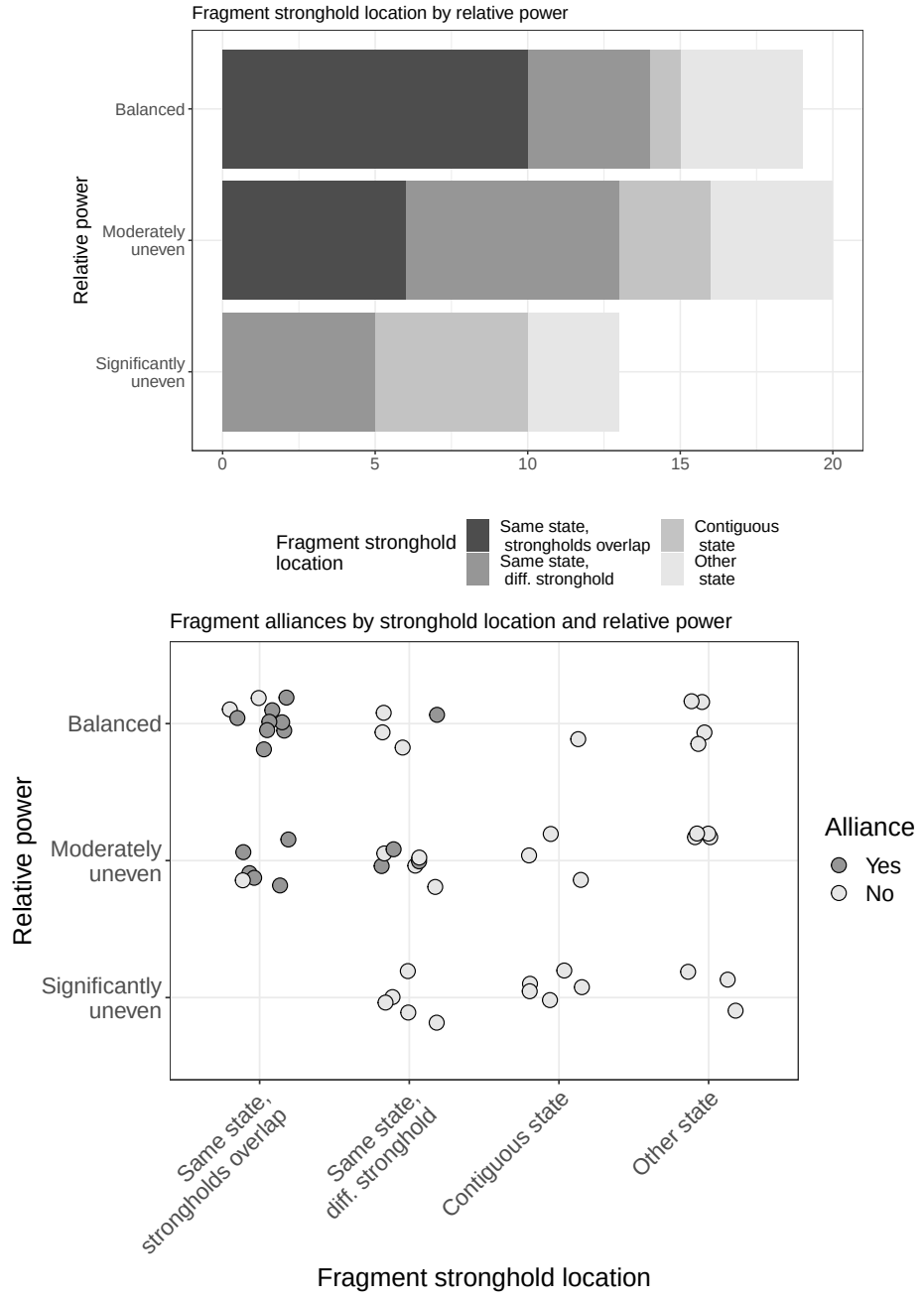

Figure 6: Location of fragment stronghold by balance of power (left) and by alliances formed at moment of fragmentation (right).

