THE REBELS' RESOURCE CURSE

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A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Political Science.

Chapel Hill
2018

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ABSTRACT

Chelsea L. Estancona: The Rebels' Resource Curse
(Under the direction of Navin Bapat)

This dissertation challenges the conventional assumption that rebel groups become stronger and present a greater threat to the state when they gain access to lucrative natural resources. I argue that militants' ability to first profit from primary commodities and then translate this profit into military and political gains should not be taken as given. I propose that, instead, rebels' success is conditional on both group structure and groups' connection with key actors in the commodity's supply chain. I consider the steps needed for rebel groups to build and maintain commodity markets in order to profit.

The first chapter explores the tension between the theoretical gains rebels should make from operating in areas with natural resources and the empirical reality that groups experience much greater variation in their conflict outcomes. I argue that a group's ability to translate primary commodity profit into political gains is conditioned on whether or not the group is centrally controlled. I apply a competing risks model to a new dataset that pairs militant group characteristics with geo-referenced access to natural resources such as petroleum, diamonds, drugs and gold. I find that for groups without strong central organization, increasing access to resource-rich territory decreases the group's chances of survival. I further find that regardless of group structure, primary commodity access decreases the probability that groups will negotiate with the state.

To elaborate on this finding, I consider militant groups' relationships with the individuals necessary to produce, transport, and sell primary commodities - their 'local investors'. I develop a game theoretic model of negotiation between the state and rebel groups in intrastate conflict when lucrative resources are present, highlighting the importance of rebel partnerships with local investors on this bargaining process. The model's implications suggest that states will seek to undermine relationships between rebels and their local investors by incentivizing local investors to defect from rebel partnerships. I conclude this chapter with a municipal-level test of the effect of the Colombian

state's agricultural credit program to coca farmers, demonstrating that this intervention minimized the number of hectares of coca to which the FARC had access.

Finally, I consider how exogenous economic conditions such as commodity price shocks affect agreements between militant groups and their relationships with local investors - specifically, their commodity suppliers. I explore the case of coca farmers and the FARC in Colombia in detail, hypothesizing that increased victimization of coca farmers from either the FARC or competing paramilitary groups is the result of volatility in cocaine price. I test these hypotheses with municipal-level Colombian data, aggregated event data about each actors' attacks on civilians, and quarterly U.S. cocaine price data. This evidence from the Colombian case suggests that as militants' increasingly invest in and rely on their primary commodity markets, disruptions to their expected profit can lead groups to engage in costly victimization of suppliers. With these three chapters, I demonstrate that militant groups, like states, can be subject to the resource curse due to institutional weakness or changes to their relationship with the local investors on whom they rely.

ACKNOWLEDGEMENTS

They say it takes a village to raise a child. I'd argue that a village is also necessary for surviving and producing a dissertation. My list of those whose support, input, and guidance I'm thankful for is extensive, and these acknowledgements are by no means exhaustive. To all in my W&M, UNC, EITM, ICPSR, Journeys, Peace Science, and Odum communities: thank you.

I am first grateful to my family. More than anyone else, my mom, Cheryl Estancona, encouraged me to pursue my early curiosity (about everything) and to turn this curiosity into a career. She also taught me that it's more important to be kind than to be right – a guiding principle that I'm grateful for every day. My dad, Craig Estancona, probably unwittingly provided the inspiration for my research. Debating the efficacy of the U.N. and telling stories about Pablo Escobar may not be your average father-daughter conversation, but it seems to work for us. Though we've pursued different career paths, his support means the world to me. Finally, my grandmothers, Phyllis Cody and Joyce Estancona, have long been my examples of the faith that I hope guides the way I study the world. To each of them: te amo tanto.

This document owes its existence – and I owe my continued enthusiasm for this subject matter and career path – to my truly amazing committee members. My advisor and chair, Navin Bapat, deserves particular thanks for his dedication to my development as a scholar. His advisor, Cliff Morgan, asked me early on in graduate school if I was afraid of Navin. At the time, I lied when answering that I wasn't: I knew Navin's reputation for incisive, unapologetic commentary on students' work. Yet it's precisely his toughness that I am most grateful for now. Navin somehow never wavered in the high standard he kept for my research, which always provided the encouragement I needed. His substantive knowledge and career advice made me a better political scientist and academic citizen. I could not ask for a better example of the advisor I hope to be.

In addition to Navin's leadership, the expertise and involvement of Mark Crescenzi, Stephen Gent, Cameron Ballard-Rosa, and David Siegel has been invaluable. I cannot count the number of times Mark has asked that my research "tell him a story" – something I now find myself repeating to

students seeking paper advice. I can't thank him enough for instilling this dedication to theory-driven scholarship, as well as for all of the times he made himself available to talk through even the smallest of problems. I remain completely in awe of Stephen's ability to quickly dissect a model – whether game theoretic or statistical – during a meeting and then offer focused, encouraging advice about how to make changes. I am also grateful to him for providing me my first opportunity to TA a methods class. Cameron's consistent enthusiasm for discussing my research was always uplifting when I hit what I often perceived as insurmoutable roadblocks. I am specifically thankful for his economic expertise and his patience when dealing with this IPE novice. Despite that I was not a graduate student at his institution, Dave always took time to read and provide detailed comments on my work, often suggesting methodological variety that I had not previously considered for my research.

Beyond my dissertation committee, I have had the privilege of learning from many incredible scholars at UNC. Layna Mosley provided me with research opportunities and mentorship throughout my graduate school career, and convinced me that I'm more of an IPE scholar than I often think. Justin Gross and Brice Acree, as my first methods professor and TA respectively, suffered through countless questions and helped me find an unexpected passion for statistics. Santiago Olivella patiently encouraged and guided my first real application of Bayesian modeling and RStan, all while dispensing valuable lessons about how to best teach quantitative methodology. Finally, Tom Carsey taught me that no matter how fancy the method, its efficacy relies on the strength of the theory driving it. He will always be my example for who I want to be at the front of the classroom, and he is missed.

I am also particularly grateful for the mentorship and friendship of some (pardon the language) kick-ass female IR colleagues at UNC. Elizabeth Menninga has made incredible efforts to encourage and advise me, even answering all of my early questions via phone while trekking between APSA hotels. Lindsay Reid has always made herself available as a sounding board for struggles both professional and personal with emergency french fries as needed. Menevis Cilizoglu has commiserated over far too many cups of coffee, somehow always weighing in with needed practical advice (and deciphering handwriting). Lucia Bird has been an amazing coauthor and friend, and I'm not sure what I would've done without her as a fellow IR cohort member.

I would be amiss not to thank many other graduate school colleagues here - indeed, I do not have room to thank them all. I was fortunate to come to graduate school with a wonderful cohort, all of whom deserve credit for helping me reach the finish line. Amy Sentementes, Ryan Williams, Steven

Sparks, Jelle Koedam, Anthony Chergosky, and Cliff Keller: thank you, always. I thank Andrew Tyner for listening with patience whenever I made mountains out of molehills and for reminding me that sometimes (always?) dessert is the answer. I am also grateful to Daniel Gustafson and Rob Williams for tough questions, shared code and shared beer. I thank both Eric Hansen and Emily Carty for their excellent examples and for reminding me in their own ways that life exists outside of Hamilton Hall. To Bailee Donahue, Claire Dunn, Kate McKiernan, and Kelsey Shoub I say simply this: the best boats really are friend boats.

Finally, this dissertation is for my grandfathers. Grandpa Frank, for a journey ranging from Euskadi to Latin America that I followed in my own way: eskerrik asko. Grandpa Lew, as someone who traveled the world with barely a high school diploma, all you asked was that I complete a degree. I hope you agree I did that in spades.

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CHAPTER 1: INTRODUCTION

Does engaging in the production and sale of natural resources help militant groups accomplish their political aims? Some of the most lethal and long-standing rebel organizations have held territory that contains lucrative primary commodities. As a recent example, the Islamic State's participation in the oil trade provided the group with the funding necessary to build and maintain the equivalent of state institutions from 2014 to 2017. Even now, as the group has gradually been forced out of oil-rich territory, the organization persists as an insurgent threat due to its economic investments (Mansour and Al-Hashimi, 2018). The groups' engagement in oil production, smuggling, and sales therefore contributed to their rapid military and political advancement as well as their longevity by providing the means for ongoing, low-intensity fighting.

The group has been considered an exceptional evil, with then Secretary of State John Kerry calling the fight against IS the "challenge of our time" in 2015 (Morello, 2015). This merits consideration of whether the conditions under which IS cultivated and increased their oil market – and in turn, their territorial ambitions – are reminiscent of those faced by other militant groups. First, the hierarchical and centrally controlled structure of the group's forces ensured accountability among fighters and leaders to budget appropriately. This meant that the profit earned from selling oil went toward maintaining the group's fighting forces as well as wages and provision of public goods. Further, the group capitalized on existing smuggling networks to transport oil through Turkey and into the international market - the group could only profit if oil crossed out of IS territory. Despite the presence of sanctions, the militant group consistently found international buyers for their product, meaning that barring changes to their supply of oil, they could count on fairly consistent income. Finally, at the height of their power, the group's share in the regional oil market ensured that they were able to dictate price, meaning that they did not face uncertainty about price volatility that might impact their reallocation of profit.

Ultimately, IS was – if for a short time – very successful in creating and managing an oil market as well as translating the profits into territorial expansion and military success. To do so, the group

avoided pitfalls such as profit-hungry leaders or rapid and unexpected changes to their oil networks due to global price shocks. Thankfully, the international coalition's airstrikes have largely cut off the militants' access to this lucrative primary commodity and limited their capacity to engage in violence against local communities and others abroad. Yet, the unusual degree of rapid attention and effort from the international community might be seen as a form of political success, even as it reduces the group from a state-like entity to an insurgency that, still fueled by natural resources, may persist for years into the future.

The outcome of the conflict with the Islamic State remains to be seen. Predicting based on other resource-rich groups' outcomes yields mixed results. The RUF in Sierra Leone, for example, financed in part by the diamond trade, negotiated a ceasefire and eventual peace agreement with the state. Sendero Luminoso in Peru, after becoming heavily involved in drug production and trafficking, was largely defeated as a political organization but continued with some criminal activity and is experiencing a resurgence nearly 20 years later. The FARC in Colombia became involved in the drug trade as well, using it to finance their activities for 60 years before participating in 4 years of peace talks with the Colombian state to gain a place as a legal political party. Each of these groups differed in its organizational structure, its development of relationships with suppliers and transporters, and the capacity of the states they faced.

These examples illustrate that militant groups' access to primary commodity wealth through oil, diamonds, drugs, or other resources is no guarantee of military and political success. The varied empirical record of group outcomes, however, remains underconsidered in the theoretical literature. Previous research discusses how natural resources amplify militants' power against the state without questioning whether such shifts in militants favor will always occur. This literature abstracts away from important conditions - such as those discussed in light of the Islamic State's success - whose presence or absence may fundamentally impact the outcomes of groups fighting in resource-rich territory. What dictates whether groups can successfully produce and invest profit from primary commodities? Phrased differently, under which conditions are natural resources beneficial to militant groups – and when can they become a curse?

This dissertation makes important progress in answering this question. I consider how internal group characteristics and external conditions - both endogenous and exogenous to group strategy - can alter militants' funding and fighting capacity and ultimately their outcome. I argue that militant

groups, like commodity-rich states, are subject to the resource curse due to weaknesses in the primary commodity markets on which they rely. In doing so, I add an overlooked strategic dimension. I explore how militant groups bargain with suppliers, transporters, refiners, or other 'local investors' necessary to take the lucrative commodities from production to sale, and how the state might undermine militant-investor deals to limit rebel groups' power.

I proceed in three chapters which, while connected, can be read as individual papers. The first considers how rebel groups' organization (or lack thereof) impacts their capacity to translate primary commodity profits into future battlefield gains. The second builds on a finding from the first chapter that resource wealth decreases groups' chances of negotiating with the state. It hypothesizes that rebels' relationships with key local investors create intractable commitment problems that encourage states to delay or prevent negotiation. Finally, the third chapter introduces additional uncertainty into these rebel-local investor relationships in the form of exogenous commodity price shocks, These shocks impact both rebels' and states' tactics for interacting with rebels' commodity suppliers. The final section concludes by discussing the collective implications of these findings for limiting militant groups' resource-driven violence and proposes additional research avenues.

CHAPTER 2: REBEL INFRASTRUCTURE, PRIMARY COMMODITY ACCESS, AND GROUP OUTCOME

Abstract

Natural resource access has been shown to benefit militant groups by increasing their power relative to the state. However, the empirical literature also demonstrates that similar resource access can drive corruption, graft, and infighting within governments and military forces. This raises several questions overlooked by current research: can natural resources similarly corrupt and harm militant organizations, and what are the conditions under which they do? Additionally, how does access to natural resources impact groups' outcomes of victory, failure, or negotiation? I argue that militants, like states, can experience a 'resource curse' in which they are negatively impacted by resource access due to poor organizational capacity. This impact includes the possibility of leader corruption, deviation in group behavior away from fighting in favor of economic activity, and an inability to reach negotiations with the state. I hypothesize that for groups with access to primary commodities, their outcome is dependent on whether or not the group is centrally controlled. To test this argument, I employ competing risks analysis on a new dataset that pairs militant group characteristics from the Non-State Actor dataset with groups' grid-cell level access to natural resources from PRIO.

Introduction

> "We are not drug traffickers. The FARC is a guerrilla army of men and women who are fighting 24 hours a day to change the country. The rest of what they say is lies."
> - Former FARC Spokesman Raúl Reyes, 2001

Can resources ever be a 'curse' for militant groups? Academics and policymakers alike stress the benefits rebel actors receive from gaining access to territory with lucrative natural resources. Groups as regionally and ideologically diverse as the Afghan Taliban, Peru's Shining Path, and Sierra Leone's RUF saw increases in their military capacity due to such access. For a current and policy salient example, one need look no further than the dramatic progress of the Islamic State until 2017 and subsequent resilience as an insurgency even after territorial losses. Defeating IS relies on understanding their funding capacity – in particular, their access to oil fields and black markets through which they market and sell this resource (Simpson and Philips, 2015). Resource access, then, is seen as critical to militants' success, and preventing this access is the primary recommendation for stamping out violent group threats.

As the above quote suggests, however, the windfall of funding groups gain from controlling natural resources can be a double-edged sword. The FARC, the primary leftist rebel group in Colombia, increasingly faced accusations of placing greater priority on their drug profits than on the progress of the rebellion against the state. The group transitioned from local taxation of growers to full-fledged control of coca production, transport, and international sale – with sections of the group's military apparatus dedicated to managing this business activity (Holmes, 2008). While this expansion increased the group's revenue and access to capital, it also limited their ability to pursue their initial goals of Marxist revolution. Participation in the drug trade decreased the group's civilian support and prevented the Colombian state and international community from viewing them as valid participants in the political process. The group's involvement with narcotics was often cited as the primary roadblock on the way to the peace process – both in getting to negotiations, as previous Colombian presidents viewed the group as purely criminal – and in making any accomplishments in the Havana talks (Otis, 2014).

Walking this line between politically motivated insurgency and criminality is not an experience unique to the FARC. The Taliban, for example, have invested in the opium trade in a similar manner

to the FARC's gradual control of coca. Leaders divert resources away from insurgent activities and re-invest profits toward increased personal gain, leading to conflict with other factions within the organization and an overall lack of focus in the Taliban as a whole (Azam, 2016). Although the FARC and Taliban are relatively large groups with long lifespans, they have faced internal or external issues that divert them away from 'success' in the form of military victory or (until recently, in the Colombian case) negotiation with the state. These negative outcomes resulting from resource access are not deterministic, however. As a contrasting example, the SPLA in the Sudanese civil war remained largely focused on their separatist agenda (despite access to mining and oil resources), leading to the creation of South Sudan in 2011 (Lyman, 2015).[1] What, then, might help us understand why some groups can successfully convert resource access into political gains while some become sidetracked by profits?

The literature on the resource curse provides a theoretical parallel. This scholarship contends that the states expected to achieve high levels of economic development due to an abundance of natural resources are often the most underdeveloped or unevenly developed. Authors suggest first that access to these resources provides little incentive to develop sustainable economic and political institutions to manage the translation of resource wealth into development (Sachs and Warner, 2001). Doing so requires strong institutions that encourage accountability among state leaders and maintain focus on appropriate allocation of profits. If resource-wealthy states often experience strife and setbacks due to a focus on commodity driven wealth, should we not consider that militant organizations might also encounter these challenges?

Toward this aim, this paper proposes a theory to better understand the conditions under which rebel groups[2] are able to capitalize on natural resources to advance their political goals. I argue that whether or not a group is centrally controlled has a conditioning effect on a militant group's ability to successfully build markets to gain natural resource profits and apply these profits toward their political goals. I expect that when groups with weak organizational structure access natural resource wealth, this will negatively affect their chances of survival and success, as they become

[1]The SPLA did receive external support while fighting, which may have offset possible negative effects of natural resource access. However, the group also made use of these local natural resources. Further, and more broadly, there is significant variation in outcomes for groups that both receive external aid and profit from natural resources, as many groups in this paper's data have both sources of revenue. This indicates that even among groups with external sponsorship, natural resource wealth still drives differing outcomes.

[2]In this document, I use the terms rebels, militants, and violent non-state groups interchangeably.

trapped by the same resource curse that affects disorganized states. Well organized and centrally controlled groups, however, are able to convert natural resource wealth into strength that increases their chances of survival and growth.[3] I further argue that the perceived positive effects of natural resource wealth for groups can have an important disadvantage: while these resources can (at least temporarily) increase a group's power in relation to the state, they also can make negotiation less possible due to increased commitment problems and a negative perception of the groups' goals.

This paper proceeds as follows: In the next section, I discuss the current state of the literature on natural resources, civil wars and the parallels of the resource curse in states. I then present my hypotheses and clarify my approach to building the necessary dataset in the third section. The fourth section presents the results from my quantitative analysis and discusses their implications. The fifth concludes.

Rebels and Resource Wealth

This paper builds on substantial literature about the role of natural resources in intrastate conflict while continuing the trend in conflict literature of temporally and spatially disaggregating the level of analysis. The foundational scholarship on resources used a much coarser lens, applying state-level measures of oil endowments (Collier and Hoeffler, 2004*a*; Fearon, 2005; Fearon and Laitin, 2003; Douma, 2001; Berdal and Malone, 2000) and finding that resource rich states tend to be more conflict prone. These authors propose two explanations - either resource endowments occur in weak states that are less able to contain rebellion, or the prospect of financial gain sufficiently offsets the costs of fighting for rebels. But at the state level, the presence of natural resources appears to have the same effect in either circumstance.

Variation in multiple sub-state factors affect a group's control of certain commodities, which in turn impacts conflict outcomes. From both a theoretical and empirical standpoint, explaining how certain groups benefit from resource revenue while others do not requires a more narrow unit of analysis than the state level. Theoretically, all groups operating within a particular state cannot be expected to have the same structure, strategic interaction with the government, or ability to translate

[3]While there may be concerns about endogeneity between group structure and natural resource access, it is appropriate to assert that initial group structure shapes further decisionmaking – including about how to capitalize on resources. This is in keeping with other literature asserting that observing a group's first military action indicates that the group has overcome collective action problems to band together and fight against the state (Gates, 2002).

resource gains into military gains. For data collection, the state is far too broad of a geographical unit to establish which groups can effectively access resources (given their location) and which cannot. Acquiring a more nuanced understanding about militant groups' strategy and resulting outcome with regards to resources requires a narrower focus.

Existing work first disaggregates by natural resource type to examine the effects on conflict duration and severity (Ross, 2004; Lujala, 2009, 2010). Importantly, these studies employ a conflict level of analysis to assess severity and duration rather than looking at the group-level implications of natural resource access. These papers hypothesize that different resource types can differently affect a group's capacity to engage in conflict, but do not present a theory of variation between *groups* that might explain whether natural resource access generates success or failure. Additional literature (Fjelde and Nilsson, 2012; Arnson and Zartman, 2005; Beardsley and McQuinn, 2009; Wright, 2015) demonstrate that rebels make strategic choices about attaining, extracting and employing natural resource wealth based on their anticipation of other actors' choices. However, this research assumes that rebels can profit from access to natural resources without carefully considering the steps needed to do so and the conditions under which they may not. Thus, we can expect that natural resource access does change the trajectory of militant groups, but additional investigation is needed to understand the conditions under which such access results in progress toward the group's political goals.

When rebel groups put aside fighting to engage in economic activity, neither the state nor the rebels can fully anticipate if this investment will pay off. External factors such as fluctuations in price and internal factors such as corruption or fragmentation can impact militants' ability to create favorable commodity markets and militants' application of the profit earned. As demonstrated in the literature above, while natural resource revenue can prolong groups' activities and strengthen them relative to the state, such wealth also provides an opportunity for rebel leaders to line their pockets – much like profit-driven state or military leaders. A group's leadership may decide to hoard some of the profits from the group's investment, leaving less for increasing military capacity and accomplishing political goals against the state. Groups that contain multiple factions may see internal squabbles over control of the group's assets. Just as natural resources can be either a boon or a downfall for developing states, militant groups can similarly experience diverging outcomes.

Weinstein's work, for example, documents how resource wealth can negatively alter the character

of a militant group by minimizing the importance of building social capital (2005). While Weinstein's theory is related to this paper's argument, it differs in an important way: I argue that even among groups with natural resource access, there are still important differences in group outcomes resulting from internal organization, rather than suggesting a group can *either* have successful social ties or corrupt, resource-driven fighters. Staniland, in a similar paper, (2012) links group resource-driven fragmentation and failure to the social ties upon which a group is built. His qualitative argument does not, however, account for the importance of variation in the internal structure of the group. Cunningham (2013) suggests that fragmentation within broader movements affects bargaining processes with the state. This indicates that if natural resource access can encourage group corruption, fragmentation, and failure, this should influence when we observe negotiation versus other types of state and group interaction. Similarly, Christia (2013) shows how changing intra- and inter-group power dynamics are the primary driver of changes in group composition and resulting behavior. Though this literature suggests that internal power shifts can affect group behavior, additional consideration is needed to determine the conditions under which natural resource access might drive these power shifts, and how such access results in different group outcomes.