6 Further Findings

Beyond exploring the drivers and patterns of fragmentation, our data reveals further insights previously uncovered about cartel's propensity to fragment, the limited success of government leadership decapitation policies, and the rise of new types of leaders and predatory cartels. We briefly introduce these here and include more details in the Appendix.

Propensity to fragment: We find that the number of fragmentations given the size of cartels follows an inverted U pattern where large drug cartels experience few fragmentations, fragments of large drug cartels experience many fragmentations, and fragments of fragments experience few fragmentations. This pattern suggests that large drug cartels are especially effective at enforcing cohesion and dissuading defection, possibly because of their superior coercive capacity and ability of credibly threaten potential defectors. Fragments of fragments may also see fewer fragmentations as they become too small to fragment further, or at least, it becomes more difficult as they become more localized. This pattern differs from firm spinoffs that tend to be more frequent for better performing firms (e.g. Klepper and Sleeper 2005; Klepper and Thompson 2010). Further research is necessary to explore this dynamic and other factors that may impact COs' susceptibility to fragmentation.

Successful dismantling: Surprisingly given the conventional knowledge, we find 18 instances of cartels ceasing to operate—17 as a direct result of government leadership decapitation strategies—and 5 of cartels being absorbed by larger cartels. This shows that government leadership decapitation strategies were successful in disbanding numerous COs—though this by no means outweighs their costs and negative implications. The successful dismantling of cartels was the government's aims when pursuing leadership decapitation strategies, but has received virtually no scholarly or media attention due to its failure in the vast majority of cases. Future research should investigate the factors that make COs prone to disbandment given the arrest of their leader.

From drug lords to warlords: Our results show that fragmentation has contributed to the evolution of cartel leadership from traditional drug traffickers to militarized leaders. We

find that fragmentation gave rise to militarized leaders, with 19 of the 54 defecting leaders (35%) leading armed wings before or at the moment of defection. By militarized leaders, we do not mean street soldiers or low-level hitmen, but individuals who led militarized armed wings (*jefe de sicarios* or *jefe de brazo armado*) before leading their own defection. Given their combat training and experience, their rise to leadership through fragmentation likely has significant repercussions for the violent behavior of the COs they lead.

From drug cartels to predatory cartels: The main drug cartels at the turn of the century were specialized drug traffickers. We find that fragmentation resulted in 18 of 54 fragments being cartels specializing in activities that are far more predatory towards citizens (e.g., extortion, theft, local drug dealing, kidnapping for ransom) than drug trafficking. The rise of smaller cartels specializing in predatory crimes has resulted in cartels that cannot fall back on drug trafficking and can only grow by increasing their involvement in predatory crimes. This likely has significant consequences for the prevalence of these crimes and the well-being and security of civilians.

7 Generalizability

To illustrate the plausible generalizability of our argument we provide brief case studies of criminal fragmentation in other countries and time periods. We highlight the roles of relative power, illicit markets, geography, and alliances in the patterns of fragmentation.

In Ecuador, a drug cartel called Los Choneros emerged in the city of Chone in the late 1990s. Los Choneros subsequently grew and expanded to prisons and new territories, becoming one of the dominant COs in Ecuador. Following the assassination of their leader in 2020, various internal factions of different sizes broke ranks and became independent, including Los Lobos, Los Tiguerones, and Los Chone Killers. To combat Los Choneros, the three fragments formed an alliance called "Nueva Generación." Los Chone Killers and the Tiguerones, smaller COs that could not compete in drug trafficking with Los Choneros,

focused on more local markets including extortion, robbery, kidnapping, drug dealing. Los Lobos, a larger CO, was able to compete in drug trafficking. Geographically, Los Choneros had extensive operations in the western provinces of Manabí and Guayas, while Los Lobos initially operated out of the eastern province of Pastaza, Los Tiguerones operate out of the northwestern city of Esmeraldas, and Chone Killers have their stronghold in the city of Durán. This fragmentation triggered a violent wave in a country that had lived under relative peace (GK 2022; Newton 2023; Insight Crime 2022, 2023).

In the early 1990s, the leaders of the infamous Cali Cartel in Colombia surrendered to authorities. Remnants of the dissolved Cali Cartel reorganized into the Cartel del Norte del Valle (CNDV) in the Valle de Cauca and Cauca regions of Colombia. In 2002, the killing of an important member triggered the rupture of CNDV into two relatively equal warring sides—Los Rastrojos and Los Machos—both with strongholds in Valle de Cauca and involvement in drug production. In the fight against each other, Los Machos allied with the leftist FARC guerrillas, while Los Rastrojos allied with the right-wing AUC paramilitary.

In the Appendix, we include additional fragmentation examples, including the Black Gangster Disciples Nation in Chicago, the Yamaguchi-Gumi in Japan, Barrio 18 in El Salvador, Cosa Nostra in Italy, Comando Vermelho in Brazil, and the Camachero Motorcycle Club in Australia.

8 Conclusion

We examine the factors influencing criminal fragmentation and their impact on subsequent fragmentation patterns. We argue that potential defectors weigh economic viability and their probability of surviving retaliation from the CO they betray. Leveraging an original dataset covering major drug cartels in Mexico and all their fragments from 2000 to 2018, we find that members at various ranks initiate defections due to leadership turnover and internal disputes. Larger fragments sometimes operate near their originating cartel's stronghold, while smaller

ones operate in distant areas which safeguards them from retaliation. Moreover, fragments operating near their originating cartel form strategic military alliances with other cartels to survive retaliation.

These results have important policy implications. Most notably, they provide a more nuanced understanding of the consequences of government leadership decapitation strategies. On the one hand, these cannot be solely blamed for the fragmentation of Mexican cartels. Even more, something not currently recognized is that, in some cases, they actually do accomplish the goal of dismantling COs. Yet, it is also very clear that the costs far outweigh the benefits. Understanding which COs are prone to disbandment given leadership decapitation would allow governments to only target those leaders without cutting Hydra's head. However, it must be recognized that the policy has clear drawbacks and, in many cases, may not be a desirable option when targeting COs. For example, fragmentation can push COs towards more local, and even predatory, crimes.

We also believe this article opens the door to future research on CO fragmentation. For example, future research could analyze additional factors shaping fragmentation and subsequent patterns, including CO size, internal structure, leadership styles, social and familial ties, or government relations. Relatedly, the degree to which each factor—illicit markets, geography, and alliances—shapes fragmentation patterns likely depends on local conditions and pre-existing dynamics. Future research could test the generalizability of the theory and refine the incentives outlined, uncover additional factors, better outline scope conditions, and provide additional insights.

Finally, studies using decapitation as a proxy for fragmentation expect violence in different places (e.g., leaders' arrest sites, home states, or areas of presence). Our geographic and alliance findings can help refine or generate new hypotheses about where violence should occur following fragmentation. For example, examining whether violence is shaped by fragment size, defector characteristics, geography, or illicit markets.

References

Agarwal, Rajshree, Raj Echambadi, April M. Franco and MB Sarkar. 2004. "Knowledge Transfer Through Inheretance: Spin-Out Generation, Development, and Survival." *Academy of Management Journal* 47(4):501–522.

Agreste, Santa, Salvatore Catanese, Pasquale De Meo, Emilio Ferrara and Giacomo Fiumara. 2016. "Network structure and resilience of Mafia syndicates." *Information Sciences* 351:30–47.

Alcocer, Marco. 2022. "Drug Wars, Organized Crime Expansion, and State Capture in Mexico." Unpublished manuscript.

Alcocer, Marco. 2023. "Mapping Criminal Organizations in Guanajuato." https://doi.org/10.7910/DVN/WJSGWW.