Natural resources can both benefit and harm rebel groups by increasing a group's capacity relative to the state while incentivizing internal corruption and infighting. This indicates a need for more comprehensive theory of when negative vs. positive outcomes should occur. The current literature predominantly focuses on *conflict* outcomes rather than group-level outcomes, and even research generated at the group level stops short of comprehensively and systematically considering how natural resource access might affect a range of group outcomes. Possible group outcomes include decisive military victory against the state, reaching negotiations with the state, and failure due to military defeat, fragmentation, or no/low activity (Fortna, 2015). Military victory and negotiation are relatively rare outcomes for militant groups due to the asymmetry of power between rebels and the states they fight, while group failure overall is a more common outcome. Primary commodity wealth might be assumed to narrow the gap between militant groups' and states' power, making the first two outcomes more likely, but access to primary commodities is no guarantee of groups' success. I argue that to better assess the conditions under which variation in the success or failure of groups might be expected, we should turn to the resource curse literature in states.

Research discussing the resource curse in states sheds light on an additional factor that influences

groups' capacity to use natural resources. Sachs and Warner (2001) see the resource curse as a budgeting problem through which the investment in the natural resource in question crowds out other growth-inducing activities: therefore, natural resources inadvertently harm growth. This point clarifies that accessing resources themselves does not necessarily lead to a lack of growth – but rather that whether or not states can successfully allocate additional profits affects their progress. When relating this problem to rebel groups, 'growth' is a parallel for battlefield gains, achieving concessions, or more broadly as progress towards achievement of their political goals against the state. Rebel groups suffering from the resource curse, then, fail to appropriately allocate profits toward continuing and advancing the fight.

Robinson, Torvik and Verdier (2006) suggest that having the proper institutions in place prior to a natural resource's discovery is crucial for a state to avoid the resource curse. Successful states possess institutions that increase accountability and competent management of profits (i.e. democratic governance, checks and balances, and changing leadership). Rebel groups can also make use of governance structures to dictate action, communicate among members, and guard against corruption (Gates, 2002). Similarly, the structure and internal governance of a group at the time the group accesses and establishes markets for natural resources will influence whether these commodities help or harm a group's progress toward its goals. Well-structured militant groups, like well-structured states, will be able to control the management of resource production and the application of resource profits, helping them avoid collapse.

Based on this resource curse argument, I expect that militant group structure and leadership are an important conditioning factor for whether or not a group can successfully build markets for primary commodities and, in turn, apply profits to political aims. Rebel groups that are centrally controlled will capitalize on resource gains, avoid the pitfalls of corruption, and funnel resource profits into group maintenance. Groups without centralized leadership are more likely to fail as they face increased challenges from internal competition over resource control and a lack of focused action toward their political objectives. I consider 'centralized leadership' or 'central control' to mean a heirarchical chain of command through which group objectives can be clearly communicated. Such groups have careful methods of maintaining accountability even over a larger geographic area. Groups without central command are comprised of loosely horizontally organized cells, in which leadership fluctuates, objectives are not clearly communicated and progress is not carefully

monitored. I expect that this element of central control is what dictates whether or not a group can successfully allocate resource gains toward fighting efforts. In short, I expect that the effect of natural resource wealth on group failure is conditioned on group structure. This logic leads to my first hypothesis:

H1: Increasing natural resource access *decreases* highly centrally controlled groups' probability of failure but *increases* this probability for groups with low central control.

Given this risk of group failure, why might groups still invest in the production or trade of natural resources? As mentioned, the literature suggests that natural resource access does generally increase group capacity, particularly for groups without any other form of funding. Just as with states, natural resources increase a group's revenue – although often not in a sustainable manner if poorly managed or if exogenous factors decrease a group's access. This indicates that resource access can increase all groups' ability to *win* against the state, as without such resource profits a group is often unable to fund basic mobilization. However, militant groups' military success against states is a very rare outcome, as few groups accomplish their political goals by soundly defeating the state. Thus, investing in natural resource production can be a risky strategy for groups – it increases the rare possibility of military victory, but can be fraught with risks of internal collapse or group distraction if the group is poorly organized. Pursuing natural resource profits may appear to be a beneficial strategy for all groups, and indeed can be expected to increase the probability of the rare outcome of victory. However, this rare outcome is accompanied by an increased risk of failure when the group is unable to weather internal corruption or leadership struggles. This leads to my second hypothesis:

H2: Increasing natural resource access increases both types of groups' probability of *militarily defeating* the state.

Even with access to natural resources, a complete victory over the state is an unlikely outcome. Powerful groups will more often attempt to reach some settlement or power sharing agreement with the state, preferring to seek political concessions through negotiation. Yet, if primary commodities spark internal corruption and power instability within the group, governments may have

considerable difficulty striking stable peace settlements with certain resource dependent groups. In contrast, groups that are able to successfully manage resource profits may see substantial gains in their power relative to the state, leading governments to extend concessions to these types of powerful militant actors. This implies that only groups with high levels of central organization can be expected to apply and manage resource gains in a manner that leads to increased chances of negotiation. Just as the fate of states that are dependent on single commodities are tied to that commodity's performance on the international market, rebel groups focused on profits from a single resource type can be prone to changes in power as their economic base shifts. This can lead to commitment problems as the state will be unwilling to sit down with a group that may be far weaker or stronger in the future (Fearon, 1996; Powell, 2006; Carter, 2010).

Another risk for groups lies in the state's willingness to harm their reputation by negotiating with economically focused militant actors. Groups that access natural resource wealth are often perceived as criminal groups focused solely on wealth acquisition rather than any real political goals (Kalyvas, 2015). This can mean that state leaders' hands are tied by domestic constituents or international supporters who will punish leaders that negotiate with 'criminals' – or that leaders can better employ this argument to delegitimize rebel claims and avoid making concessions. From the perspective of poorly organized groups, a desire to continue extracting resource rents (rather than reach a peaceful and politically expedient outcome) may prevent them from committing to negotiations. My third hypothesis is thus:

H3: Increasing natural resource access *increases* highly centrally-controlled militant groups' probability of reaching negotiation, but *decreases* this probability for groups with low central control.

Data and Testing

To test these hypotheses and better understand the impact of rebel resource access, I bring together information from three existing datasets. I hypothesize that group structure, leadership and size are important factors that contribute to whether or not a group will be corrupted by resource access – specifically, that groups with less central, unified control will be more prone to the corruption and

fragmentation that leads to group termination. My unit of analysis, then, is the group-year, as I am interested in group-level outcomes. My data pairs time-invariant information about group characteristics such as the group's level of central control with yearly measures of location-specific group activity and access to different resource types. I employ the existing Non-State Actor (NSA) Data (Cunningham, Gleditsch and Salehyan, 2009) and UCDP Geo-Referenced Event Data (Sundberg and Melander, 2013) for group characteristics and group location. I match this with geo-referenced data about the location and yearly discovery of different natural resource types: petroleum, gold, gems, and drugs (Tollefsen, Strand and Buhaug, 2012). These spatial data allow me to identify when and where militant groups gain access to natural resources and their subsequent conflict outcomes at an unprecedented level.

I consider these different possible outcomes with competing risks analysis, and thus my dependent variable is the time until each possibility: failure, negotiation, or military victory. This approach is in keeping with Fortna (2015), who employs competing risks analysis for a similar set of rebel group outcomes. The 'failure' outcome includes the possibility of military defeat by the state, as well as failure due to a lack of activity or being absorbed by another group. I aggregate these failing outcomes from the NSA data (Cunningham, Gleditsch and Salehyan, 2009). The negotiation outcome includes ceasefires as well as peace agreements and captures the idea that the state should only be willing to stop fighting and discuss concessions with certain types of groups. Finally, the military victory outcome records the rare instances in which militant groups are able to militarily defeat the state, as these groups usually face such a power asymmetry that outright battlefield victory is unlikely.[4]

My first independent variable is a measure of group structure and control. I modify the NSA's measure, which codes a group's degree of central control (none, low, moderate, high).[5] I collapse this variable into a dichotomous measure of whether the group has no/low central control or moderate/high central control.[6] In the data, groups with no or low control are those with poor communication and accountability across their constituent parts, such as the ONLF (Ogaden National Liberation

[4]Full tables or plots of descriptive statistics for the variables discussed in this section , including the number of occurrences of each outcome in the data, can be found in the appendix.

[5]In the description of the data, this is coded as "the extent to which a central command exercises control over the constituent groups of an insurgent movement."

[6]I make this recoding decision for both practical and theoretical reasons. As might be expected, there are few groups in the data with no central control whatsoever and few with a very high degree of central control. However, this regrouping is

Front) in Ethiopia (*Ethiopia: Deal with Breakaway ONLF Faction*, 2010). These groups are often characterized by frequent leadership struggles and a more horizontal or nonexistent organizational structure. In contrast, well-controlled groups are those with a heirarchical structure that more closely resembles a state military. An example in the data is the LTTE in Sri Lanka, a group with formalized leadership transitions, efficient communication, and high accountability for subgroups or individuals acting against the wishes of the central command (Beardsley and McQuinn, 2009).

For my second independent variable, I rely on the PRIO geolocated and time-varying data on natural resource deposits. This dataset codes the number of deposits of certain natural resources within a grid cell, which is a spatial unit defined with GIS technology by the researcher creating the data. The locations of petroleum, gold, gemstones, diamonds, and drugs are all coded in these data. For my measure of a groups' degree of natural resource access, I sum the number of grid cells containing at least one natural resource in which the group was active in a given year. This means that a group with activity in a cell with 4 petroleum deposits is considered to have the same degree of resource access as a group present in a cell with 2 drug deposits and 2 gold deposits. Tracking changes from year to year in the number of resource cells to which a group has access is helpful for understanding how changes in group territory can affect the time militant groups are present in the data and each group's outcome. Because I am interested in the conditional effect of a militant group's central control on natural resource access, my primary explanatory variable is thus an interaction term between this sum of natural resource cells and the dichotomous measure of whether or not a group has a high level of central control.

I include a number of additional control variables at both the group and country level, as is standard in the civil conflict literature. At the state level, I control for state population and GDP[7], in keeping with other work on conflict duration (Collier and Hoeffler, 2004*b*; Gaibulloev and Sandler, 2014). At the group level, I include a measure of the total number of grid cells to which a group has access in each year of its activity. This variable captures the effect of overall territorial control or territorial access, and allows me to distinguish my results as driven by natural resource access in

also theoretically appropriate, as I hypothesize that poorly controlled groups will see negative effects from natural resource access, while well-controlled groups will be able to benefit.

[7]For both, I take the natural log of the raw measure.

particular.[8] I also control for the strength of the group relative to the government using the NSA's measure, which I collapse into three categories: groups that are weaker than the government, at parity, or stronger.

After matching each group present in the NSA to those active in the GED, including each group's natural resource access per year, and limiting the sample to groups originating after 1989 (the first year of the GED data), my dataset contains 651 group-year observations. I also remove any conflicts coded as coups in the NSA data and any groups that represent subsets of state forces. There are 178 unique groups in the sample, as many groups are only present for a limited number of years.

To test my hypotheses, I use a set of parametric event hazard models to determine the relationship between natural resource access and degree of central control on group failure, negotiation with the state, or military victory.[9] For each model, I assume a lognormal distribution. The lognormal baseline hazard is an appropriate distributional assumption when modeling events for which the hazard of experiencing the event increases in the short term and decreases over time. This is also in keeping with other work modeling militant group outcomes such as negotiation (Bapat, 2005).[10] For each model, standard errors are clustered at the group level.

Due to the difficulty in presenting and interpreting interaction terms for event hazard models, I instead include the plotted hazard ratios for each outcome below.[11] Each plot represents the hazard of an event (failure, rebel military victory, or negotiation) over a 5- year time period. For each possible outcome, I plot the hazard rates for groups with low central control and high central control in two subsequent graphs. Thus, for each group type, I show the effect of increasing the number of resource cells on the probability of observing each outcome. I vary the number of resource cells to which groups have access and plot the effect of 0 cells (no natural resource access), 1 cell, and 3 cells. These values represent the minimum, mean, and one standard deviation above the mean of the resource cell variable.[12]

[8] The correlation between total cells and resource cells for this sample is .3.

[9] For the sake of simplicity and in keeping with previous literature, I assume that the risk of each outcome is independent (Fortna, 2015).

[10] The results are robust to different specifications of the parametric model, and the results of Cox proportional hazards regression for each outcome can be found in the appendix.

[11] Full tables for each model can be found in the appendix.

[12] The results are robust to changes in the total number of cells.

Figures 1 and 2 illustrate the effect of natural resource access on militant groups' likelihood

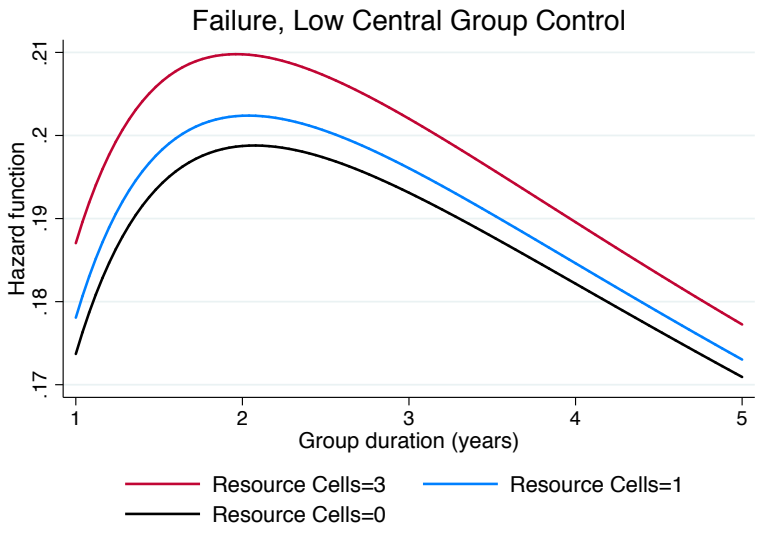


Figure 1: Hazard of Group Failure, Low Central Control

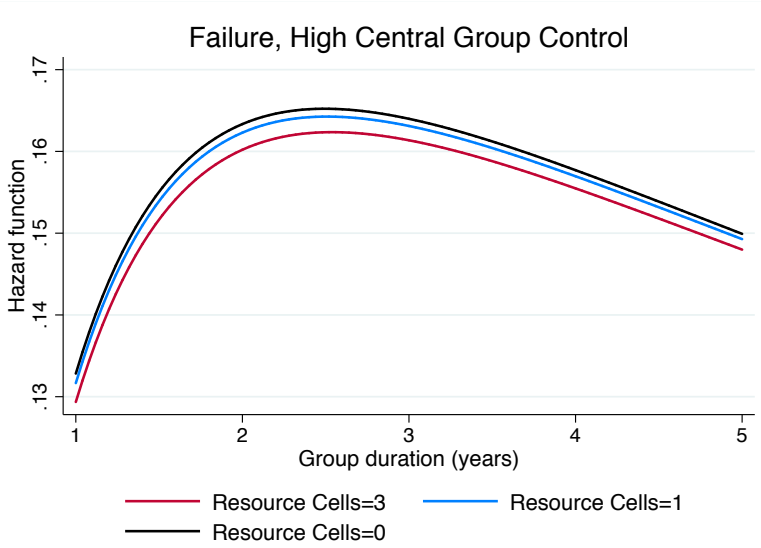


Figure 2: Hazard of Group Failure, High Central Control

of failure. Failure, here, constitutes military defeat by the state, or, more commonly, failure due to low or no activity. As hypothesized, groups with higher central control (Figure2) are able to better capitalize on access to natural resources – increasing their number of resource cells decreases their hazard of failure. However, increased natural resource access has the *opposite* effect when groups are poorly organized with minimal central control. Figure 1 illustrates this effect: groups with no

resource cells are least likely to fail. These plots indicate support for H1: that the effect of natural resource access is conditioned on whether or not a rebel group can successfully manage resource profits.

Figures 3 and 4 similarly present the effect of natural resource access on the possibility of rebel

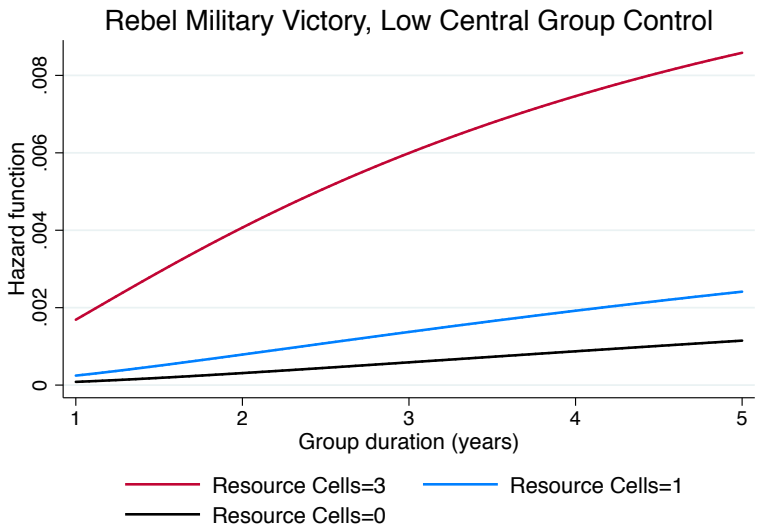


Figure 3: Hazard of Military Victory, Low Central Control

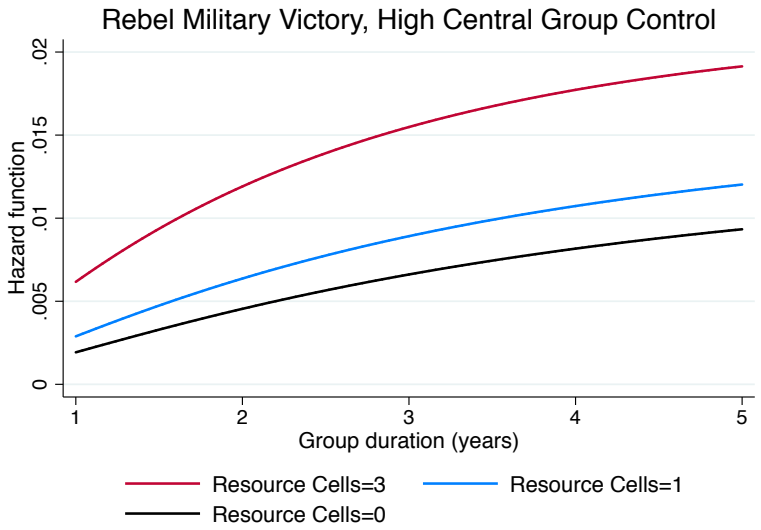


Figure 4: Hazard of Military Victory, High Central Control

military victory. In my second hypothesis, I stated my expectation that natural resource access – by providing at minimum additional economic gains – would increase all groups' prospects for military

victory. As figures 3 and 4 show, increased access to resource cells affects both group types in the same way: it makes them more likely to win. These results demonstrate support for H2. However, this outcome merits further discussion. This is, as noted, a very rare outcome in civil wars regardless of group characteristics or resource acquisition. As demonstrated above, natural resources can have a negative effect on some groups' survival. Thus, while profits from natural resources may increase a group's chances of beating the state – particularly for very poor or small groups – this increase can, in essence, be a gamble that is offset by the chance of internal corruption, disbandment, and failure.

Finally, the plots corresponding to the third hypothesis about the likelihood of a group reaching

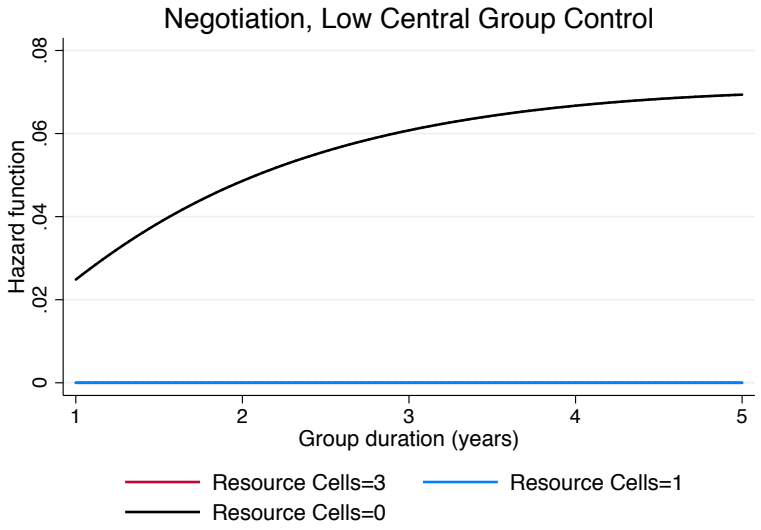


Figure 5: Hazard of Negotiation, Low Central Control

negotiation with the state can be found in figures 5 and 6. It should first be clear that negotiation, like rebel victory, is a fairly rare outcome – but as is evident from the figures, increased natural resource access *hurts* groups chances of negotiating with the state regardless of groups' organization. Figure 5 demonstrates that for groups with less central control, only groups with no access to resources are ever able to engage in negotiation. Although only two lines are visible on this plot, all 3 values of resource cells are plotted - the red line for 3 resource cells also falls at p(hazard of negotiation)=0. Groups with natural resource access (1 or 3 cells) never reach negotiation. It is worth noting that this is a fairly small sample, and thus not unusual to expect that groups with certain characteristics have a hazard of 0 for this event. Even for well organized groups which were hypothesized to be better equipped to present a substantial threat against the state, increasing natural resource access

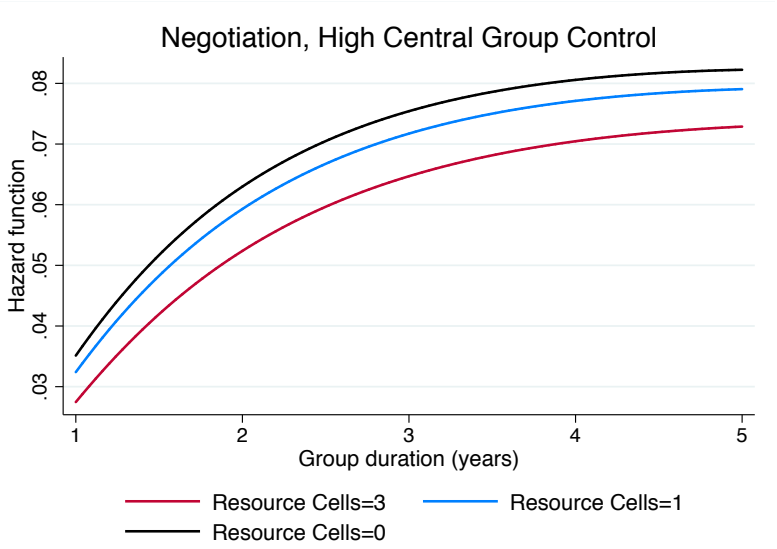


Figure 6: Hazard of Negotiation, High Central Control

hurts their chances of getting to the negotiating table (Figure 6).