Arı, Barış and Theodora-Ismene Gizelis. 2020. "Civil conflict fragmentation and the effectiveness of UN peacekeeping operations." *International Peacekeeping* 27(4):617–644.

Asal, Victor, Mitchell Brown and Angela Dalton. 2012. "Why split? Organizational splits among ethnopolitical organizations in the Middle East." *Journal of Conflict Resolution* 56(1):94–117.

Atuesta, Laura H and Aldo F Ponce. 2017. "Meet the Narco: increased competition among criminal organisations and the explosion of violence in Mexico." *Global Crime* 18(4):375–402.

Atuesta, Laura H. and Yocelyn Samantha Pérez-Dávila. 2018. "Fragmentation and cooperation: the evolution of organized crime in Mexico." *Trends in Organized Crime* 21(3):235–261.

Atuesta, Laura H. and Yocelyn Samantha Pérez-Dávila. 2021. *Presencia de los grupos criminales y de las fuerzas de seguridad en el contexto de la pandemia por COVID-19*. CIDE PPD.

Ayling, Julie. 2009. "Criminal organizations and resilience." *International Journal of Law, Crime and Justice* 37(4):182–196.

Bakke, Kristin M, Kathleen Gallagher Cunningham and Lee JM Seymour. 2012. "A plague of initials: Fragmentation, cohesion, and infighting in civil wars." *Perspectives on Politics* 10(2):265–283.

Berlusconi, Giulia. 2022. "Come at the king, you best not miss: criminal network adaptation after law enforcement targeting of key players." *Global crime* 23(1):44–64.

Calderón, Gabriela, Gustavo Robles, Alberto Díaz-Cayeros and Beatriz Magaloni. 2015. "The beheading of criminal organizations and the dynamics of violence in Mexico." *Journal of Conflict Resolution* 59(8):1455–1485.

Campbell, Benjamin A., Martin Ganco, April M. Franco and Rajshree Agarwal. 2012. "Who leaves, where to, and why worry? Employee mobility, entrepreneurship and effects on source firm performance." *Industrial and Labor Relations Review* 65(1):65–87.

Catanese, Salvatore, Pasquale De Meo and Giacomo Fiumara. 2016. "Resilience in criminal networks." *Atti della Accademia Peloritana dei Pericolanti-Classe di Scienze Fisiche, Matematiche e Naturali* 94(2):1.

Catino, Maurizio. 2014. "How do Mafias organize?: Conflict and violence in three Mafia organizations." *European Journal of Sociology* 55(2):177–220.

Cavallaro, Lucia, Annamaria Ficara, Pasquale De Meo, Giacomo Fiumara, Salvatore Catanese, Ovidiu Bagdasar, Wei Song and Antonio Liotta. 2020. "Disrupting resilient criminal networks through data analysis: The case of Sicilian Mafia." *Plos one* 15(8):e0236476.

Chemmanur, Thomas J. and An Yan. 1983. "Spin-offs and the new firm formation process." *California Management Review* 25(2):3–16.

Contreras Velasco, Oscar. 2023. "Unintended consequences of state action: how the kingpin strategy transformed the structure of violence in Mexico's organized crime." *Trends in organized crime* pp. 1–25.

Cunningham, Kathleen Gallagher, Kristin M. Bakke and Lee J.M. Seymour. 2012. "Shirts today, skins tomorrow: Dual contests and the effects of fragmentation in self-determination disputes." *Journal of Conflict Resolution* 56(1):67–93.

Doctor, Austin C. 2020. "A motion of no confidence: leadership and rebel fragmentation." *Journal of Global Security Studies* 5(4):598–616.

Esberg, Jane. 2021. "More than cartels: Counting Mexico's crime rings." https://www.crisisgroup.org/latin-america-caribbean/mexico/more-cartels-counting-mexicos-crime-rings.