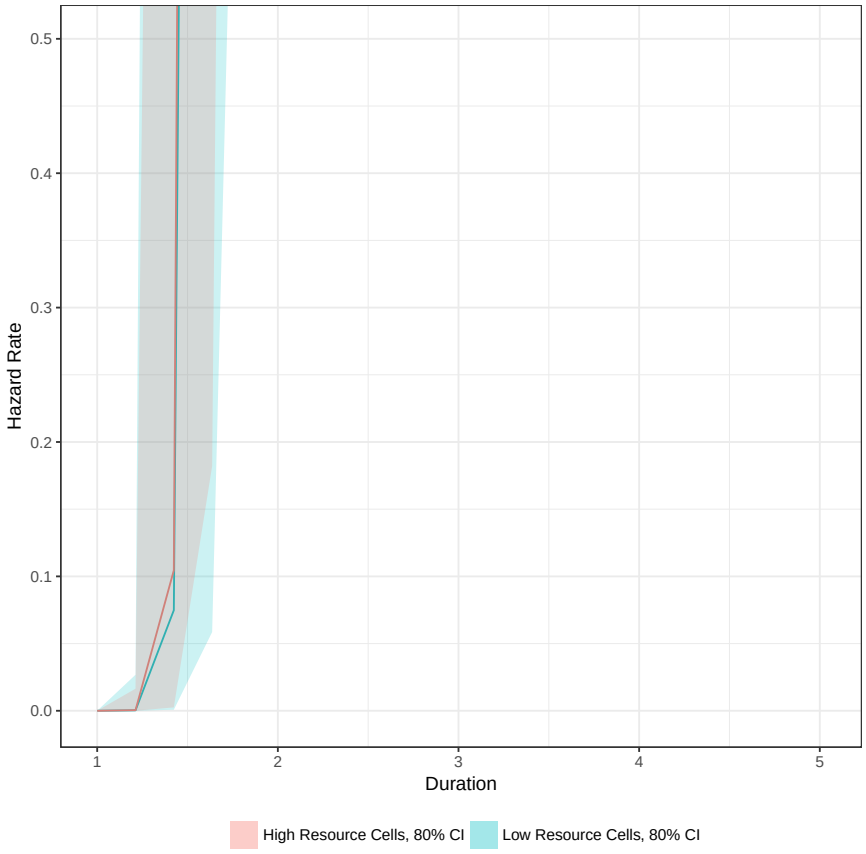
While the direction of these relationships – exempting the negotiation outcome – is as hypothesized, further investigation is needed into the statistical significance of the resource sum and central control measures as predictors of group outcome. Due to the difficulty in producing measures of confidence from standard parametric duration and competing risks models, I turn to Bayesian competing risks models[13]. This estimation choice allows me to include credible intervals for the subhazard of each type of group termination, while accounting for within-conflict variation and time varying covariates. I then plot the hazard of each type of termination for groups with high central control and low central control, varying their access to lucrative natural resources.

Below are the plotted hazard rates for each outcome (Failure, Military Victory, and Negotiation) with 80% credible intervals. Of immediate note is the size and overlap of the credible intervals. While the direction of these relationships are consistent with the frequentist models, these credible intervals provide additional important information and opportunities for further development. First, better empirical distinction between centrally controlled and non centrally controlled groups is needed in the data, as similar groups can be characterized in either way. Second, limited observations combined with a large amount of variation in groups' duration (1 year to 20+ years) means that these

[13]Full information about these models' specification can be found in this chapter's appendix. A Weibull baseline hazard, rather than the Lognormal, is used to minimize difficulties in convergence

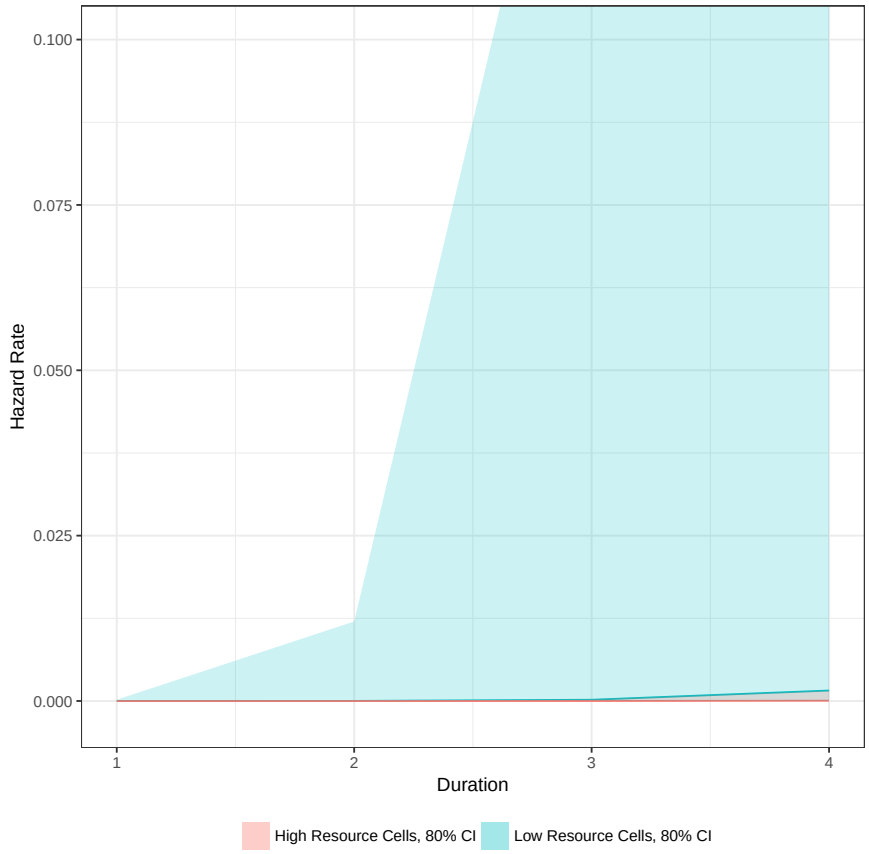
models struggle to estimate groups' duration with statistical confidence. This indicates that a more sophisticated way to measure time until each outcome may be needed to better understand the hazard of group failure within the first few years. Finally, while these results do convey minimal substantive information, they are an important step toward better capturing a data generating process in which groups' duration until multiple possible outcomes is jointly estimated.

Figure 7: Hazard of Group Failure, Low Central Control



These mixed results suggest the importance of further considering the state's strategic calculus when fighting resource-rich rebels. States should not want to negotiate with groups whose future strength is uncertain. Governments should instead preemptively suppress rebel gains if they can be certain that resource gains will amplify militants' power to the extent that the state would later be unable to counter. Such certainty about militants' gains is impossible, however, given exogenous factors such as global commodity price fluctuations and uncertainty about rebels' capacity to translate resource wealth into sustainable fighting power. If rebels attempt economic expansion and the resource in question suffers a negative price shock, meaning that the group will not profit, states

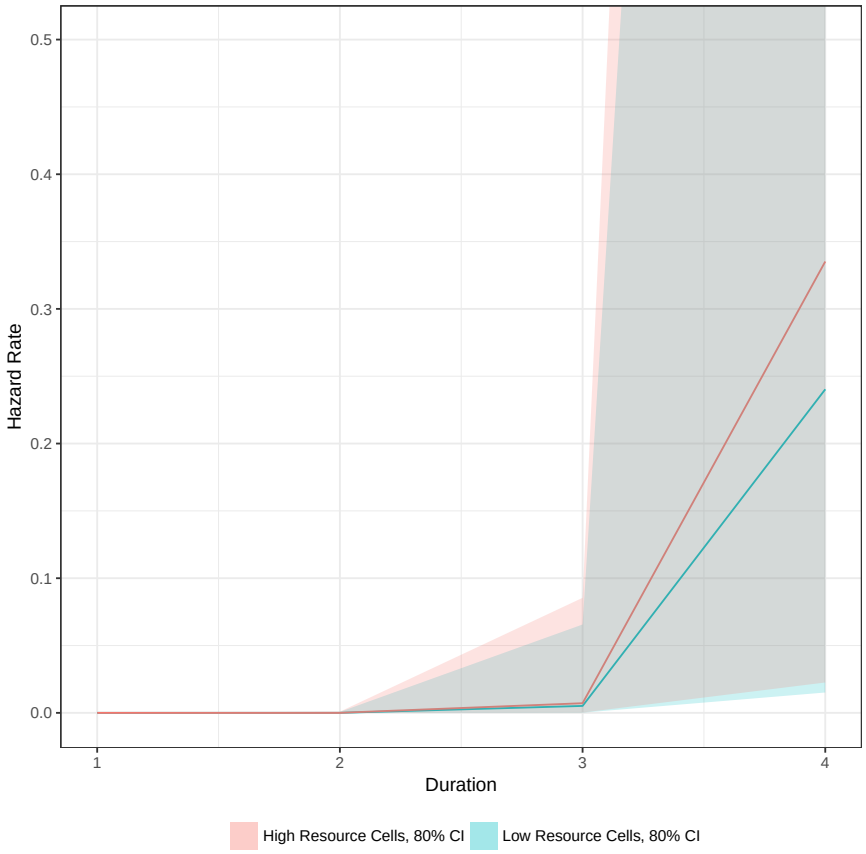
Figure 8: Hazard of Group Negotiation, Low Central Control



should prefer not to waste resources in early fighting – but also still wish to avoid negotiation with groups' whose future is uncertain. As the first two figures show, natural resource access can result in militant groups' collapse. Similarly, exogenous price shocks and price volatility can provide an uncertan economic environment for rebel groups in the same way volatile commodities affect state development. Given these sources of uncertainty resulting from natural resource investment, governments' unwillingness to negotiate with groups that are dependent on steady profit is understandable, but provides an important opportunity to investigate the circumstances under which such negotiation can occur.

The analysis thus lends tentative support to the the first two hypotheses discussed above: first, that natural resource access has differing effects on group survival dependent on the group's level of organization; second, that regardless of group structure, natural resources increase a group's chance of the (incredibly) rare outcome of military victory. Finally, increased natural resource access decreases militant groups' ability to negotiate with the state regardless of groups' organizational

Figure 9: Hazard of Group Failure, High Central Control

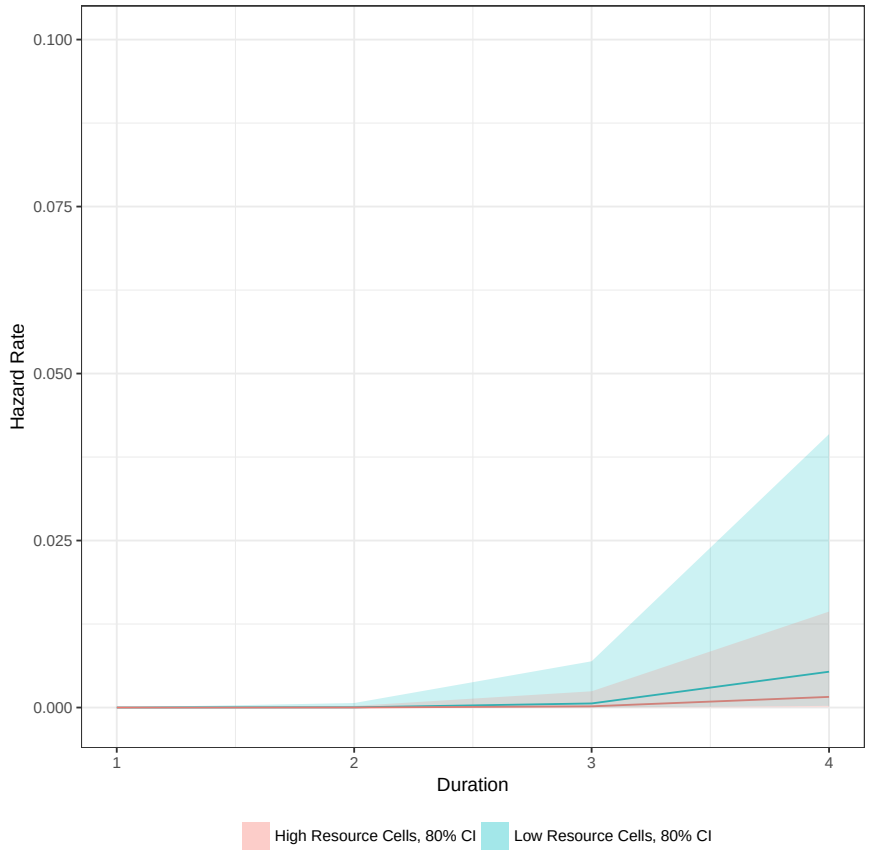


capacity. When combined, these results paint a fairly detailed picture of how the 'resource curse' functions for rebel groups. Resources can be a tempting windfall of revenue that can increase the chances of military success. However, only certain groups are able to capitalize on these economic gains and translate them into success towards their political goals – much like states, the proper 'governing institutions' must be in place for this to occur. Finally, natural resource access can be a curse in that it obstructs the primary pathway for militant groups to receive political concessions: negotiation.

Conclusion

Can natural resource access harm militant groups' chances of reaching their political goals? The results of this research suggest that the answer is yes. Much like developing states, I find that rebel groups can be haunted by a 'resource curse' in which the effect of natural resource revenues is conditioned on the quality of governing institutions. Groups with a high degree of central control

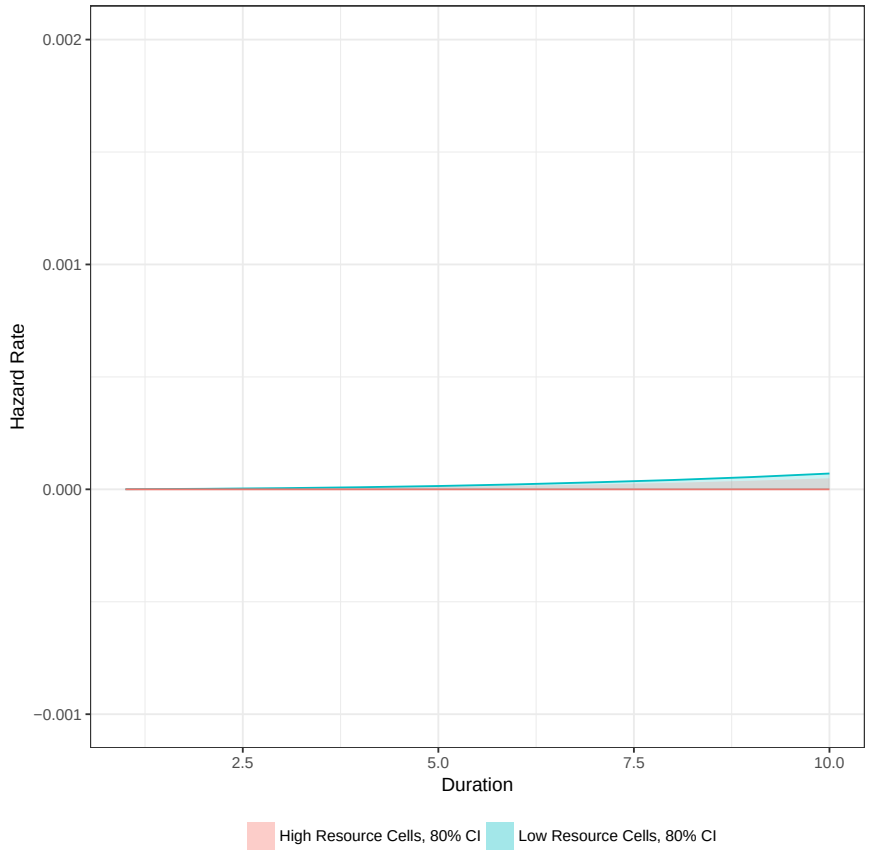
Figure 10: Hazard of Group Negotiation, High Central Control



are able to mitigate chances of internal corruption and fragmentation by appropriately budgeting economic gains and ensuring their application towards group survival and progress. Militant groups without such central control, however, experience the opposite effect: increasing their access to natural resources makes them more likely to fail due to such internal power struggles and improper allocation of revenue.

I also find that while natural resource access does increase groups' probability of military victory, it limits groups' ability to get to the negotiation table with the state. Although natural resources increase group revenue and power, they augment the commitment problems that groups face. Given possible price fluctuations in the resources upon which groups can become dependent as well as internal causes of failure, states should be unwilling to negotiate with a group whose power might shift drastically in the future. Further, states will not wish to negotiate with groups whose nature appears 'criminal' or solely focused on economic gain. This means that while the rare outcome of military victory becomes marginally more plausible, the more realistic possibility of negotiation

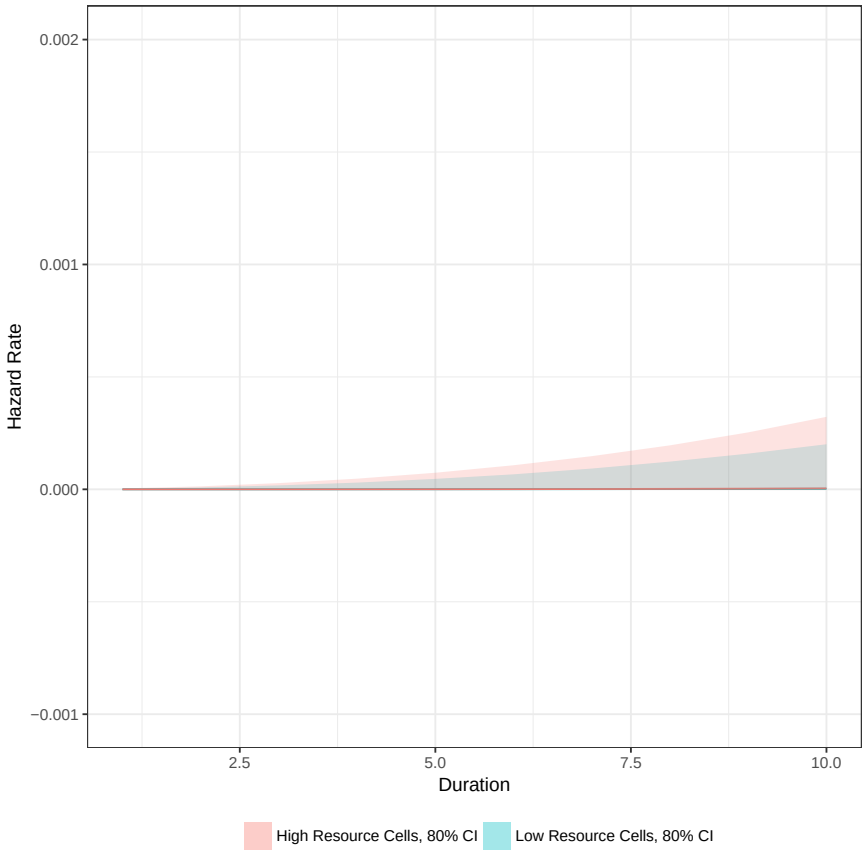
Figure 11: Hazard of Group Victory, Low Central Control



becomes less possible as natural resource access increases.

The findings of this paper indicate that scholars should reconsider the effects of natural resources in conflict, particularly for the strategic interaction between states and militant groups. Specifically, if certain groups can be expected to fail as a result of the resource curse, strategic states should be less concerned about preempting these groups' access to revenue, as the literature on shifts in power and commitment problems in war would prescribe. This paper also suggests that natural resource access deserves greater consideration for studying the conditions under which negotiation can be expected. Finally, my findings indicate that the trend toward both geographic and temporal disaggregation of data should continue, as this provides increased information about group location relative to important natural resource features and allows us to track group-level changes such as leadership or relative strength over time. This paper finds that the resource curse certainly does affect rebel groups, and makes room for additional theoretical and empirical contributions to better

Figure 12: Hazard of Group Victory, High Central Control



understand the nature of this curse.

CHAPTER 3: REBEL PRIMARY COMMODITY MARKETS AND NEGOTIATION IN CIVIL WAR

Abstract

Does rebel access to natural resources hurt or help warring parties' chances of negotiating? To address this, I consider how rebels create new markets for lucrative primary commodities by striking deals with local 'investors.' Rebels weigh state offers of negotiation against anticipated commodity revenue. Similarly, governments co-opt rebels' possible investors, thus maintaining their territorial control without making concessions to militant groups. Commitment problems arising from local investors' shifting loyalties lead to delayed negotiation. I develop a game theoretic model of government, rebel, and local investor strategic interaction. The model's implications indicate that increasing militants' access to natural resources decreases the probability that such conflicts will end in negotiation - except for very strong states, where even the greatest projected resource gains cannot even the playing field. I find support for these hypotheses with quantitative tests on both cross-conflict, geo-referenced data and municipal level Colombian data about the FARC's involvement in the coca trade.

Introduction

How does access to primary commodities affect rebels' chances of negotiating with the state? Groups that profit from natural resources– such as the FARC and the Islamic State – are some of the most durable and powerful militant organizations (Humphreys, 2005; Lujala, 2010). Yet, accruing power and fighting capacity by producing and selling resources such as drug crops and oil reserves rarely leads the group to the negotiating table. Resource-driven conflicts often last much longer, with states refusing to negotiate with rebel actors that pursue economic endeavors. Why, then, if resource profits enable these groups to become far more powerful threats, do states delay negotiation?

This study develops an explanation of how natural resources affect governments' willingness to offer negotiation and militant groups' propensity to accept. I consider a source of uncertainty about the future balance of power between the militants and government: rebels' capacity to build a market for the production, distribution and sale of primary commodities. I demonstrate how a rebel group's ability to use natural resource revenue to buy off key local actors – including farmers or miners, distributors, public officials, community leaders – can prolong conflict and diminish the already rare outcome of negotiation. These local investors take on varied roles dependent on commodity type, existing market structure, and militant groups' degree of involvement, but are universally necessary for resource-rich groups to generate profit. I use the term 'local investors' to capture the variety of militants' economic partners without limiting their purpose or possible involvement to specific conflicts.

For example, ISIS' control over oil production in Iraq and Syria and distribution for eventual international sale was dependent on middlemen to refine and smuggle oil outside of ISIS-controlled territory (Faucon and Albayrak, 2014). Similarly, as the Taliban has increased their control over the heroin trade from taxation of poppy farmers to participation in reform and transport, their partnerships have expanded to include smugglers and corruptible local political officials (Mashal, 2017). As such, this study addresses local investors in a generalizable framework that captures the prevalence and importance of such relationships in intrastate war.

In long-surviving intrastate conflicts, gaining the loyalties of these investors allows insurgents to build and maintain the illicit economy that fuels conflict. Other local actors, however, remain loyal to the state, indicating that the access to revenue from nearby primary commodities these investors'

support affords is not guaranteed. Militant groups' control of lucrative territory achieved through locals' support is therefore tentative at best. When community leaders' partnership allows rebels to increase profits, their power relative to the state also increases, suggesting that negotiation should become more likely. However, accepting political concessions in negotiations robs militant groups of future profits and with it the local support augmenting the rebels' power. When militant groups can expect to continue profiting from conflict due to cooperation from local investors, a broader range of offers made by the government is unlikely to appease the group, as political concessions become less appealing in comparison. States, meanwhile, seek to prevent local investors from striking this deal with militant groups by offering tax cuts, economic credits, arms for self defense, or other means of encouraging loyalty and incentivizing local actors to resist rebels' attention. This further prolongs conflict, as states respond to rebels' increased strength locally as a substitute for conflict-level negotiation.

Below, I review the relevant literature about natural resources and intrastate conflict, focusing on how rebels strike deals with local investors and how states undermine these deals, making negotiation less likely. I then consider government, rebel, and local investor interaction to assess how changes in the value of natural resources available to rebel groups and the resulting balance of power affect the probability of negotiation leading to conflict resolution. I test my argument at two levels of analysis: with a duration analysis of negotiation across intrastate wars and a micro-level analysis of local investors' participation in the FARC's development of coca markets.

Natural Resources, the Balance of Power, and Conflict Negotiation

Negotiation in any civil war is a rare outcome (Kaplow, 2016; Walter, 1997). Conflict processes such as negotiation can be further complicated by the presence of natural resource wealth in conflict zones. This means that identifying the conditions under which negotiation can be expected is an even more complex endeavor in such conflicts.[14] Natural resources have differing effects on conflict negotiation depending on the level of analysis and the assumed theoretical mechanism motivating the conflict (Wennmann, 2011; Rustad and Binningsbo, 2012; Humphreys, 2005). If natural resources are used to effectively close the gap between government and rebel groups' probability of winning, such

[14] I define negotiation as any peace-inducing deliberation.

resource profits may be positively associated with negotiated outcomes, as states may be motivated to negotiate with strong groups that will pose a future threat to their security. However, others note that wealth gained from primary commodities influences rebel actors to continue fighting to enable future profit if they cannot fully defeat the state (Humphreys, 2005; Jonsson, Brennan and O'Hara, 2016).[15] Two differing mechanisms, then, can affect negotiation in conflicts with natural resources: militant groups may be motivated to fight to maintain their access to profit, and shifts in the balance of power can affect states' and militants' bargaining process. Additional scholarship is necessary to differentiate and synthesize these mechanisms.

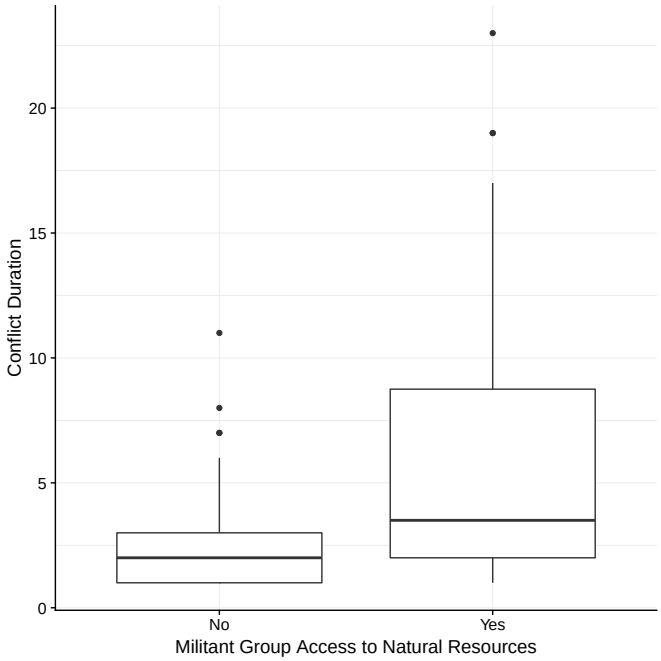
It is well established in the literature that natural resources affect the onset and duration of intrastate conflicts (Ross, 2004; Fearon and Laitin, 2003; Berdal and Malone, 2000; Sorens, 2011; Thies, 2010; Lujala, 2010). As Figure 13 below illustrates, the average duration of conflicts involving militant groups with no access to lucrative natural resources is just over two years, while conflicts in which militants have such access on average last nearly six years. As also evidenced in Figure 13, there is substantial variation in the survival of groups that benefit from natural resources. This variation provides an opportunity to investigate the characteristics of long-lasting groups and to better consider reasons for the delays in conflict termination related to resource access.

In all intrastate conflicts, changes in the balance of power between rebel groups and states affect conflict duration and whether or not negotiation is achieved (Gent, 2011; Clayton, 2013). Stronger rebels are better able to gain the state's attention and overcome bargaining problems stemming from their lack of credibility. However, differing foundations of rebel strength may have diverging effects on the state's willingness to negotiate, depending on the durability of rebel power.

This suggests that it is first necessary to consider now natural resource wealth impacts the balance of power between rebel groups and states. Access to primary commodities can aid militants by providing the direct benefits of profit, which groups can apply towards additional weapons or troops, or indirect benefits such as territorial control as a byproduct of involvement in resource production. States are most often willing to bargain with 'established' rebel groups such as those with consistent natural resource access through their control of territory (Kaplow, 2016). Given the literature about

[15]This may be dictated by whether or not any proposed peace agreements allow the rebels some share of continued economic activity. However, provisions for rebels' continued access are uncommon and, where they occur, result after protracted fighting that indicates states' determination to delay negotiation until absolutely necessary (Ross, 2004). Further, some resources, such as drug crops, are outside of state control and exempt from such power sharing agreements.

Figure 13: Conflict Duration for Groups With and Without Natural Resources



the balance of power in civil wars, if natural resources narrow the difference in power between the state and the rebel group and allow the group to be percieved as a real threat, negotiation should be more likely as weak groups grow in strength. When militant groups translate natural resource wealth into fighting capacity, they should be expected to capitalize on this positive shift and pursue negotiation from a rare position of strength.[16] Such an outcome is conditional, however – and it is necessary to consider *how* militant groups are able to profit from primary commodities and when they successfully translate this profit to military strength.

Additional relevant scholarship points to commitment problems as a key explanation for why parties in intrastate conflict find it difficult reach the negotiating table (Walter, 1997). If a militant group must surrender its arms – the source of its bargaining power – in the process of conflict resolution, their ability to prevent the government from reneging on agreed concessions in the future is limited. When groups profit from primary commodities, getting to negotiation may be aided by a positive shift in power. Paradoxically, then, although primary commodity profits can increase weak groups' power and make negotiation more likely, for militants negotiating also means giving up any access to future profit and with it the source of militants' power. Control of their economic gains is

[16]Relative to other groups and their previous capacity prior to economic growth.

by definition a byproduct of conflict, requiring the group to remain active to ensure future wealth.

If militant groups weigh the benefits of a negotiated outcome against the costs of continued conflict (Kaplow, 2016), rebels with economic profits from resource production and sale will find the political concessions of negotiation even less appealing, as primary commodity wealth offsets these costs. Despite the costs imposed by fighting, the economic benefits of territorial occupation and natural resource investment can make ongoing conflict beneficial for militant groups. The presence of lucrative commodities has an effect not only on the characteristics of civil wars writ large but also on individual group strategy, goals and the state response to these changing dynamics (Snyder and Bhavnani, 2005; Weinstein, 2005; Staniland, 2012). The RUF in Sierra Leone, for example, notoriously delayed settlement and disarmament with the state to continue accessing diamond mines (Farah, 2000). If and when groups are able to profit from access to natural resources, this windfall affects their available strategies – provided that they are also able to effectively manage these profits. Even if rebels' increased capacity persuades states to offer negotiation, militant groups must consider that negotiating will lead them to lose the strength enabling them to counter the state: their projected economic profit accrued by partnering with local investors. Because rebels should be expected to weigh the costs of fighting against the benefits of primary commodity wealth in this way, it is next important to consider the conditions under which natural resource access can truly be beneficial to rebels' wealth, capacity, and aims.

Despite the literature describing how natural resources amplify militant groups' power, similar commodities have been shown to harm states' development rather than aiding their growth. As research in comparative political economy demonstrates, states with ineffective institutions are unable to manage and reallocate profit from the oil or other resources contained in their territory (Sachs and Warner, 2001; Robinson, Ragnar and Verdier, 2006). Thus, increased development is not a foregone conclusion for states with primary commodity wealth. Instead, states that should be expected to convert resource wealth into development are often harmed rather than helped by such resource endowments.

A similar resource curse argument can be applied to the expectations for militant groups' growth and strength, particularly for those with long-term access to territory containing natural resources. The impact on such groups from natural resource wealth differs from those that are only able to intermittently loot resources. Rebel groups, like states, need to efficiently manage the production and

sale of primary commodities and ensure that resource profits are reinvested into fighting. Further, like resource rich states, such groups are even more prone to poor management, infighting and corruption that drives collapse rather than growth and increased capacity. Groups that fail to manage resource investment face a resource curse similar to states, as poorly governed groups (those without central leadership) are *less* likely to survive if they have access to natural resources, while primary commodities increase well governed groups' ability to survive.

This means that resource access is not enough to ensure militant groups' growth or increased capacity. Further, the argument that rebels' natural resource wealth will even the balance of power and encourage negotiation is conditional. Rebels must first ensure that they can generate profits from primary commodities, which means not only being able to access the resource in question but also to sell it. Doing so requires access to resource markets, generally through cooperation with existing economic actors. In particular, for militant groups to generate profit that influences their relative strength, they must rely on investors. Evaluating the effect of natural resource wealth on group outcomes such as negotiation, then, requires consideration of the economic partnerships on which rebel strength relies.

Rebels' Economic Partnerships: the Importance of Local Investors

Groups with territorial access to natural resources must make use of existing labor and connections to efficiently trade and profit. Militant groups are, of course, able to coerce a degree of cooperation through violence against noncombatants (Wood, 2010; Kalyvas, 2006). This differs, however, from militant groups' capacity to form mutually profitable and minimally costly partnerships with key local investors in the territory in which they operate. Consistent access to territory containing agricultural crops, illicit drug crops, mining resources or other types of lucrative primary commodities allows militant groups to create stable economic relationships with actors that are important for the local illicit economy surrounding these commodities (Collier, 2000; Arnson and Zartman, 2005). Specifically, militant groups are able to strike deals with relevant investors by offering security and a share of increased profits from rebel control, in exchange for labor and local markets in which to sell these commodities. The Taliban, for example, first partnered with local farmers and community leaders to increase opium production and manage transportation out of opium-rich localities (Azam,

2016; Peters, 2010).

The suggestion that rebel groups orchestrate agreements and cooperation with local investors is in keeping with literature about state-building in conflict environments, which details the interactions between local leaders and rebels to set up wartime institutions (Arjona, 2015; Mampilly, 2011). Natural resource wealth allows groups to form partnerships with investors, as militants can provide such actors with economic benefits – particularly benefits that the local licit economy may not be able to match. For example, in some Colombian municipalities, the rebel-led illicit economy eclipsed the licit economy during the conflict as community actors invested and participated in FARC or ELN-led drug production (Rangel Suarez, 2000).

This implies that the details of these militant-investor partnerships vary with conflict characteristics, resource type, and current local economic conditions. However, the need for militants to produce, transport, and market any primary commodities in the territory to which they have access remains constant across resource-driven conflicts. The RUF relied on smugglers to transport diamonds into Liberian markets (Rupert, 1999) much in the same way the Islamic State relied on middlemen to move oil into Turkey (Faucon and Albayrak, 2014). Similarly, both the FARC and the Taliban established relationships with drug crop growers and drug refiners to build their respective coca and opium empires. In each of the above rebel-investor 'deals', militants incentivized individuals or groups to partner with them over the state or other existing economic partners. Variation in conflict conditions will impact the scale and content of the incentives rebels must provide local investors,[17] but the presence of such deals can be considered a generalizable phenomenon. While further investigation about the specific nature of these partnerships is merited in additional scholarship, it is first appropriate to consider the conditions under which militants can establish such commodity markets and subsequently profit from them.

Militants' fighting capacity increases as a result of local investors' cooperation and their resulting profits, making negotiation with the state more plausible as the group's perceived threat grows. However, the partnerships underlying shifts in rebels' power will dissolve if rebels enter negotiations with the state, implying that the foundation for such negotiation disappears, increasing the commitment problems discussed above. These local investors will no longer be able to profit from the illicit

[17]This paper captures this dynamic by allowing a bargaining range for rebels' deals with local investors in the game theoretic model below.

market they have helped to build if a settlement between the state and militants occurs. Maintaining deals between supporting investors and militants and the success of these illicit economic endeavors is dependent on continued conflict. The militant group's presence is necessary to provide security against the state's efforts to reestablish economic control and to maintain the expected amount of profit gained and shared with these investors. To maintain their newfound profits and power, militants must be able to assure local investors that they will continue to receive a portion of natural resource revenues.

Rebels are therefore incentivized to avoid negotiation when they can establish and profit from economic relationships with local investors. This is not only because primary commodities only gained through war are lucrative, but also because the investors on which these groups rely will abandon their partnerships if rebels begin talks with the state. It is next important to consider how this interaction between militants and local economic actors affects states' counterinsurgency strategy and their willingness to offer negotiation. The balance of power argument suggests that rebels' economic partnerships enable them to become more powerful in relation to the state, prompting state offers of negotiation.

However, the state, like the rebel group, is cognizant of the tentative nature of rebels' source of power and will take opportunities to undermine these partnerships. When resource-rich militant groups invest in economic partnerships, states must reconsider the strategy they choose to employ. If the state anticipates that these partnerships will allow rebels to translate resource wealth into fighting strength, the best course of action may be to preempt this growth in capacity by coopting militants' partners at an early stage. This logic is in keeping with literature about endogenous transfers of power and commitment problems (Fearon, 1995; Carter, 2010; Powell, 2006). However, states will not wish to waste resources by engaging with groups that will fail to build from such resource wealth endowments and instead increasingly resemble criminal bands (Kalyvas, 2015; Gutierrez Sanin, 2004). Thus, the effect natural resources have on states' decision to negotiate is unclear. States may instead employ localized conflict strategies in an effort to undermine relationships between militant groups and their local economic support. This means that states will incentivize latent local investors to resist rebel activity in varied ways. Incentives from the state can include increased provision of public goods, direct payments or economic incentives to specific community leaders, or

the provision of arms or training to encourage the creation of pro-government militias (PGMs).[18] These mechanisms through which governments seek to draw economic support away from militants all function as encouragement to protect the territory from rebel access.

Both states and rebel organizations, then, vie for the support of key local actors - namely, rebels' possible investors. Governments do so to maintain their territorial control and prevent rebel groups from establishing lucrative economic relationships that make them more powerful relative to the state. Rebels do so to maintain access to natural resources, continue fighting the state, and increase their economic and possibly military capacity. This localized competition can fuel resilient conflicts, as the rebels' base of power is tentative, making it difficult for them to strike a deal with the state through negotiation. Although natural resources increase rebel capacity and even the current balance of power, negotiation becomes less likely due to increased commitment problems – both between the state and the militant group, and between militants and their investors. The availability of deals between local investors and rebels, driven by the prospect of resource profits, affects whether or not a rebel group would accept negotiation from the government. Similarly, if governments can regain key territorial assets by encouraging local investors to defect from economic relationships with rebels, this decreases their willingness to offer concessions to a rebel group. Thus, local investors are a central and under-considered driver of both mechanisms through which natural resources can increase conflict duration.

If natural resource wealth makes it even more challenging to reach intrastate conflict negotiation, under what conditions *do* we observe negotiated outcomes between militant groups and the states they fight? The literature reviewed here suggests that militant's access to natural resource wealth can affect the prospect of an agreement in several key ways. Given changing factors such as differences in resource access and value, the characteristics of local investors, and different states' capacity to influence these investors, the specific conditions under which negotiation should occur remain unclear. In the next section, I develop a model to better explain this conflict outcome in resource-driven intrastate wars, focusing on how natural resource value and states' relative strength affect when militants reach negotiation.

[18] Such incentives differ with state capacity, the type of conflict, and the nature of the local investors. To capture states' allocation of resources across a variety of intrastate conflicts, I do not focus on a particular type of local state investment for this study.

Modeling Negotiation in Resource-Driven Conflict: A 3-Player Game

I develop a formal model to further explore the strategic interaction between the government (G), a militant or rebel group (R), and the local investors (L). I treat L as representative of the median 'local investor' drawn from a distribution of possible investors. This is in keeping with the idea of a generalizable set of local investors that militants seek to attract to develop and expand their primary commodity markets. In this model, I consider a government and militant group that are already engaged in fighting a conflict over some policy or territory. At the start of the game, it is assumed that the local investors are not involved in the conflict, perhaps because the rebels are not yet active in their particular territory. This means that they neither pay costs of war or receive any positive payoff unless they become involved in the conflict by aligning themselves with the government or the rebel group. It is also assumed that the militant group has access to natural resources, although the value of such resources – which affects rebels' ability to partner with local investors – varies and is represented by the parameter λ. The rebel group profits from this resource as long as conflict continues. Phrased differently, if the group accepts G's offer of negotiation, I assume that they are no longer able to illegally engage in natural resource production or trade for profit.

I include the model's game tree below in Figure 14 and a table of parameters in Table 1. The game proceeds as follows: first, the government (G) decides to either incentivize the local investors or make an offer of concessions (negotiation) to the rebel group. I use the term 'co-opt' for the first option as shorthand for a variety of methods through which governments encourage local officials to fend off rebel groups. In practice, this might mean increasing local investment in public goods, engaging in a form of clientelism in which key supporters are provided economic incentives, or indirectly providing arms and weapons to nascent militia groups. In short, the model is agnostic about how G incentivizes local investors to resist the rebels. If G invests in L and L remains loyal to the government by rejecting the possibility of cooperation with the rebel group, G benefits from an increase in their probability of victory β. I do not include conventional force as a strategy for the government for the sake of simplicity. It can be assumed that the government is already fighting the broader conflict by standard military means and that negotiation is offered to the group as a whole, but that the distinct tension in this game is over the locals' role in the fight for a specific, resource-rich territory that will increase R's economic and fighting capacity.

After observing G's decision, R has the choice to either accept G's offer of negotiation or to instead make their own offer θ of some share of the natural resource profits to L. In doing so, R makes an effort to engage L's cooperation and increase the group's economic gains. If R accepts the negotiation deal from G, the actors' payoffs represent the current balance of power, in which G receives p, R receives $1 - p$ and L receives 0 as they have not yet entered the game. I conceptualize the rebels' offer θ as a business contract in which some share of the group's profits from natural resource extraction are given to the local investors, and the probability that this share is maintained is aligned with R's probability of surviving in the territory. When R refuses G's offer of negotiation and instead tries to strike a deal with local investors, R and G pay costs of conflict c_R and c_G respectively.

When R makes an offer of cooperation to the local investors, L will accept if this offer θ is high enough to compensate for the costs accrued from fighting with the rebels and the change in probability of survival with the rebels vs. winning with the government. I assume that R prefers L's acceptance over rejection, given that this increases R's ability to hold on to territory and to continue earning any profit – despite the loss in profits θ. If L accepts, L's payoff is expressed in terms of R's probability of winning the contested territory, as I assume that such acceptance of the rebel offer constitutes an alignment with R's goals, while rejection means that L will now fight alongside G. This assumption is in keeping with empirical accounts in which, following rebel activity in a territory, local investors or officials' choice to either remain loyal to the government or begin assisting the rebels constitutes a decision to engage in conflict for one side or the other. It is also designed to capture the idea that both states and rebels are vying for cooperation from local investors – either to form or prevent economic partnerships.

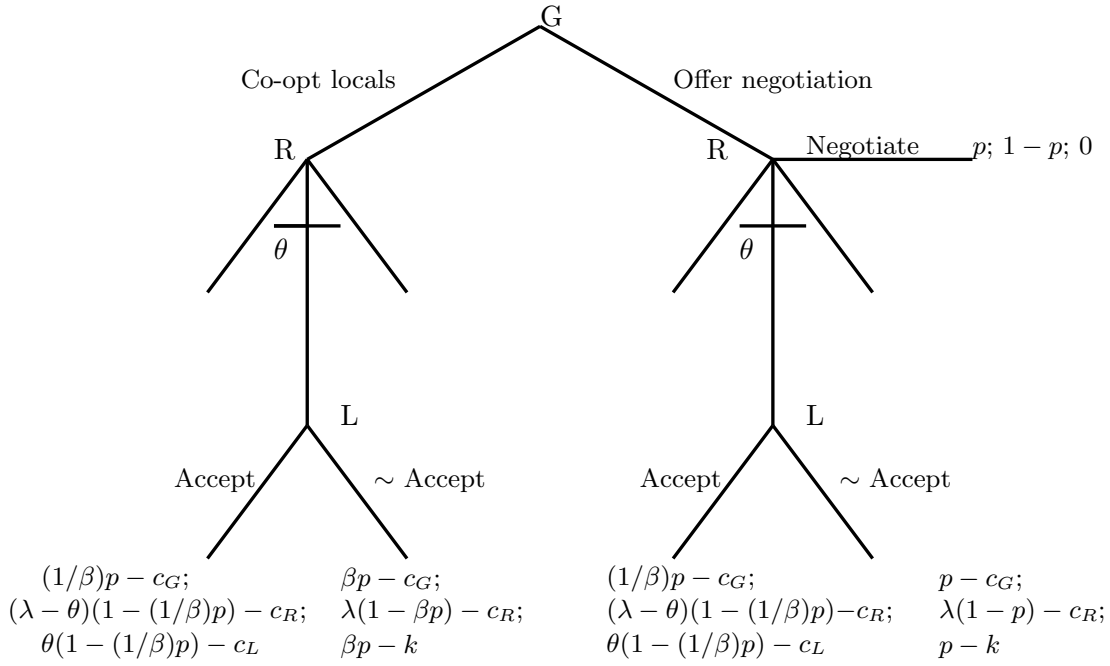
If L accepts R's offer, R loses θ from the resource profits as an ongoing transaction to the local officials, meaning that they keep $(\lambda - \theta)$ with their probability of victory, while L receives θ with the same probability. Cooperation between the militant group R and the locals L also diminishes G's probability of victory by $1/\beta$ – the inverse of the increase when L cooperates with G, as such cooperation means that R is able to secure a valuable hold on relevant territory and increase their natural resource profits. A deal between L and R allows R to continue engaging in conflict from this location and provides R with an upward shift in power relative to the government.