Esberg, Jane. 2025. "Criminal fragmentation in Mexico." *Political Science Research and Methods* p. 1–8.

Faulkner, Christopher M and Austin C Doctor. 2021. "Rebel fragmentation and the recruitment of child soldiers." *International Studies Quarterly* 65(3):647–659.

Gambardella, Alfonso, Martin Ganco and Florence Honoré. 2015. "Using what you know: Patented knowledge in incumbent firms and employee entrepreneurship." *Organization Science* 26(2):456–474.

Ganco, Martin. 2013. "Cutting the Gordian knot: The effect of knowledge complexity on employee mobility and entrepreneurship." *Strategic Management Journal* 34(6):666–686.

Gates, Scott. 2002. "Recruitment and allegiance: The microfoundations of rebellion." *Journal of Conflict resolution* 46(1):111–130.

GK. 2022. "¿Quiénes son los Chone Killers?" https://gk.city/2021/10/21/quienes-son-los-chone-killers/.

Goertz, Gary and Stephan Haggard. 2023. "Large-N Qualitative Analysis (LNQA): causal generalization in case study and multimethod research." *Perspectives on Politics* 21(4):1221–1239.

Herrera, Joel Salvador and Cesar B Martinez-Alvarez. 2022. "Diversifying violence: Mining, export-agriculture, and criminal governance in Mexico." *World Development* 151:105769.

Insight Crime. 2022. "Lobos." https://insightcrime.org/ecuador-organized-crime-news/lobos-ecuador/.

Insight Crime. 2023. "Choneros." https://insightcrime.org/ecuador-organized-crime-news/los-choneros/.

Joo, Minnie M and Bumba Mukherjee. 2021. "Rebel command and control, time, and rebel group splits." *International Interactions* 47(2):318–345.

Kenny, Paul D. 2010. "Structural integrity and cohesion in insurgent organizations: Evidence from protracted conflicts in Ireland and Burma." *International Studies Review* 12(4):533–555.

Klepper, Steven. 2007. "Disagreements, spinoffs, and the evolution of Detroit as the capital of the US automobile industry." *Management science* 53(4):616–631.

Klepper, Steven and Peter Thompson. 2010. "Disagreements and intra-industry spinoffs." *International Journal of Industrial Organization* 28(5):526–538.

Klepper, Steven and Sally Sleeper. 2005. "Entry by spinoffs." *Management science* 51(8):1291–1306.

Kostelnik, James and David Skarbek. 2013. "The governance institutions of a drug trafficking organization." *Public Choice* 156:95–103.

Leeson, Peter T and David B Skarbek. 2010. "Criminal constitutions." *Global Crime* 11(3):279–297.

Lessing, Benjamin. 2021. "Conceptualizing criminal governance." *Perspectives on politics* 19(3):854–873.

Lessing, Benjamin and Graham Denyer Willis. 2019. "Legitimacy in criminal governance: Managing a drug empire from behind bars." *American Political Science Review* 113(2):584–606.

Lidow, Nicholai Hart. 2016. *Violent order: Understanding rebel governance through Liberia's civil war*. Cambridge University Press.

Mahoney, Charles W. 2020. "Splinters and schisms: Rebel group fragmentation and the durability of insurgencies." *Terrorism and Political Violence* 32(2):345–364.

Mosinger, Eric S. 2019. "Balance of loyalties: Explaining rebel factional struggles in the Nicaraguan revolution." *Security Studies* 28(5):935–975.

Newton, Christopher. 2023. "Ecuador Gang Massacre Highlights Intensified Fight for Drug Routes." https://insightcrime.org/news/gang-massacres-nine-ecuador-fight-drug-routes-intensifies/.

Pereda, Valentin. 2021. "Macabre ceremonies: How Los Zetas produces extreme violence to promote organizational cohesion." *Violence: An International Journal* 2(2):278–296.