The costs for L differ depending on their decision after receiving R's offer θ. If L supports R, they pay costs c_L, while they pay k if they choose to support G. This difference in costs can be

conceptualized as L's underlying affinity for either actor. The costs c_L and k may be influenced by G and R's ability to punish L for choosing the opposite side, although this punishment is not explicitly modeled here. These costs may also capture the ability of other community actors or parties in conflict to punish the local investors. Thus, the costs can also represent changes to their reputation or other, non- economic incentives. As the model necessarily simplifies the variety of important relationships shaping actors' choices and motivations in civil war, I do not model such interactions directly.

Finally, prior to the start of the game, I assume that Nature draws c_L from a uniform distribution with $c_L \in [0, 1]$. Only L observes this draw, meaning that G and R have incomplete information about c_L. G and R are equally unaware of L's resolve to side with them, and uncertainty about c_L alone can be thought of as uncertainty about the difference between c_L and k.[19] Changing the setup such that G and R do not have information about k leads to similar results and empirical predictions. The assumed uncertainty about c_L captures the dynamic discussed at the beginning of this paper in which local investors' allegiances are tentative and liable to shift.

Figure 14: Three Player Game Tree



[19]Having G and R be uncertain about both k and c_L unnecessarily complicates the game.

Table 1: Model Paramters and Functions

Parameter	Range of Values	Substantive Meaning
p	$\in [0, 1]$	G's probability of keeping territory
λ	$\in [1, 2]$	R's resource profit from conflict
θ	> 0	L's share of resource profit
β	> 1	L's impact on p
$c_G,\ c_R$	> 0	Cost of fighting
c_L	$\in [0, 1]$	L's cost of fighting for R
k	$\in [0, 1]$	L's cost of fighting for G

Model Solution and Implications

Due to the inclusion of incomplete information for G and R, the game is solved using the perfect Bayesian equilibrium concept (PBE). I include the full solution in the appendix, but focus here on the intuition of the game. As G and R are uncertain about the parameter c_L, I first find the critical value c_L* at which L is indifferent between fighting for the rebels and the government for either side of the tree. The complete information solution - in which G and R are aware of how costly it is for L to cooperate with the rebels - is also included in the appendix. It is important to note that under complete information solution, G will always offer negotiation. This is because G is aware of the value at which L will no longer cooperate with R, and can adjust their offer of negotiation to R accordingly. When G has co-opted the local investors (on the left side of the tree), the value of c_L – the locals cost of cooperating with the rebels – at which L is indifferent between accepting and rejecting R's offer is higher than on the right side of the tree. This suggests that an acceptable offer from R to L must be higher when G invested in the local investors, as L's probability of winning alongside the government is higher in this case. When the government has incentivized locals to remain loyal, militant groups will find it more difficult to make acceptable offers and gain local investors' cooperation.

Because the value of c_L is unknown to R and G, on either side of the tree R makes an optimal offer of to L based the payoff the group will receive if locals agree to cooperate with them. R's payoff following an offer to local investors is based on the amount paid to local investors and the probability of correctly assessing the costs locals pay for cooperating with the rebel group. If G has provided incentives to co-opt the local investors, R's only strategy is to make an offer of economic partnership to L. When the government has extended an offer of negotiation to R, however, the rebels

must compare their payoff from accepting negotiation to the possibility of gaining local support and accruing continued profits. If R negotiates with G, they receive a payoff of $1 - p$, reflecting the current balance of power between R and G. The rebels will agree to negotiate with the state if $1 - p$ is greater than R's payoff from extending an offer to L, which is probabilistic depending on whether or not L will accept.[20] Two parameters are of particular importance for R's decision of whether or not to accept: λ and p.

The parameter λ, bounded between 1 and 2, captures the benefit rebel groups receive from natural resource access. A λ of 1 indicates territory that provides no increase to R's economic and fighting capacity, while a λ of 2 signifies very high amount of resource revenue that doubles R's probability of defeating G in a given territorial area.[21] It is important to note here that I consider λ to represent revenue from resources that cannot be accessed simply through looting. As long as they remain in the conflict, the rebels in question are able to consider λ a source of fairly regular profit, which entails access to the territory in which the resource is located. Empirically, low values of λ represent control of common agricultural crops or even minimal alluvial mining assets, while lucrative drug crops or (rarely) access to oil reserves would constitute high values that significantly increase R's ability to hold on to the territory in question. Thus, as the value of natural resources increases, R will be less willing to negotiate and give up access to future revenue, despite receiving concessions from the government. Increased resource value also provides R with greater capacity to sway local investors and form important economic partnerships.

In addition to the resource value λ, the balance of power between G and R also factors into R's decision of whether or not to accept negotiation. As the state's strength p increases, R will receive less from any agreement struck with G, as their payoff is $1 - p$. However, when G is very strong, R must negotiate as any value of λ cannot offset the probability of G winning the territory in question. An implication from the model, then, is that when facing strong governments, even natural resource revenue that can more than double R's probability of winning cannot offset the appeal of negotiation due to G's strength and ability to defeat R. Such situations – in which a rebel group that is able to hold territory faces a strong, capable government – are empirically rare.

[20] The inequality comparing these two payoffs can be found in the appendix.

[21] I make this assumption about the value of λ because natural resource wealth that will more than double R's probability of winning is empirically very rare.

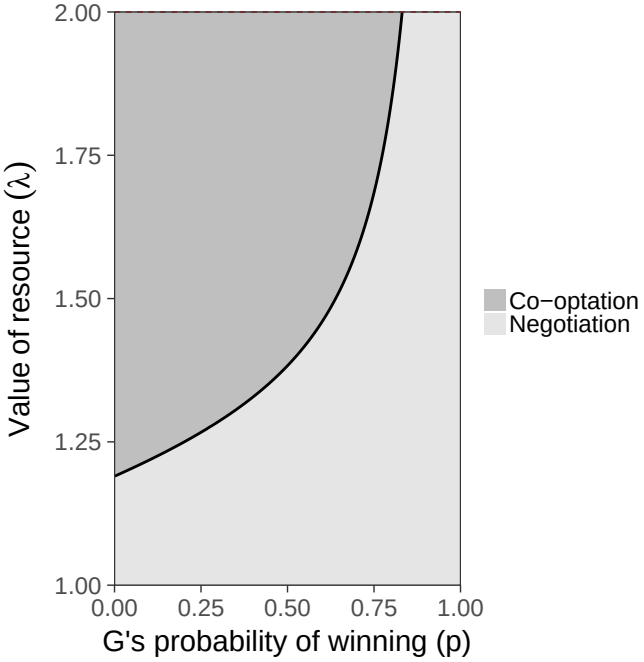
In contrast, when G's probability of victory is low to moderate as in the bulk of civil war settings, R's decision of whether or not to negotiate is dictated by the value of λ in comparison to the concessions offered by the government. These concessions are designed to be general, and could constitute monetary compensation, political concessions such as legislative participation, or territorial gains. I leave R's payoff from negotiation $1 - p$ intentionally generalizable to capture a variety of agreements that G might bring to the table in an effort to end the conflict with R. For rebels facing weak or moderately strong governments, agreeing to negotiate a cessation of conflict depends on the resource value λ to which R has access.

Thus, R's decision to negotiate is a function of both G's offer of concessions – which corresponds to R's probability of defeating the state and maintaining its access to territory – and the revenue R can extract from any natural resource(s) to which R has access. When assessing G's decision of whether or not to co-opt L at the top of the tree, I make an important simplifying assumption: that G prefers negotation to the costs of incentivizing L's loyalty and continuing to fight. This assumption serves two purposes. It first allows the government's action to be a function of R's anticipated actions, which prompts a more careful assessment of the rebels' decision calculus given uncertainty about the local leaders L. Secondly, it follows logically from the primary parameters dictating the rebels' decision. Strong governments (high p) facing a rebel group with natural resource access can offer minimal concessions while preventing rebels from continuing to fight and gaining strength as they profit from natural resource access. Thus, G has a dominant strategy depending on the value of λ: when λ is sufficiently low[22] or p is sufficiently high such that R will accept any minimal offer of negotiation, G will choose to negotiate rather than co-opting local investors. If, however, λ is high and R will reject negotiation in favor of chancing cooperation with L, G's dominant strategy is to attempt to undermine partnerships between L and R by playing Arm. This means that negotiation should only occur for very strong states that can successfully diminish rebel gains and offer minimal concessions.

Figure 15 illustrates the two equilibrium outcomes of the game as a function of λ, over the range of government strength p. The black line indicates how the critical value of λ at which R is indifferent between negotiation with the government and extending an offer of cooperation to

[22]Specifically, below the critical value of λ defined in the appendix.

Figure 15: Negotiation vs. Co-Opting as a function of Rebel Benefits from Resource Access



local investors changes at different values of p. As is evidenced in the plot, at very high values of p (roughly $> .8$), it is impossible for λ to take on higher values within the assumed range. These are the cases in which G's strength forces R to acquiesce quickly and for lesser terms.

For intrastate conflicts in which G is minimally to moderately strong, increasing the value of primary commodities rebels can access decreases the probability of negotiation. This is driven by such states' decisions to deter cooperation between local investors and rebels rather than negotiate. Only states that are powerful enough to confidently offset the possibility of rebel gains from natural resources will make offers of negotiation. Knowing that the rebels have access to highly valuable natural resources, G prefers to co-opt local investors in an effort to fight back against the rebel efforts to grasp important territory and prevent future increases in R's relative strength. Rebels, meanwhile, will continue fighting and profiting from lucrative natural resources when they make satisfactory offers to local investors. The game theoretic model yields two empirically testable cross-conflict hypotheses about negotiation when militant groups have access to natural resources. While these hypotheses address the conflict-level implications of the game-theoretic model, H3 addresses the sub-conflict mechanism through which states delay negotiation: reducing rebels' economic foundations by incentivizing local investors to defect from their partnerships.

H1: Increasing militant groups' access to lucrative natural resources decreases the probability of negotiation.

H2: The probability of negotiation is high for strong states regardless of groups' natural resource access.

H3: When militants in weaker states access natural resources, these states will co-opt militants' local investors, resulting in a loss of rebel profit.

Below, I address my data collection and testing plans for the cross-conflict hypotheses and the sub-conflict test for the third hypothesis. For the first two hypotheses, the dependent variable is the time to negotiation, as the game theoretic model provides intuition about when states and militant groups will delay this particular outcome. For the third hypothesis, I focus on militant and state interactions with key local investors in the Colombian conflict.

Cross-National Data and Testing

Testing the first two hypotheses requires information about rebel group location relative to that of natural resources and about rebel group outcomes. I bring together several sources of existing data in a novel approach for understanding how rebel resource access affects whether or not a group will reach negotiation with the state. Increasing groups' access to lucrative natural resources allows them to form economic relationships with local investors in these territories, which in turn makes concessions offered by the state less valuable in comparison to continuing economic opportunities. Because the outcome of interest is a group's negotiation with the state, my unit of analysis is the group-year.

My data compiles yearly measures of location-specific group activity and access to different resource types. I employ the Non-State Actor (NSA) Data (Cunningham, Gleditsch and Salehyan, 2009) for characteristics about the militant groups and coding the time to negotiation or censoring out of the dataset. I then pair this information with UCDP Geo-Referenced Event Data (Sundberg and Melander, 2013) for changes in group location over the years they are found in the data. Next, I match this with PRIO geo-referenced data about the location, yearly discovery, and amount of different natural resource types: petroleum, gold, gems, and drugs (Tollefsen, Strand and Buhaug,

2012).[23]

Finally, I include measures of state capacity from the Relative Political Performance data (Kugler and Tammen, 2012). Specifically, I make use of the Relative Political Reach (RPR) measure, which captures a government's ability to mobilize their population and extract resources, given factors such as the state's bureaucratic capacity and population characteristics.[24] Specifically, the construction of this measure is as follows:

$$\begin{aligned}\frac{\text{Activity Rate}}{\text{Population}} &= \alpha + \beta_1(\text{time}) + \beta_2(\text{Education}) + \beta_3(\text{Young Population}) \\ &+ \beta_4(\text{Social Security}) + \beta_5(\text{Urbanization}) + \beta_6(\text{Population}) \\ &+ \beta_7(\text{GDP per Capita}) + \beta_8(\text{Bureaucracy}) + \beta_9(\text{Inclusion Dummy}) + \epsilon\end{aligned}$$

This variable appropriately captures state capacity for several reasons. As Hendrix (2010) suggests, states' bureaucratic and extractive ability perform well as indicators for state capacity relative to conflict onset and duration, particularly when used jointly. This is also particularly appropriate for the theoretical mechanism discussed here: rebels are unlikely to be able to sway local investors at all in states that are highly capable of engaging with their citizens, indicating that rebels in such situations should quickly accept any concessions offered by the state. As the second hypothesis from the equilibrium solution suggests, situations where the state is very strong relative to the militant group are those in which negotiation is expected to occur even for groups with high amounts of very valuable resource access that can drastically increase their capacity. Conflicts in which militants face states with high values of RPR, then, should have a higher probability of negotiation even if rebels have access to lucrative resources.

This combination of spatial, fine-grained data allows me to identify when and where militant groups gain access to natural resources, which influences their interactions with local investors. Rebels' ability to sway local investors will also be influenced by the state's ability to engage with

[23] As this paper is concerned with the generalizable role of local investors in farming, mining, or transporting goods, it is appropriate to consider the variety of resources to which rebels have access. However, Table B.3 in the appendix demonstrates that the results do not change when only resources that require mining capacity (oil and primary diamond or gemstone mining) are considered.

[24] These data also contain a relative political extraction measure (RPE). However, this measure is partially based on changes in mining and agricultural production as a share of GDP, which are likely to be particularly endogenous to changes in the conflict environment for the type of conflicts addressed here.

these investors and maintain their loyalty. This, in turn, affects their subsequent conflict-level outcome: whether or not they negotiate with the government they are fighting and after how many years. By bringing together all of this information, I am able to consider how micro-level changes in rebel group access to natural resources affects the conflict-level propensity of militant groups and states to pursue negotiation.

For my dependent variable – each group's time to negotiation as a conflict outcome – I aggregate peace agreements and ceasefires from the NSA data (Cunningham, Gleditsch and Salehyan, 2009). The number of groups ending in ceasefire in the data is very low, whereas groups coded as ending in 'peace agreements' are more common.[25] Militant groups' campaigns can, of course, end in a variety of other ways including military defeat by the state or fragmentation into sub-groups. Because time to negotiation is the outcome of interest, groups that do not experience this outcome are treated as right censored in their final year. Groups whose conflicts have not ended as of 2011, the final year in which the NSA data was collected, are also treated as right censored. Rebel groups can be present in the data for as little as one year and as long as 23 years, with an average duration of about 5 years.[26]

My primary independent variable is taken from the PRIO geolocated and time-varying data on natural resources. This dataset codes if a grid cell (a geographic unit defined by the researcher building the dataset) contains a given natural resource. The data include information about petroleum, gold, gemstones, primary and alluvial diamonds, and drugs. For my measure of natural resource access, I sum the number of cells containing at least one natural resource in which the group was active in a given year. This means that a group with activity in a cell with 5 diamond deposits is coded in the same way as a group present in a cell with 3 drug deposits and 2 gold deposits. Variation in the number of resource cells from year to year to which a group has access is helpful for understanding how increasing a group's ability to invest in natural resources can affect their outcome. The first implication of the formal model suggests that increasing the value of natural resources decreases the probability of reaching negotiation. Empirically, changes in resource value are captured in two ways: increases in the number of grid-cells containing a single valuable commodity, or increases in the number of primary commodities available to a militant group. This measure, then, captures not

[25]The results do not change when the dependent variable reflects only full peace agreements. Ceasefires are too infrequent an outcome for reliable statistical estimates.

[26]Full tables or plots of descriptive statistics for the variables discussed in this section can be found in the appendix.

only increasing valuable territorial holdings, but any possible changes in the types of resources to which groups have access.

Because the state capacity measure used (RPR) already captures standard country-level confounders such as population and GDP (Collier and Hoeffler, 2004*b*; Gaibulloev and Sandler, 2014), I include two additional independent variables at the group level. These are intended to capture other group characteristics that may influence whether or not the state and militant group will pursue negotiation. Specifically, I include a variable measuring each militant group's average distance from the capital for each year, and the NSA's dyadic indicator of whether or not the group controls territory.

I construct the measure of a rebel group's yearly distance from the capital by averaging the distance of each grid cell the group operates in for a given year as provided by PRIO (Tollefsen, Strand and Buhaug, 2012), then scaling this average by the country's total area. A militant group's distance from the capital city might influence the state's strategy toward the group, as groups operating near the captial will be perceived as more threatening than those near the fringes of the state. I include the dummy variable for whether or not the militant group in question has territorial control to capture group strength, which influences the balance of power between the rebels and the state and affects the group's capacity to shift the loyalties of local investors. In addition to the primary model presented below, the results are robust to several other model specifications such as using military expenditures as a measure of state capacity (Singer, 1987) as well as the inclusion of other possible explanations for delaying negotiation such as external support for rebel groups or the state in conflict's political institutions. (Marshall, Gurr and Jaggers, 2016).

After matching each group present in the NSA to those active in the GED, including each group's natural resource access per year, and limiting the sample to groups ending after 1989 (the first year of the GED data), my dataset contains 606 group-year observations. I also remove any conflicts coded as coups in the NSA data and any groups that represent subsets of state or presidential forces. There are 154 unique group-state dyads in the sample.

As the dependent variable is time until negotiation, hazard models are the appropriate class of test. To ensure robustness of results, I use both a parametric event hazard model and a Cox proportional hazards model, both reported below in Table 2. I assume a lognormal distribution for the first model. This distributional assumption is appropriate for modeling events for which the hazard increases

in the short term, then decreases over time, and is in keeping with other work modeling insurgent outcomes such as negotiation (Bapat, 2005).[27] For each model, standard errors are clustered at the group level. For the parametric model, the measure of groups' natural resource access is a statistically significant predictor of the hazard of group failure by negotiation. The measure of relative political reach, however, is not a statistically significant predictor of group failure in either model.[28] Given the importance of these measures for understanding variation in when militant groups and states in conflict will negotiate, further investigation of how the hazard of negotiation changes for different values of these key independent variables is merited.

Table 2: Duration Models: Dependent Variable = Time to Negotiation

	Lognormal (AFT)	Cox PH (Coefficient)
Sum, Natural Resource Cells	0.151*	-0.198*
	(0.0740)	(0.1026)
Dummy, Territorial Control	-0.667*	0.827*
	(0.2833)	(0.3307)
Distance From Capital, Scaled by State	0.0524	-0.00345
	(0.2403)	(0.2238)
Relative Political Reach	-0.773	0.567
	(0.4719)	(0.5868)
Constant	3.114*	
	(0.5357)	
N	606	606
AIC	182.5	281.6
BIC	208.9	299.3

Standard errors in parentheses

* $p \leq 0.05$

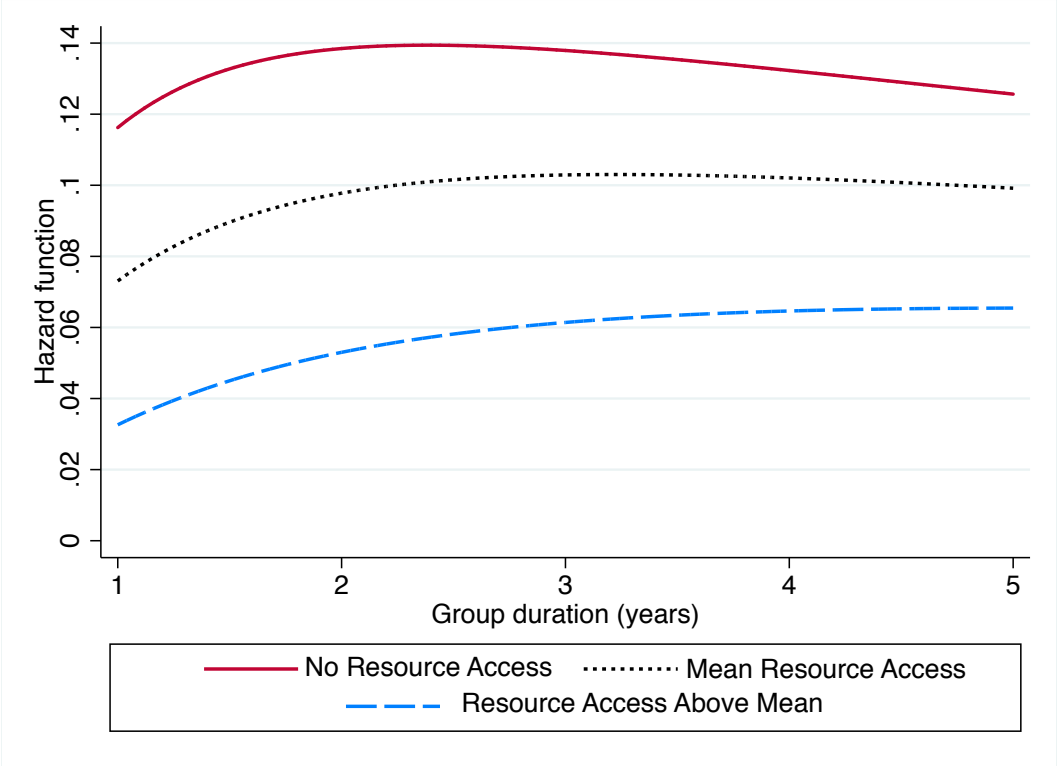
To further evaluate my hypotheses, I turn to plotted hazard ratios from the parametric model. Figure 16 plots the hazard of negotiation over changing values of natural resource access, while Figure 17 plots the difference in the hazard of negotiation for state capacity at its minimum, mean,

[27] The results do not change when using a Weibull parameterization, but the Lognormal is chosen both for the theoretical appropriateness of its shape and because the AIC and BIC reflect a better fit.

[28] For the parametric model, RPR is a statistically significant predictor at the .1 level, but does not reach the standard .05 level.

and maximum values.[29] My first hypothesis suggests that as the value of the natural resources to which they have access increases, militant groups are increasingly able to make offers of cooperation to local investors that will be accepted. This means that as the value of natural resources increase, the hazard of negotiation should decrease. The first plot, found in Figure 16, shows the effect of changing the value of the number of natural resource grid cells to which groups have access from the minimum (0) to its mean (2) and one standard deviation above the mean (5). For this plot, the distance from the capital at the mean value, for groups that hold territory and are facing weak or moderately weak states.[30] As the plot shows, the hazard of negotiation for groups with no natural resource access is nearly 10%, while groups with access to 5 resource 'cells' have only a 2% chance of getting to negotiation with the state. Given that negotiation is a rare outcome in intrastate conflict, this is a notable change. The results of the model support the first hypothesis that groups with access to primary commodities become increasingly less likely to negotiate as their ability to economically gain from these resources increases.

Figure 16: H1: Hazard of Negotiation, Increasing Natural Resource Access



[29]The plots of corresponding survival curves from the Cox model are in the appendix.

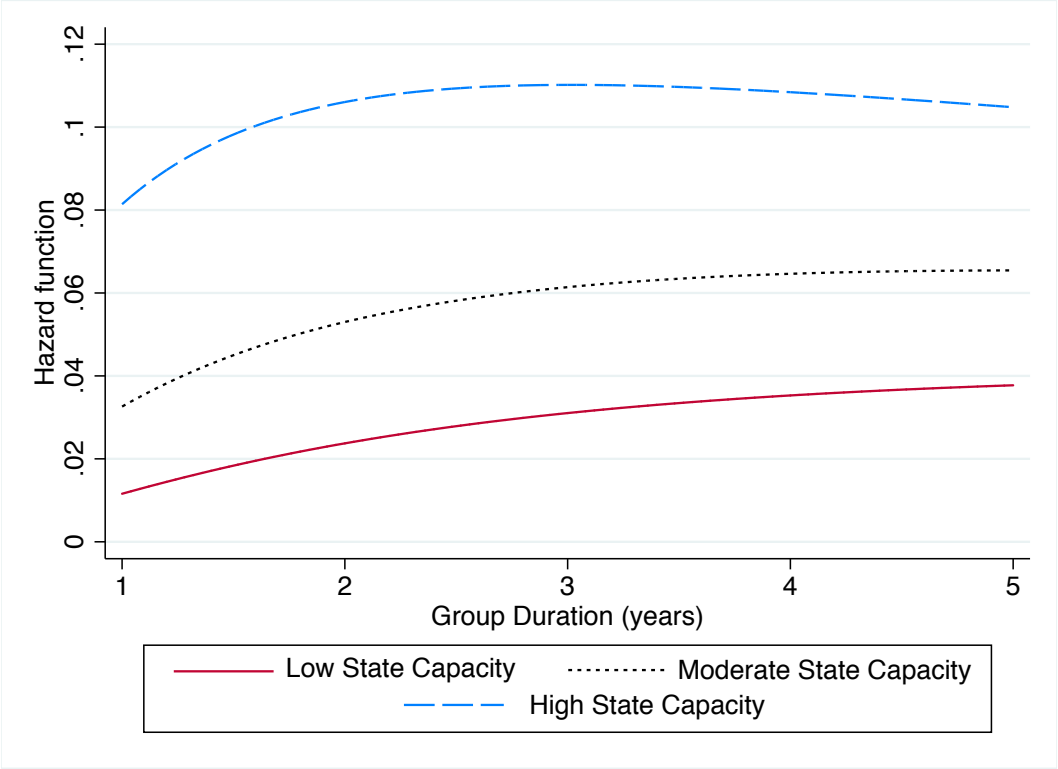
[30]The relationship reflected here is invariant to changes in the values of any of the independent variables.

Figure 17 evaluates the second hypothesis that groups fighting stronger states will be more likely to engage in negotiation even with access to lucrative natural resources. Here, I hold resource access constant at 5 resource 'cells', which is one standard deviation above the mean value. This allows me to evaluate the effect of changing state capacity on rebel groups with access to highly valued primary commodities. I hypothesize that even militant groups with highly valued lucrative resources, when faced with a strong, capable states, will accept offers of negotiation rather than attempt to sway local investors' loyalties. Knowing this, strong states should wish to offer minimal concessions to these groups and avoid the costs of encouraging local investors to pursue fighting, delaying the end of conflict. This relationship emerges from the model, as groups facing very strong states (for which the Relative Political Reach measure is set at the maximum) are nearly four times as likely to end as the result of a negotiated settlement than groups facing weaker states. However, as noted above, while the direction of this relationship is as expected, the effect is not conventionally statistically significant. The model, then, provides limited support for the hypothesis. When militant groups with natural resource access face strong state opponents, negotiation is more likely than when rebel groups can expect to reasonably counter weaker states by employing natural resource wealth to strike bargains with local investors.

Sub-State Empirical Test: Local Investors in Colombia

The above tests on a global sample of intrastate conflicts demonstrate that increasing rebels' primary commodity access decreases the probability of negotiation. Negotiation is relatively more likely for strong states that are able to prevent rebels' attempts to build markets for these commodities, meaning that rebel gains from such resources will be minimal. These findings illustrate the generalizability of how rebel access to lucrative primary commodities influences civil war termination. However, isolating the influence of local investors on conflict outcome requires a fine-grained empirical test of this particular mechanism. Sub-state indicators of government strength and changes in rebel markets are needed to establish how states undermine deals between local investors and rebels to increase production of lucrative primary commodities, as the implications of the formal model suggest. Specifically, I use municipal-level data from the Colombian conflict to track changes in coca

Figure 17: H2: Hazard of Negotiation, Increasing State Capacity



production resulting from state efforts to co-opt rebels' local investors.[31]

This conflict between the Colombian state and leftist guerilla groups lasted more than 50 years. Militant groups' access to primary commodities - specifically, to coca - was a defining feature that shaped the duration of the conflict and its eventual outcome. The Fuerzas Armadas Revolucionarias de Colombia (FARC), the primary leftist group fighting the state, was involved to varying degrees in the growth, refinement, and transportation of coca over its lengthy history. The FARC's involvement in the drug trade is consistently cited as a reason for the group's durability, and why the peace talks initiated in 2012 required four years of negotiation prior to their resolution (Otis, 2014; Holmes, 2008). In the Colombian case, the local investment sought by the FARC to sustain their economic profit came from coca farmers and middlemen transporting cocaine to international markets. I focus here on the former. Cooperation between the FARC and farmers provided the group with efficient access to raw coca for eventual sale, thus increasing group profit and farmers' economic security. In turn, these profits impacted the rebels' ability to take territory and strike further bargains with other

[31] Ideally, relevant data would also directly capture 'deals' struck between such investors and militant groups. However, these deals are all but impossible to observe.

growers. Thus, increases in the amount of coca grown in FARC-controlled municipalities provides evidence of increased rebel-farmer cooperation.

For the Colombian state, disrupting the FARC's source of power depended not only on military action, but also on discouraging farmers' collaboration with the militant group. As the formal model and resulting H3 suggests, states can be expected to encourage militants' local investors to instead remain loyal and resist militant efforts to gain their collaboration. In this case, one way to do so was to incentivize other forms of licit commodity farming as a means of diminishing the relative gains from coca growing. In the early 2000s, the Colombian government implemented several programs to minimize coca farming and support sustainable, alternative economic growth, particularly in municipalities of particular benefit to the FARC's economic base (UNODC, 2014).

To measure these changes in coca production and the Colombian state response, I turn to data from the Universidad de los Andes' Centro de Estudios sobre el Desarrollo Económico (Center for the Study of Economic Development, or CEDE) (*Facultad de Economia: Centro de Datos*, 2015). This institute collects yearly, municipal-level data on geography, governance, socio-economic conditions and conflict indicators. I use the measure of hectares of coca produced in a given municipality-year as my dependent variable to assess changes in coca production resulting from changes in local loyalties. My primary independent variable measures the value of agricultural and livestock credits provided by the Colombian Department of Agriculture to farmers in each municipality. These credits were provided to encourage and support farms of all sizes engaged in producing legal crops.[32]

To account for the FARC's role in coca production by building economic relationships with local farmers, a measure of FARC's access to the municipality in question is needed. This is important for two reasons. First, the Colombian state should be expected to allocate more resources towards coopting local investors in the areas where such investors might most benefit the FARC. Second, in the Colombian context where coca growth was widespread, pinpointing changes in crops entering the FARC's particular market is important. However, assessing groups' degree of territorial control is notoriously difficult, and the Colombian case is no exception. To capture where the FARC had territorial influence, I create a dummy variable for whether a municipality falls in four

[32]The results of models discussed are invariant to alternate measures such as the number of credits provided or the value of credits to only small landholders. I choose this measure to best capture the state's commitment of resources to counter plausible rebel deals with farming communities.

key departments: Caquetá, Meta, Putumayo, and Guaviare (Holmes, 2008).[33] These departments experienced the highest amount of FARC governance and control over the course of the conflict, indicating that coca farmers in the municipalities within these departments are most likely producing coca for FARC distribution and sale. The implications of the formal model and H3 indicate that in order to reduce the FARC's profits, the Colombian state should focus on co-opting the FARC's local investors (coca farmers) in these areas. The distribution of the value of credits, included in Table 3,[34] applied to these key departments vs. elsewhere demonstrates that the Colombian state invested a greater amount in FARC controlled areas.

Table 3: Value of Agricultural Credits Provided by Colombian Government

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
FARC-Controlled Areas	0.00	128.45	641.15	1780.39	1856.50	84777.33
Not FARC Controlled	0.00	36.62	334.96	906.01	1017.94	44878.00

My third hypothesis posits that states will minimize militants' profit by breaking up deals between militants and their local investors. Agricultural credits provided to small farmers with whom the FARC may collaborate can be expected to limit the FARC's earnings by incentivizing coca farmers to break their bargains with the FARC. To test this, I include an interaction term between the dummy for FARC territorial control and the value of agricultural credits provided. In areas without FARC involvement, credits should have only a limited effect on the growth of coca, as there are fewer farmers engaged in producing illicit crops that may be swayed by such offers. In areas where the FARC has solidified territorial control, increasing the value of agricultural credits should also increase the value of the deal local investors demand from the FARC to secure their loyalty. As such, the Colombian state's heavy application of agricultural credits (the co-opting strategy) in FARC strongholds should minimize the FARC's cocaine earnings. In other municipalities these credits should have little impact on coca growth.

In addition to these primary independent variables to capture FARC influence in a municipality and the state's efforts to undermine bargains between the FARC and farmers, I include a dummy for whether or not the AUC was present in a municipality. The AUC, or Autodefensas Unidas

[33] In Colombia, the department is the administrative level above the municipality.

[34] This is also illustrated with a boxplot in Figure 10 in the appendix.

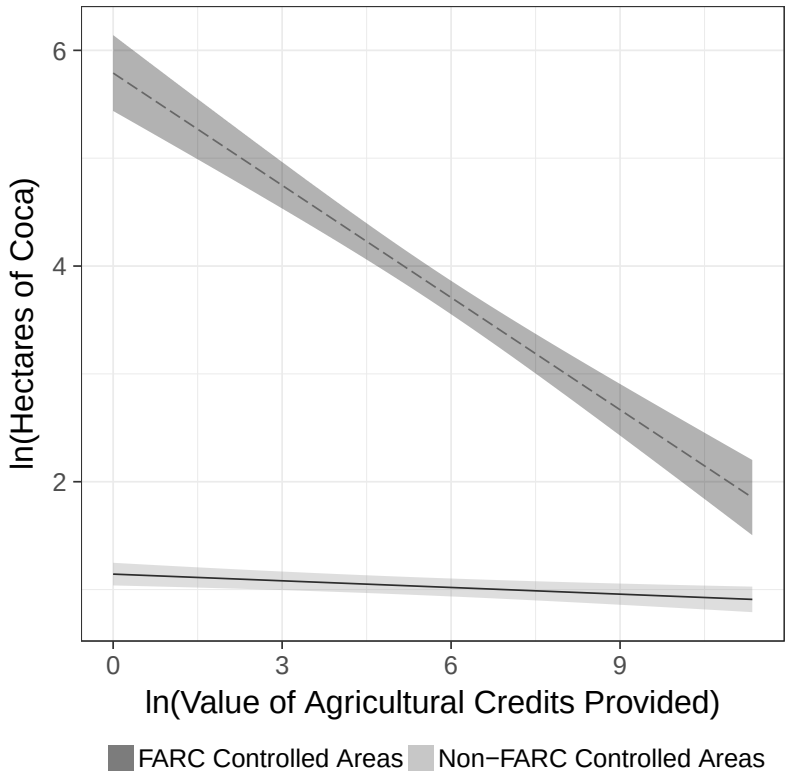
de Colombia, was an umbrella organization of paramilitary groups unofficially supported by the Colombian state to subvert FARC community influence (Gutierrez Sanin, 2008). AUC presence could, then, indicate an alternate strategy taken by the Colombian government state to deter FARC activity. However, because the AUC was also prominently involved in the cocaine trade, their presence is likely to increase the growth of coca in the area. Thus, although AUC presence may have a similar effect as the FARC's on the total amount coca grown (even as it decreases FARC-specific access), its effect on the contestation of a municipality is important to consider. I also include a measure of each municipalities' inequality of land ownership (a particular type of gini coefficient), as this characteristic may influence municipalities' receipt of agricultural credits.

Table 4: OLS: Impact of Government Provided Agricultural Credits on FARC's Coca Crop

	Dependent variable:
	log(Hectares of Coca$_{t+1}$)
Dummy, FARC-Controlled Areas	4.646*
	(0.180)
Log(Value of Agricultural Credits)	−0.021*
	(0.007)
AUC	0.610*
	(0.045)
Gini, Land Ownership	−3.066*
	(0.161)
FARC Control*Agricultural Credits	−0.326*
	(0.029)
Constant	2.645*
	(0.115)
Observations	9,013
Note:	*p<0.05

This combination of variables is available in the data over the time span 2000-2008, with 1122 municipalities covered. The total number of observations in the model is then 9,013. Due to the continuous but strictly positive nature of the dependent variable, I log-transform the hectares of coca and estimate the model with ordinary least squares (OLS). I also take the natural log of the

Figure 18: Impact of Government Provided Agricultural Credits on FARC's Coca Crop



value of agricultural subsidies. The dependent variable is led by one year relative to all independent variables to capture the effect of the previous year's agricultural credits on the current year's coca production.[35] Table 4 provides the results from the regression, while Figure 18 plots the predicted hectares of coca over the range of agricultural credit value, comparing the effect of these credits for departments under FARC control vs. other departments.[36]

Figure 18 illustrates that providing agricultural credits has a particularly dampening effect on coca growth in FARC-controlled departments. Increasing the value of credits provided from 0 to the mean can be expected to reduce these municipalities' coca output by about 350 hectares per year. This indicates that the Colombian state's targeted efforts to prevent deals between the FARC and local investors – here, coca farmers – substantially reduced the FARC's coca yield. In contrast, for municipalities where the FARC's influence is limited and small farmers are less likely to engage with the group as local investors, changing from the minimum to the maximum amount of credits reduces

[35] An additional version of this model with year fixed effects can be found in the appendix.

[36] I include the plot for municipalities in which the AUC is present, but the effect does not change for those in which the AUC is not active.

the coca output by roughly 1.5 hectares per year.

As anticipated, by concentrating the agricultural credits provided to coca farmers on the FARC-dominated municipalities, the Colombian state was able to co-opt small farmers and remove a crucial source of the FARC's economic windfall. Though these credits were available in other municipalities, their substantial limiting effect on the production of coca in FARC strongholds illustrates the importance of coca farmers' cooperation for the FARC's economic and military gains. While coca production sharply decreased in these municipalities following the introduction of agricultural credits, it did not cease entirely, indicating that the FARC was able to maintain their bargains with certain local investors. These findings demonstrate how competition over local investors' loyalty prolonged the conflict and delayed the eventual negotiation between the FARC and the state.

Conclusion

This paper addresses the puzzle of why negotiation is particularly difficult to achieve in intrastate conflicts involving natural resources. Although resource wealth provides rebels with a boost in strength that should lead to an increased chance of negotiation, the partnerships that are the source of this wealth can easily collapse, making rebels' future strength uncertain. I develop an argument about the previously unconsidered role of local investors, who can become collaborators in militant groups' efforts to maintain the resource revenues that enable their survival. As we see empirically in diverse conflict examples such as Afghanistan, Sierra Leone, and Colombia, local investors often become involved in civil wars either as key partners of rebel groups or, conversely, as collaborators with the state, particularly when profitable resources shape the local conflict landscape. The Colombian conflict discussed here highlights both the involvement and uncertain loyalties of local investors. Some participated in the drug economy to increase and share in the FARC's economic windfalls (Holmes, 2008). In response, the Colombian state equipped local actors to resist FARC partnerships by providing agricultural credits to farmers. These credits allowed former coca farmers to resist the FARC 's offers of future cooperation, thus undermining the FARC's economic support base. This example of a civil war involving lucrative primary commodities lasted over 50 years, demonstrating how local economic parterships can prevent states and rebels from seeking peace.

This paper develops a game theoretic model to better understand the impact of local investors'

changing loyalty and the uncertainty this generates for states and rebels about their future relative power. This model demonstrates that negotiation occurs when governments are far stronger than rebels regardless of the value of local natural resources. Further, increasing the total value of natural resources to which militant groups have access decreases the probability that the groups' time spent fighting will end in negotiation. These implications formed two hypotheses, which are tested with newly compiled data that matches rebel group and natural resource locations, rather than simply testing whether or not resources are present in a conflict. The results of the quantitative, large-N test provide evidence in support of both hypotheses. A third hypothesis posits that when states do not negotiate and instead co-opt local investors, their efforts will minimize rebel profits by making deals between militants and local investors more difficult. This hypothesis was upheld with municipal-level data from the Colombian civil war.

When militant groups can access natural resource wealth through partnerships with local investors, such conflicts are less likely to end in negotiated settlements. Governments will choose to co-opt local investors in an effort to prevent them from transferring their loyalty to the rebel group, delaying negotiation by diminishing rebels' already tentative base of power. Thus, for the weak or moderately weak states that constitute the majority of civil war cases, increasing profit from natural resource endowments makes rebels better equipped to strike deals with local investors and unwilling to forego profit by accepting state concessions. However, in contrast, strong states with high bureaucratic and extractive capacity should expect that local investors will not be swayed by any value of rebels' possible resource wealth, leading militants in this situation to accept minimal offers of concession rather than continue fighting. In keeping with this logic, I find that stronger states fighting rebel groups with access to natural resources are much more likely to see conflict end in negotiation than weaker states.

This paper's findings provide opportunities for additional scholarly work and policy suggestions for minimizing the duration of civil wars. Fostering stable, legal economic incentives for communities to avoid participating in the illicit economy may prevent the shifts in power that make such conflicts so durable. Similarly, a necessary next step for scholarly work is understanding the effect of peace agreements that contain provisions for future division of primary commodities. This will provide policy suggestions to overcome the specific commitment problems driven by local investors and natural resource wealth in future conflicts.

CHAPTER 4: REBEL PRIMARY COMMODITY MARKETS, PRICE SHOCKS, AND SUPPLIER VICTIMIZATION

Abstract

A common argument in the civil war literature is that rebel organizations often profit from the sale of primary commodities. However, certain primary commodities require extensive labor for production. Rebels ensure a consistent supply of the lucrative good by providing security and payment to laborers. Rebels' ability to uphold agreements with suppliers depend on the commodity's profitability, and prices for these commodities may be volatile and susceptible to shocks. How, then, do price shocks to labor-intensive primary commodities impact rebel organizations' relationships with suppliers and rebels' access to commodity markets? I hypothesize that negative price shocks encourage laborers to turn to other economic activity, leading cash-strapped rebels to resort to coercive action to maintain future sales of lucrative goods. Conversely, states seek to prevent rapid increases in rebels' profit while avoiding the reputational costs of engaging in repression against rebel suppliers. I further hypothesize that following positive price shocks states will delegate coercive action against rebels' suppliers to groups such as pro-government militias (PGMs). I test these hypotheses with a new dataset that combines quarterly U.S. STRIDE data on fluctuations in cocaine price over the years 1981-2012 with municipal-level data from the Colombian Centro Nacional de Memoria Histórica about the FARC and paramilitary groups' use of civilian victimization.

Introduction

> "Sendero [Luminoso] acts as an intermediary between the peasant growers and the drug traffickers, winning higher prices for the growers, taking a cut of the profits, and providing protection."
>
> "The campesinos... are prepared to give up coca cultivation in exchange for the means to make a secure and legitimate living. The traffickers and insurgents terrorize them daily, killing their leaders when discussions on alternative development progress too far."
>
> - U.S. House of Representatives Hearing on Narcotics Control and Human Rights in Peru, 1991

How do changes in the price of the primary commodities they sell impact militant groups? In turn, how do shifts in price affect state tactics against these groups? As the above quote about the Peruvian insurgent group Sendero Luminoso suggests, considering the commodity's supply chain is necessary to fully answer these questions. When rebel groups establish markets for primary commodities rather than simply looting these goods, long-term labor is required to produce and sometimes refine, transport and sell the commodities in question. For example, for Sendero to reap the benefits of the coca trade, the group had to first ensure that farmers continued to plant coca. If the supply of the lucrative resources militants rely on to maintain their funding and fighting strength dries up, the group may face a reduction in capacity or even group failure.

Yet, as suggested above, farmers frequently re-evaluate their decision to grow coca or to abandon the illegitimate crop for other economic opportunities. Because changes in commodity price impact the relative attractiveness of local economic choices, militant groups and states should be cognizant of changes as they compete for these farmers' loyalty and productivity. A key policy suggestion in the fight against Sendero was to reduce the price of cocaine in the international market and thus at the 'farm gate' to discourage coca farmers from accepting the risk of participating in this lucrative market (Kay, 1999). While this strategy influenced suppliers' decisions in the long run, both Sendero and the Peruvian state mixed repressive tactics and positive economic incentives as they sought to influence coca growing communities' choices (Kay, 1999; Taylor, 2017). The availability of positive incentives is limited by actors' resources, however, which suggests that civilian victimization may have been used to compensate for periods in which profit was limited. Such tactics contributed to a decrease in Sendero's perceived legitimacy and eventual near-demise in the 1990s.

Sendero Luminoso's experience is far from unique. Militant groups as geographically and

ideologically diverse as the FARC in Colombia, the Taliban in Afghanistan and Pakistan, and the MTA in Myanmar became heavily involved in the production and sale of primary commodities. Considering how militant groups and states interact with the laborers forming the foundation of militants' commodity markets is an important step in identifying the conditions under which these violent groups thrive or fail. I argue that exogenous shocks to commodity price can spark changes in groups' relationships with their suppliers - which in turn impacts how states or pro-state forces interact with these communities.