Pereda, Valentin. 2024. "How organizational culture shapes criminal organizations' street-level territorial control capabilities: a study of Los Zetas." *Crime, Law and Social Change* 81(1):53–74.

Pereda, Valentin and David Décary-Hetu. 2024. "Illegal Market Governance and Organized Crime Groups' Resilience: A Study of The Sinaloa Cartel." *The British Journal of Criminology* 64(2):326–342.

Perkoski, Evan. 2019. "Internal politics and the fragmentation of armed groups." *International Studies Quarterly* 63(4):876–889.

Phillips, Brian J. 2015. "How does leadership decapitation affect violence? The case of drug trafficking organizations in Mexico." *The Journal of Politics* 77(2):324–336.

Piano, Ennio E. 2017. "Free riders: the economics and organization of outlaw motorcycle gangs." *Public Choice* 171:283–301.

Raleigh, Clionadh, Roudabeh Kishi and Andrew Linke. 2023. "Political instability patterns are obscured by conflict dataset scope conditions, sources, and coding choices." *Humanities and Social Sciences Communications* 10(1):1–17.

Robinson, Kaitlyn and Iris Malone. 2024. "Militant splinter groups and the use of violence." *Journal of conflict resolution* 68(2-3):404–430.

Rudloff, Peter and Michael G Findley. 2016. "The downstream effects of combatant fragmentation on civil war recurrence." *Journal of Peace Research* 53(1):19–32.

Ríos, Viridiana. 2013. "Why did Mexico become so violent? A self-reinforcing violent equilibrium caused by competition and enforcement." *Trends in organized crime* 16:138–155.

Shekhar, Suraj. 2018. "Signaling, reputation and spinoffs." *Journal of Economic Behavior & Organization* 149:88–105.

Signoret, Patrick, Marco Alcocer, Cecilia Farfan-Mendez and Fernanda Sobrino. 2021. "Mapping Criminal Organizations in Mexico: State Panel 2007-2015." https://doi.org/10.7910/DVN/N0KGCZ.

Skarbek, David. 2010. "Putting the "con" into constitutions: the economics of prison gangs." *The Journal of Law, Economics, & Organization* 26(2):183–211.

Skarbek, David. 2012. "Prison gangs, norms, and organizations." *Journal of Economic Behavior & Organization* 82(1):96–109.

Skarbek, David. 2014. *The social order of the underworld: How prison gangs govern the American penal system*. Oxford University Press.

Skarbek, David. 2024. "The political economy of criminal governance." *Public Choice* pp. 1–24.

Skarbek, David and Peng Wang. 2015. "Criminal rituals." *Global Crime* 16(4):288–305.

Staniland, Paul. 2018. *Networks of rebellion: Explaining insurgent cohesion and collapse*. Cornell University Press.

Sundberg, Ralph, Kristine Eck and Joakim Kreutz. 2012. "Introducing the UCDP non-state conflict dataset." *Journal of peace research* 49(2):351–362.

Tamm, Henning. 2016. "Rebel leaders, internal rivals, and external resources: How state sponsors affect insurgent cohesion." *International Studies Quarterly* 60(4):599–610.

Trejo, Guillermo and Sandra Ley. 2016. "Federalism, drugs, and violence. Why intergovernmental partisan conflict stimulated inter-cartel violence in Mexico." *Política y gobierno* 23(1):11–56.

Trejo, Guillermo and Sandra Ley. 2020. *Votes, drugs, and violence: The political logic of criminal wars in Mexico*. Cambridge University Press.

Varese, Federico. 2020. "How mafias migrate: transplantation, functional diversification, and separation." *Crime and Justice* 49(1):289–337.

Woldemariam, Michael. 2018. *Insurgent fragmentation in the Horn of Africa: Rebellion and its discontents*. Cambridge University Press.

Wyer, Frank. 2024. "Peace Versus Profit: Rebel Fragmentation and Conflict Resurgence in Colombia." *International Organization* 78(4):701–730.