The paper proceeds in five sections. I first discuss literature that draws connections between commodity price and intrastate conflict. I then consider how price shocks to illicit, labor-intensive commodities such as drug crops might impact the relationship between growers, rebel groups, and state forces or pro-government militias (PGMs). The third section provides a brief background on the Colombian conflict with the FARC, focusing on the role of coca farmers. The fourth describes the data and testing framework and presents the results from a municipal-level quantitative analysis of the FARC conflict. The fifth concludes.

Commodity Prices and Intrastate Conflict

That certain militant groups rely on primary commodities to fund their endeavors is well established in the intrastate conflict literature (Fjelde and Nilsson, 2012; Arnson and Zartman, 2005; Beardsley and McQuinn, 2009; Wright, 2015; Snyder and Bhavnani, 2005; Fearon, 2005). Lucrative primary commodities can amplify militant groups' capacity to recruit soldiers and supporters (Weinstein, 2005; Staniland, 2012) and increase their military might relative to the state (Humphreys, 2005). However, access to natural resources does not guarantee that a group will generate long-term profit, or that such profit will be sustainable. Groups that establish control over the production, transportation and sale of the commodities within the territories they control come to rely on more steady income than those that intermittently loot. Just as for producers in the licit economy, maintaining such profit requires an investment of time and resources. Further, consistent returns on this investment are not guaranteed - market changes can impact militant group producers in the same way producers in the legal economy might be affected. Unlike for conventional producers, shifts in commodity value and resulting changes in profit are tied not only to militants economic well-being but also to their fighting

success. This implies that it is necessary to consider not only whether or not militant groups can convert lucrative natural resources into profit, but also how changes in the market value of these natural resources impact fighting choices for militants and the state's responses.

Studies of primary commodities in civil war largely employ static values of the commodities in question (Ross, 2004; Lujala, 2009, 2010; Sorens, 2011; Thies, 2010). Variation in what is considered 'lucrative' for rebels is tied to commodity type rather than within-commodity variation over time. This body of literature also differentiates militant strategy and outcomes based on commodity type. For example, certain natural resources like oil require significant initial investment, making them accessible only to more powerful militant organizations. Once rebels have access to primary commodities, however, it is assumed that they will continue profiting unless they lose the territory containing them. Additionally, the lucrative nature of these goods is assumed to monotonically impact militants' strategy: gaining access leads to positive shifts in fighting capacity and power while losing access decreases rebels' ability to counter the state. Treating primary commodity value as static, then, masks important subsequent changes in militant and state strategy that impact conflict outcome and duration.

A small body of literature discusses the connection between commodity shocks and conflict or organized violence, with a focus access to primary commodity profit as a mechanism for states to decrease conflict or to motivate individuals to fight. Bazzi and Blattman (Bazzi and Blattman, 2014) use country-year level analysis to consider changes in price for a variety of primary commodities as motivation for conflict initiation or fuel for ongoing conflicts. Related work hones in on Sub-Saharan Africa due to the importance of commodity exports - both agricultural and mineral - for the economies of states in the region and the availability of local or state-level conflict data. Brückner and Ciccone (Bruckner and Ciccone, 2010) demonstrate that downturns in the global price of Sub-Saharan African states' primary exports substantially increase the probability of civil war onset. Berman and Couttinier (Berman and Couttenier, 2015) focus on how income shocks impact conflict onset and escalation in sub-state agricultural regions. In doing so, they improve our understanding of how and where violence occurs and better link gains from agricultural commodities to individuals' propensity to participate in conflict.

In each of these studies, the impact of commodity-based wealth is seen from two distinct levels: first, at the state level considering changes in capacity resulting from positive shocks, and second, at

the individual level when negative shocks decrease incomes and drive rebellion. Rebels' decisions are absent from their research largely due to their level of analysis, which presents an important opportunity for expansion. Berman, Couttinier et al (Berman et al., 2017) use spatial analysis to demonstrate that conflict incidence increases in mineral-rich areas of Sub-Saharan Africa as a result of mineral price 'super-cycles'. Their work confirms the importance of considering conflict escalation stemming from increasing the value of lootable mineral resources at the local level, but raises questions of how price shocks impact strategic interaction between conflict actors, including rebels employing non-lootable practices resulting from longer term territorial access.

The above literature treats primary commodity wealth as zero-sum, in which militants' profit from primary commodities mirrors their home state's loss of profit. This assumption may generally be appropriate when the commodities in question form part of states' legal economies. When only non-state actors can profit from the production of resources as with narcotics or when militants' profit from illicit markets is likely to differ substantially from states' profit in legal markets, further disaggregation of shocks' impact by actor type is needed. Although not focused on politically motivated conflict, Dube, Garcia-Ponce and Thom (2016) demonstrate a relationship between negative price shocks to maize, increases in drug crop cultivation in Mexico, and subsequent increases in cartel competition for territory and violence. Their work highlights the importance of non-state actors in encouraging farmers or other produers to substitute illicit production for legal agricultural products to counter downturns in income. Dube and Vargas (2013) provide additional detail with a Colombian case study by differentiating between coffee as a labor-intensive resource and oil as a resource that requires less labor investment. Negative shocks to coffee prices raise municipal levels of violence by decreasing the opportunity costs of participating in rebellion, while positive shocks to oil encourage looting and extortion from armed groups.

It is important to note that the literature lacks an analysis of price shocks to commodities already under militants' control. Commodities such as opium poppy or coca leaf can influence conflict dynamics through both the opportunity cost mechanism and the rapacity mechanism (Dal Bo and Dal Bo, 2011). These resources, like other agricultural products, require the labor of farmers who might choose different employment if their wages changed. They also motivate armed groups to fight for access to lucrative territory as in the case of oil or gemstones. Previous work explains changes in violence during conflict as the consequence of one of two distinct mechanisms: unorganized

future rebels' expressing dissatisfaction, or rebels acting as 'roving bandits' (Olson, 1993) taking limited advantage of commodity booms. This fails to consider rebel groups as stationary, long-term economic actors who - like firms or states - must make choices to maintain the commodity markets they have developed and upon which they often rely. Further, previous research discusses civilians only as latent, disconnected rebels or as inadvertent victims, rather than considering the impact of changes in commodity value to their bargaining power vis-á-vis either rebels or the state. Particularly when civilians partner with militant groups to build markets for mutual profit from primary commodities, changes in price will affect these partnerships. These gaps in the literature lead to an important question: how do rapid changes in commodity price impact rebels' capacity to maintain their labor-intensive sources of profit? How, in turn, do commodity price shocks impact states' ability to cut off rebel access to these sources?

Drug Price Shocks, Bargaining, and Civilian Victimization

To maintain profit from labor-intensive primary commodities such as agricultural products, rebel groups must rely on farmers to continue to produce a satisfactory amount of the good in question. Agricultural commodities are not the only labor-intensive resource militants might control (certain mines, for example, require significant labor investment). However, I limit my discussion to militants' relationships with agricultural laborers to simplify my assumptions about the nature of bargaining between civilian laborers, militants, and the state. For example, the Afghan Taliban formed agreements with local poppy growers to ensure production and distribution of the raw commodity for refinement and sale (Azam, 2016; Peters, 2010) within territories under the group's control. In the case of drug production, laborers require not only some form of incentive to farm but also increased protection from state retribution due to the risk they incur by participating in the illegal economy. While the incentives militant groups provide to ensure farmers' participation may not always be positive economic inducement, coercion and victimization is costly and rebels can be expected to use such tactics strategically and sparingly (Kalyvas, 2006; Wood, 2010, 2014; De la Calle, 2017). This implies that, when possible and particularly for communities that provide them with long-term economic support, militants will prefer to positively encourage local labor participation than to expend the effort and risk the reputational costs of extensive coercion.

Continued, steady profit is necessary for rebels to uphold the terms of these deals - both by providing agricultural partners with economic incentives such as wages and by maintaining the military might needed to secure and monitor the territory in which farming occurs. When exogenous changes in price impact militants' anticipated profit, they must make adjustments to their relationships with farmers to ensure production continues. A rapid downturn in the international price of drugs that militants are involved in producing and selling impacts the amount militants can spend. This gap between anticipated profit and actual profit means that rebels must find other ways to ensure that production continues, or risk longer-term economic and military consequences by failing to maintain the commodity markets they have created.

Drug crop production can be a reliable or lucrative farming choice for communities when prices are high (Dube, Garcia-Ponce and Thom, 2016). Negative price shocks, however, can incentivize a change in crop - particularly when militants' security guarantees against the state are relaxed and the risks of producing illegal rather than legal commodities amplified. When the value of drug crops decreases, making other options more attractive, militants must prevent changes in farmers' planting choices that would impact militants future economic returns. Temporary, unexpected downturns in the value of illicit commodities that fund militant groups' activities require them to focus profits on protecting territory against state incursions while seeking alternative short-term solutions to prevet farmers from engaging in other economic endeavors. Under these conditions, militants can be expected to substitute economic incentives with increases in victimization in the communities that produce the commodities rebels sell.

In contrast, positive drug price shocks provide opportunities for militants to use additional funding to expand their territorial presence or military efforts against the state. Short-term profit boosts can lead to long-term shifts in power in rebels' favor (Fearon, 1995; Powell, 2006) when rebels apply temporary windfalls to territorial expansion or increased future economic production. Militants will seek to maintain the amount of drug crops harvested and sold during positive price shocks to ensure they reap the economic benefits. States, meanwhile, will want to prevent militants from increasing their profit and allocating it towards future growth by limiting the amount rebels can earn from increases in commodity price. One way to do so is to make farmers' agreements with rebel groups difficult for civilians to uphold by making it more costly for farmers to cooperate with rebels - thus limiting rebels' supply of the increasingly lucrative goods. More capable states may also seek to

increase the relative benefit of engaging in legal economic activity by increasing public goods, loans, or other positive incentives to key areas over the course of the conflict. These positive incentives take time and funding to plan and allocate, however, and are unlikely to serve as a counterbalance to rapid increases in militant group funding. Futher, states cannot directly compete with rebels over producers of illicit commodities. Increased state victimization of key farming communities that supply militants with lucrative drug crops is therefore likely following positive price shocks to the drug crop in question.

Although employing violence against civilians is costly for both militant groups and states, states face different consequences for pursuing this strategy. Governments are constrained by both their constituents' expectations and the international community's standards for the protection of noncombatants (Ritter, 2014; Gartner and Regan, 1996). Given these constraints, states must weigh the prospect of facing wealthier, more powerful militant groups in the future against the consequences of committing atrocities against civilians. However, states can often avoid accountability for violence against civilians by allocating this task to local forces affiliated with the state but not fully under state control. To this end, states often employ pro-government militias (PGM) to commit such violence as a means of disincentivizing farmers' cooperation with rebels when PGMs are active in these areas.

Local-level militia activity remains under-studied in the literature, although recent work provides an important discussion about how militia groups can broadly affect conflict processes -with a particular emphasis on PGMs as a tool of repression and violence against civilians (Mitchell, Carey and Butler, 2014; Jentzch, Kalyvas and Schubiger, 2015; Colaresi and Carey, 2015). Because militias usually operate in areas where rebel groups exercise some control over the territory, local PGMs often possess useful knowledge about the civilian population's loyalties (Eck, 2015; Saab and Taylor, 2009; Staniland, 2015). This suggests that when states are anxious to quickly counteract increases in rebels' profit by limiting their access to drug crops, PGMs are a valuable tool to dissuade farmers from cooperation with rebels due to their ability to engage in selective victimization. Governments may encourage or turn a blind eye to PGM violence against farming communities when rebels' natural resource wealth is increasing more rapidly than standard military or economic efforts can combat. In such situations, the government is particularly anxious to not only prevent rebels' current economic gains, but to deter additional lucrative relationships between other farming communities and rebels. When compared to deployment of conventional military forces, militia violence can be

a relatively costless option for governments seeking to quickly limit militants' advances and avoid accountability for coercive behavior (Stanton, 2015).

Price shocks in commodities over which states and militants cannot compete - such as drug crops - present an interesting opportunity to consider the impacts of exogenous changes to conflict processes involving multiple actors. As drug crops require farming labor, it is important to consider how the producers necessary for militants to profit fit into this equation. When the price of narcotics falls rapidly, farmers may be incentivized to plant other crops or seek other careers that will provide higher or more steady income. This is particularly likely when growing illegal crops presents additional security risks that may be heightened from rebels' inability to protect farmers and ensure continued market access, relative to legal crops. Rebels, however, will be keen to maintain the production of drug crops and will engage in civilian victimization as a short-term means of coercing farmers' loyalty when economic incentives are not enough to offest these risks. Alternatively, when the price of the narcotics increases rapidly, states will strive to prevent rebels from accessing these gains by limiting militant groups' supply of the good in question to sell at such high prices. States cannot directly compete with militants for these illegal profits, and policy changes to increase the relative attractiveness of the legal economy take time and extensive economic investment. The presence of pro-government militias in rebel territories presents an opportunity for states to deter farmers from supplying militant groups with the products they need to sell while avoiding the repercussions of engaging in human rights violations. Volatility in drug price, then, negatively impacts noncombatants engaged in the production of this primary commodity - but disaggregation by actor and type of shock is necessary to understand the strategic component of increased victimization. The Colombian case presents a useful opportunity to track the relationship between price shocks and violence from different conflict actors against key producers.

Coca Shocks and the Colombian Conflict

The Colombian civil war, which concluded with a peace agreement between the primary conflict actors in 2016, is a case in which the presence of drug crops provided an economic opportunity that differently impacted militant groups and the state. The FARC, or Fuerzas Armadas Revolucionarias de Colombia, was the primary rebel threat to the Colombian state over the course of a conflict

beginning in 1964. The group primarily funded its military operations through involvement in the production and trafficking of coca crops or refined cocaine. In addition to using conventional military efforts against the leftist group, the Colombian state encouraged the formation and involvement of pro-government militia groups to combat the FARC's territorial influence (Acemoglu, Robinson and Santos, 2013; Holmes, 2008; Gutierrez Sanin, 2004, 2008).

The FARC's military expansion went hand in hand with its expansion into the coca trade. The group established relationships with traffickers as well as farmers or *cocaleros* (Jansson, 2006; Rettberg and Ortiz-Riomalo, 2016). As the FARC began to vertically integrate itself into the coca trade, the group increased its access to the coca market and in turn was able to ensure farmers of longer-term access to coca wages (Jansson, 2006; Mejia and Rico, 2010). However, a report from the Universidad de los Andes suggests that farmers were aware that the FARC's ability to pay fluctuated based on group strength and territorial presence, which at times led to changes in farmers' planting choices or decisions about to whom they would sell coca crops (Ripoll, Berrio and Rubiano, 2013). While the FARC was usually able to offer the best prices to producers, changes in the amount the FARC earned from the international sale of cocaine further down the supply chain would impact the group's ability to maintain farmers' loyalty without coercive tactics.

Paramilitary groups were an important third violent actor in the Colombian case to complicate the relationship between the FARC and its suppliers. Militia groups were originally formed by wealthy landowners to protect their property from appropriation by guerilla groups - often for the reallocation of land into smaller plots for coca farmers (Holmes, 2008). The degree of cohesion among these community militia groups differed by time period and location, with an umbrella organization known as the AUC or Autodefensas Unidas de Colombia at the forefront in the 1990s and early 2000s. The AUC, as well as smaller, independent militias, were often supported by the state due to the common goal of eradicating the FARC and other leftist groups (Acemoglu, Robinson and Santos, 2013). However, paramilitary organizations also often profited from the coca trade by protecting cartels' interests and their investments from FARC competition (Jansson, 2006). This implies that in the Colombian case, disincentivizing coca farmers from partnering with the FARC may have both allowed them to maintain state support and to earn additional profit by redirecting the FARC's coca wealth into their own pockets. Further, the presence of multiple conflict actors competing over access to the supply of coca implies that farmers often faced choices about who best protected their

economic and security interests. When either the FARC or PGMs were unable to pay competitive prices for the coca produced, they may have sought other, more violent means to ensure their future access to producers and profit.

Thus, focusing on the Colombian case allows consideration of how price shocks to an illicit primary commodity impact an armed group's relationship with their suppliers. Further, due to the presence of state-supported militias, I am able to assess responses to changes in this bargaining dynamic. In doing so, I add to previous work on the Colombian case that has examined the impact of shocks to legal, substitute crops (Angrist and Kugler, 2008; Dube and Vargas, 2013; Wright, 2015) such as coffee and oil on violence and local labor markets. I also supplement work that considers coca price shocks, but does not consider the strategic interaction between farmers, the FARC, and paramilitary groups (Mejia and Restrepo, 2013; Mejia and Rico, 2010). To break down the relationship between shocks to coca price and civilian victimization, I propose the following two hypotheses:

H1: Following negative shocks to cocaine price, the FARC will increase civilian victimization in coca growing municipalities where the FARC has a strong territorial presence.

H2: Following positive shocks to cocaine price, militias will increase civilian victimization in coca growing municipalities where the FARC has a strong territorial presence.

U.S. Coca Price, FARC and Paramilitary Civilian Victimization

To test these hypotheses, I bring together three datasets that allow me to track changes in coca price, changes in victimization of cocaleros from the FARC and paramilitary groups, and other municipality-level characteristics. For my primary explanatory variable, I take data reflecting quarterly changes in U.S. domestic prices of cocaine from the U.S. Drug Enforcement Administration's STRIDE (System to Retrieve Information from Drug Evidence) database (*The Price and Purity of Illicit Drugs: 1981-2007*, 2008). I then include municipal-level data covering the FARC and various paramilitary groups' use of violence against civilians from the ¡Basta Ya! report prepared by the Colombian Centro Nacional de Memoria Histórica (de Memoria Historica, 2013), and aggregate this event data to quarterly counts. Finally, I use additional municipal-level measures from Universidad de los Andes' Centro de Estudios sobre el Desarrollo Económico (Center for the Study of Economic

Development, or CEDE (*Facultad de Economia: Centro de Datos*, 2015).

The STRIDE data record quarterly gram amounts, purity, and street-level prices for cocaine seizures in the United States for the years 1981-2016, amounting to 140 quarters. Prices are reported for several distribution levels (corresponding to the amount of cocaine purchased). Despite that these data reflect the price of drug seizures and undercover purchases and thus can be considered a convenience sample, they are an appropriate measurement of fluctuations in this particular commodity price for several reasons. First, these data allow me to track changes in cocaine's market value on a quarterly basis. This better captures the volatile nature of illegal commodity prices in comparison to other data sources which measure cocaine's yearly price in global or regional markets (Mejia and Posada, 2008). Further, as the U.S. is the primary market for Colombian coca products, changes in U.S. price are most likely to affect the decisions of Colombian producers such as the FARC (ONDCP, 2016), rather than capturing prices in a smaller market from which producers could easily exit.[37][38] Second, although these data reflect information about individual DEA seizures within different U.S. states, I am able to use these fine-grained data to create an average quarterly price per gram in the overall U.S. market. I use only quarterly information based on more than 10 observations and take the median of these prices to ensure that unusual seizures do not inappropriately weight this average price. Finally, these data are an appropriate choice given that I am interested in changes in price rather than absolute price - and measuring these prices at the street level provides a sensitive measure of quick changes.

I define a 'shock' as follows. To assess shifts in the amount sellers would receive – which in turn impacts the profit armed groups such as the FARC receive – I find the total change in the average price from month to month. To determine whether or not this change constitutes a 'shock', I code whether or not this change is greater than 20% of the price observed in the previous quarter. Changes greater in absolute value than this amount are coded as a shock, with sharp decreases in price considered a negative shock and increases as a positive one.[39] Shocks at the 20% level occur in

[37] Although my current choice of data allows me to measure price shifts in a more nuanced way than other data options, I also intend to use all available sources to create a more comprehensive measure of global price at the yearly level.

[38] Below, I discuss concerns about whether changes in the amount of Colombian coca produced impact shifts this in price.

[39] There is little agreement over how to define a commodity price shock in the associated literature – understandably, as the degree and nature of changes substantial enough to impact different markets vary widely. Further, employing standard definitions such as disaggregating price shocks into demand and supply shocks or using global supply and share of GDP

12% of the observed quarters.[40][41] To assess the effect of the previous quarter's shock on the current level of farmer victimization, I lag the price shock by one quarter relative to the dependent variable.

The STRIDE data provide information about changes in the profit the FARC can expect to receive, on average, from the coca they produce that is sold in U.S. markets. These shifts affect the group's capacity to maintain relationships with farmers, which impacts the FARC's territorial control and fighting strength. As hypothesized, when the FARC's ability to maintain deals with their coca suppliers is compromised by a lack of steady income resulting from negative shocks to cocaine price, I anticipate the group's tactics to change. Further, when the FARC can expect increases in coca profits due to positive shocks, I anticipate that paramilitary or militia groups that are active in FARC territory will ramp up victimization of producers that might be dissuaded from growing coca for the FARC's particular benefit. The dependent variable must capture changes in these two actors' tactics: specifically, when either the FARC or paramilitary groups increase civilian victimization in FARC-dominated municipalities. The Colombian Centro Nacional de Memoria Histórica collected event data for armed group and government actions during the conflict for the years 1981-2012, and to my knowledge is unique in its level of disaggregation by time, location, and actor. I arearrange these data to reflect quarterly counts of victims of certain actions to match the time unit for changes in U.S. coca price. I tally the FARC and all paramilitary groups' (coded as either 'Paramilitary Groups' or 'Militias' in the data) use of the following tactics: civilian massacres, targeted assassinations,[42] and other attacks on the population.[43]

This combination of event types captures either actor's use of coercive action in a specific municipality. The number of victims from FARC activity are expected to increase when the group's suppliers begin to seek alternatives. When the group's economic strength wavers and it loses the

(Kilian, 2009; Kinda, Mlachila and Ouedraogo, 2016; Cashin, Liang and McDermott, 2000) is not possible for cocaine, given its illegal nature and the difficulties in collecting data.

[40]I also code for shocks of greater than 50% of the previous price. These occur in only 2% of the quarterly observations and almost entirely correspond to quarters after collection of my dependent variables had ceased, meaning that I cannot etimate models with this large of a shock. Alternatively, I also code a shock as any change in price greater than the average quarterly change plus one standard deviation. Shocks greater than the mean plus one standard deviation of the changes in the data occur in 9% of quarters.

[41]I include the results of shocks at the 20% level here. The models are robust to the alternative mean-based measure.

[42]The ¡Basta Ya! data includes information about any targeted civilian killings as an assassination.

[43]The FARC, in particular, also made use of kidnappings both as a means of coercion and to supplement other income. While these data do contain information about kidnappings, municipality names are differently coded and will require additional efforts to match observations to the datasets containing other forms of victimization.

ability to positively incentivize coca farmers, it must resort to coercive action. Paramilitary group victimization is expected to increase when local militia groups seek to disincentivize cocaleros' collaboration with the FARC- specifically when the FARC can expect increases in profit following positive price shocks.

These particular responses to coca price shocks are expected to occur only in FARC-dominated territory: specifically, in locations where coca production can be assumed to be largely under the FARC's control, such that coca farmers are most often making choices as FARC suppliers. This means that information about the FARC's territorial strongholds and the location of coca crops is needed to form the sample of municipalities used for analysis. I assess whether or not a municipality is one in which the FARC might be expected to control coca production by coding if a municipality is in a department that the FARC historically controlled (Caquetá, Meta, Guaviare, or Putumayo) or a department affected by the 1948-1953 conflict known as La Violencia, which sparked the leftist movement from which the FARC originated and would be able to draw the most support (Holmes, 2008; Acemoglu, Robinson and Santos, 2013). I run my analysis on this set of 19 departments, which encompass 207 municipalities for a total of 14,115 observations.

I then incorporate information from CEDE (*Facultad de Economia: Centro de Datos*, 2015) about coca growth in each Colombian municipality and municipal-level economic characteristics. The CEDE data is reported yearly from 1993-2014. As a measure of whether or not the municipality is a coca producer, I create a time-invariant dummy variable for whether or not coca crops are ever observed in the municipality. By then interacting this dummy with the shock variable, I can examine changes in victimization from either the FARC or paramilitary groups of farmers in municipalities that are most likely to be supplying the FARC with coca. Further, farmers' willingness to grow coca rather than engage in legal farming or other legal economic activities will be affected by the availability of legal options. To capture whether or not legal economic alternatives are present in a particular municipality, I include the natural log of that municipality's GDP per capita.[44]

An additional concern for this modeling strategy is that for some of the observed years, Colombian cocaine constituted the bulk of the supply in U.S. markets. This could mean that the causal

[44]The measure of GDP/capita per year is nearly time invariant in the CEDE data. To maintain the quarterly structure in the data and have a rough assessment of economic opportunity in a municipality prior to the CEDE data's start, I create a fully time-invariant measure in two ways: by taking the average GDP per municipality over the time frame observed and by using the value of GDP/capita for the year 2000. The results are consistent for either measure.

arrow is reversed: the FARC and AUC's actions impact the price of cocaine by influencing the supply available. To assess if changes in the supply of Colombian cocaine impact the price per gram in the United States in these particular data, I run a simple correlation tests between the number of hectares of coca eradicated in the year prior and the recorded average price for the current year. I fail to reject the null hypothesis of no relationship between the eradication efforts and the U.S. price of cocaine. This indicates that changes in the supply of Colombian cocaine that may be driven by FARC and paramilitary actions may not impact changes in the U.S. price of cocaine as reflected by the STRIDE data.[45] To illustrate the impact of cocaine price shocks over time, I first plot the FARC and paramilitary groups' civilian victimization in coca growing vs. non-coca growing municipalities over the range of quarters observed, taking note of negative and positive price shocks. I include these plots in Figures 19 and 20.

As the dependent variables for both H1 and H2 are counts of victims from the FARC and paramilitary groups respectively, I use poisson regression for my analysis. Because all municipalities are affected by the same quarterly shocks, I include a random effect for each quarter. Further, because information about coca growth is collected at the departmental level, I also include department random effects.[46]

I report the results of both regressions in Tables 5 and 6. For the first model, the negative price shock alone does not statistically significantly explain variation in FARC violence overall. However, the interaction between a 20% *decrease* in coca price in the previous quarter and the presence of coca in FARC municipalities is a statistically significant and positive predictor of FARC violence. This indicates that the effect of a price shock in FARC controlled, coca growing municipalities differs from the effect in municipalities under FARC control that do not grow coca. In the second model, a 20% *increase* in price in the previous quarter is a statistically significant predictor of paramilitary violence against civilians in FARC-controlled municipalities, but has an overall dampening effect on paramilitary violence. Paramilitary violence increases only in coca producing municipalities.

This provides tentative evidence for the hypothesis that FARC and paramilitary violence is

[45] A more sophisticated statistical model is likely necessary to deal with these concerns in the future and ensure that endogeneity is not a problem.

[46] Both models suffer from overdispersion, as might be expected. However, given that victimization is a very rare occurrence and that random effects are needed to ensure that the model is properly specified, mixed-effects negative binomial models do not converge when estimated with standard maximum likelihood. In the future, I will correct for this by changing model specification or using a Bayesian hierarchical model.

Table 5: FARC Civilian Victimization after Negative Price Shocks to Cocaine

	Dependent variable:
	Count, FARC civilian victims
20% Negative Price Shock$_{t-1}$	−0.427
	(0.592)
Dummy, Coca Crops	1.086*
	(0.073)
ln(GDPPC)	0.092*
	(0.033)
Negative Price Shock$_{t-1}$*Dummy, Coca Crops	0.623*
	(0.195)
Constant	−4.975*
	(0.578)
Observations	14,115
Note:	*p<0.05

Table 6: Paramilitary Civilian Victimization after Positive Price Shocks to Cocaine

	Dependent variable:
	Count, Paramilitary civilian victims
20% Positive Price Shock$_{t-1}$	−1.173*
	(0.591)
Dummy, Coca Crops	1.048*
	(0.042)
ln(GDPPC)	0.218*
	(0.024)
Positive Price Shock$_{t-1}$*Dummy, Coca Crops	0.601*
	(0.203)
Constant	−6.083*
	(0.508)
Observations	14,115
Note:	*p<0.05

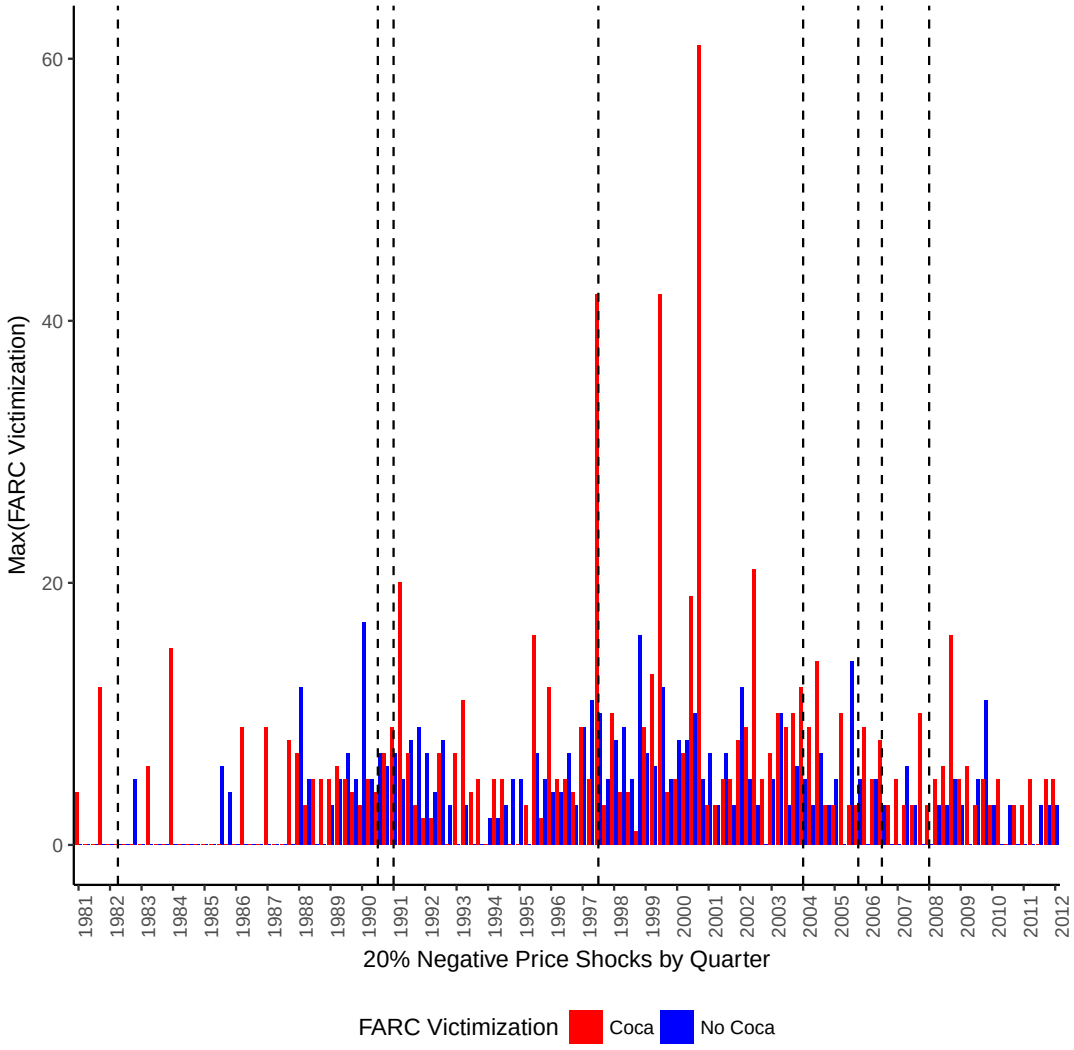


Figure 19: FARC victimization, 20% Negative Price Shocks Marked

explicitly directed towards changing or influencing the behavior of the FARC's coca suppliers in response to unexpected, exogenous chages in FARC income. When negative price shocks to the FARC's income result in sharp decreases to their coca suppliers' wages, the FARC increases coercive tactics to ensure the expected coca yield in the future. This effect does not occur in municipalities without coca crops, suggesting that the FARC is engaging in targeted victimization to ensure suppliers' loyalty when positive incentives fail.

To better explore the substantive implications of these results, I present the distribution of predicted counts of civilian victimization by actor in Tables 7 and 8. To produce these counts, I hold the measure of GDP per capita at its mean, then find the predicted count of victims for municipalities

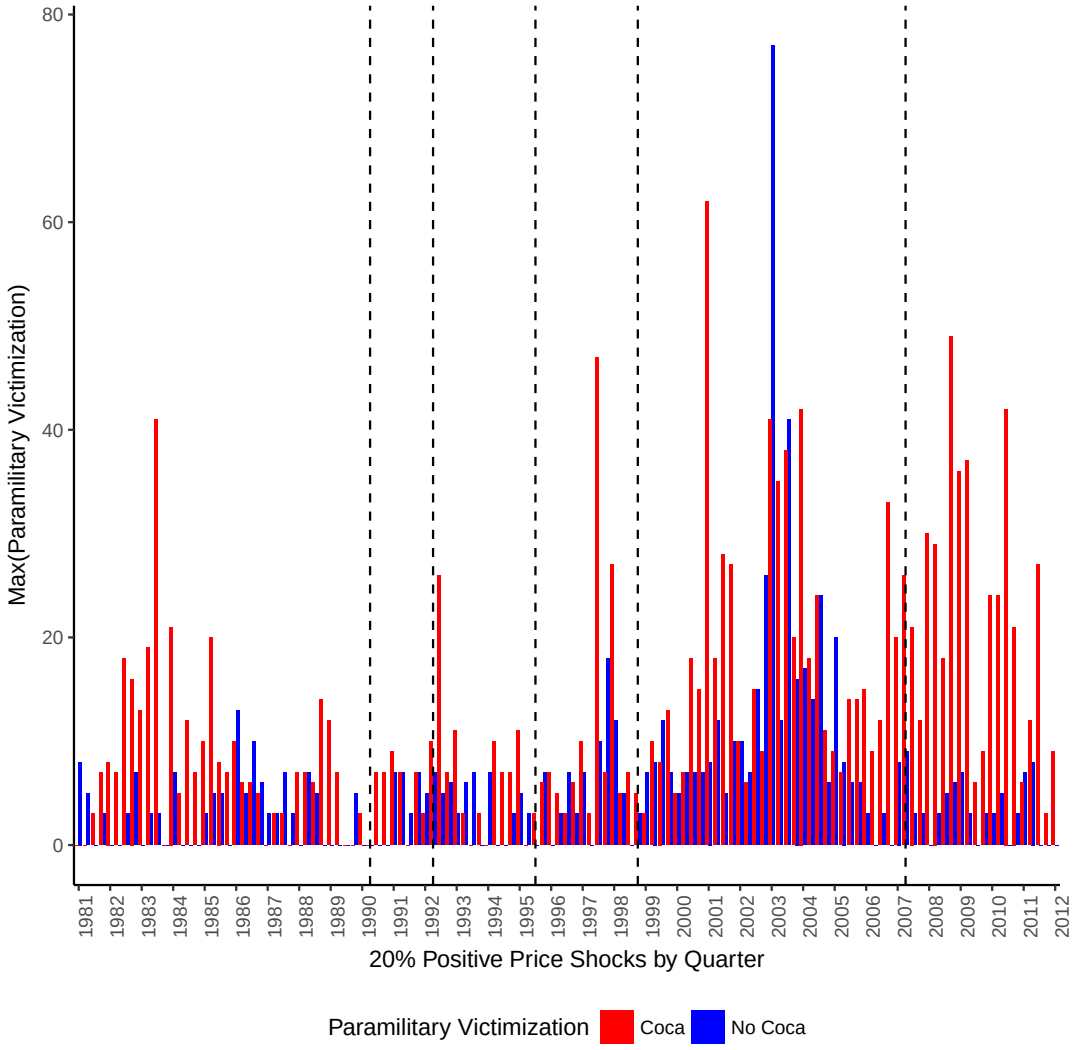


Figure 20: Paramilitary victimization, 20% Positive Price Shocks Marked

with coca and without, also varying if there has been a cocaine price shock in the previous quarter. Of immediate note is that victimization by either the FARC or paramilitary groups is very rare - the majority of municipality quarters experience no victimization from either conflict actor.[47] This implies that the impact of changes in the predicted counts of victims may be dampened. Nonetheless, the predicted counts of victims in FARC-dominated municipalities display the expected patterns, as negative price shocks in coca-growing municipalities increase victimization while shocks to areas

[47]The distribution of the dependent variables may merit exploring zero-inflated regression at a later date. However, these models require that zeros and changes in count be modeled separately and thus produced by distinct data generating processes, which may not be a defensible modeling choice.

without coca somewhat decrease the FARC's engagement in such coercive behavior.

Table 7: Predicted Counts of FARC Victimization

	Min	1st Q	Mean	3rd Q	Max
No Coca, No Shock	0.00	0.01	0.05	0.12	1.64
No Coca, Shock	0.00	0.01	0.03	0.08	1.07
Coca, No Shock	0.00	0.04	0.14	0.36	4.86
Coca and Shock	0.00	0.05	0.17	0.43	5.92

Table 8: Predicted Counts of Paramilitary Victimization

	Min	1st Q	Mean	3rd Q	Max
No Coca, No Shock	0.00	0.02	0.08	0.22	5.63
No Coca, Shock	0.00	0.01	0.02	0.07	1.74
Coca, No Shock	0.00	0.06	0.22	0.62	16.04
Coca and Shock	0.00	0.03	0.13	0.35	9.06

The predicted counts of paramilitary or militia groups' repressive behavior merit further investigation. Higher levels of victimization when compared to the FARC in these particular municipalities can be expected, as these groups' proclivity for violence against community members suspected of cooperating with leftist groups is well documented (Holmes, 2008). Positive price shocks in the previous quarter, which were hypothesized to increase paramilitary violence against FARC coca suppliers in an effort to counteract FARC gains, appear to have a dampening effect on paramilitary violence in all FARC municipalities relative to quarters without price shocks. This decrease may be caused by several factors. First, the FARC may be able to apply increases in profit to better security, reducing the presence of militias or paramilitary groups in the territories they control. Second, grouping all militias together may be masking important variation in individual militias' goals and origin. Self-funding militias may be more focused on reaping the benefit of coca price booms in the municipalities where they exercise greater influence than on engaging in violence to prevent the FARC from doing the same. Regardless, further exploration of these findings in more highly contested municipalities is an important next step to understand the impact of exogenous price shocks on either actor's strategic behavior toward coca suppliers.

Conclusion

This paper has provided a preliminary exploration of how exogenous changes in the profit militants earn from primary commodities impact their behavior toward key suppliers. In turn, it considers how such changes impact opposing actors' attempts to manipulate the behavior of rebels' supporting local investors. Previous work has considered the impact of price shocks to legally produced commodities on civil war via changes to state capacity and labor markets. Here, I add the important complication of looking at the strategic interaction between militant groups, producers, and states when there is volatility in the price of illegal commodities that only rebels can access. To do so, I employ an unprecendented level of disaggregation with a 30-year analysis of the impact of quarterly U.S. cocaine price shocks on FARC and paramilitary group violence in different Colombian municipalities.

I find mixed support for the argument that negative and positive price shocks can both increase victimization of certain noncombatants. By focusing on historically FARC-controlled territories, I am able to assess how changes to the group's profit impacts the FARC and paramiltiary groups' interaction with suppliers in coca growing municipalities vs. civilians elsewhere. I demonstrate that the FARC increases victimization to the communities supplying them with coca crops following a negative price shock - in short, when these suppliers might be most incentivized to take other economic opportunities. A positive price shock to cocaine was hypothesized to further increase victimization of FARC suppliers, but from paramilitary groups resorting to coercion following increases in the FARC's profit that may solidify their relationship with suppliers. While paramilitary groups do engage in heightened levels of victimization in FARC controlled territories that grow coca, positive price shocks do not seem to increase this victimization. This finding warrants additional attention, particularly to the impact of price shocks in highly contested municipalities.

While primary commodities can increase militant groups' wealth and afford them the opportunity to advance in their fight against the state, this paper demonstrates that external changes to rebels' profit can negatively impact their ability to maintain such markets. Rebels that invest heavily in long-term primary commodity production, transportation, and sales must apply some of their profit toward paying producers or other parts of their supply chain while also paying soldiers and maintaining their security against the state. When rebels' profits change due to unexpected price shocks, however, groups are forced to make budget cuts. Rebel groups cannot risk defeat by cutting back on securing

their assets against the state, but they can make changes to how they incentivize their local investors. However, even the temporary use of violence or repression against their local investors can have negative reputational impacts for these groups. Long-term consequences such as an inability to attract additional investors and a decrease in their legitimacy as political actors can push these groups further into criminality and away from accomplishing their original political goals.

This paper suggests that price shocks to the labor-intensive commodities militant groups control have adverse effects for the communities engaged in their production. To guard against these effects, states and other actors wishing to protect noncombatants should consider longer-term efforts to develop regions in which these commodities can be found. Providing alternative economic opportunities will decrease the benefits initial local investors reap from partnering with militant groups. This may, in turn, prevent militant groups from building the markets that allow them to grow into formidable, persistent violent foes.

CHAPTER 5: CONCLUSION

Can the resource curse afflict rebel groups? The findings of this dissertation suggest that rebels, like states, can experience negative externalities even as they profit from primary commodities such as oil, diamonds, drugs, gemstones, or gold. In this document, I demonstrate how groups' internal structure, rebels' and states' strategic interaction with rebels' local investors, and exogenous factors such as commodity price shocks can all limit rebels' ability to accomplish their political goals. In sum, these chapters provide evidence against the conventional assumption that resources unconditionally allow rebels to become stronger and better fighters. Instead, given the many factors impacting rebels' capacity to build commodity markets and apply profits to their fighting strength, choosing to invest in primary commodities may more often lead a group into criminality and failure than toward success.

Managing natural resource wealth begins with strong leadership and group organization. With a competing risks framework, I demonstrate how group outcome after accessing lucrative natural resources is conditional on rebels' organizational structure - much like states' management of resource wealth is conditional on state institutions. Even as primary commodities increase militants' assets and thus their ability to militarily defeat the state, they increase groups' risk of fragmentation and failure as well as limiting militant groups' probability of negotiating with the state. Only centrally coordinated groups that are able to rein in opportunistic members and re-invest commodity wealth toward the group's fighting progress will increase their chances of survival by becoming involved in primary commodity markets. However, even these well-managed groups will find it more difficult to reach a negotiated outcome with the state - a finding that I explore in the next chapter.

To understand why negotiation becomes less likely for groups as they increase their access to natural resource wealth, I consider the base of militants' economic power: their local investors, or the individuals necessary to produce, prepare, transport, and sell the commodities before these groups can reap the benefit of increased capital. To encourage these investors' participation, militants offer incentives such as higher wages and security. But because local investors' livelihood is dependent on

militants' continued presence, if rebels pursue negotiation with the state these investors are liable to defect - taking with them the source of rebels' power that allowed them to consider negotiation in the first place. Further, states would rather undermine rebels' source of economic power by encouraging local investors to defect from rebel employment than to take on the costs of negotiating with militant groups. This presents a trap for rebel groups: to efficiently and consistently profit from primary commodities they must build relationships with local investors, but these relationships can further rebels' instability and provide additional opportunities for states to undermine rebels' strength.

In addition to the alternative opportunities provided by states to encourage rebels' local investors to defect, rapid decreases in the price of commodities can make cooperation with rebels relatively less appealing, encouraging local investors to pursue other employment. When exogenous, negative price shocks limit rebels' anticipated profit, rebels will be less able to incentivize their investors' participation. I focus here on drug crop growers, who are engaged in an economy that the state cannot directly access, which impacts rebels' and states' interaction with these suppliers. Volatility in drug prices negatively impacts militants' suppliers, as drops in price lead rebels to engage in violence against their producers to coerce continued supply. Positive shocks also increase victimization from the state or state-allied forces in an effort to stem rebels' increasing returns. Such victimization can harm militant groups' long-term relationship with these suppliers, decreasing their access to the markets that ensure their survival, and can impact their reputation as violent criminal organizations rather than legitimate political actors.

These chapters provide insight into how rebel groups' increasing involvement in the primary commodity trade can hinder rather than aid their progress toward their political goals. First, groups without strong central organization in place to direct the creation of commodity markets and the re-investment of earnings are more likely to fracture and fail. Second, even for the rebel groups that effectively organize commodity markets, doing so largely removes the option of negotiation with the state as these markets provide new options for states to undermine rebels' strength. Finally, investing in primary commodity markets means that militant groups expose themselves to volatile commodity prices that can have a substantial impact on groups' short and long term tactics. Taken together, these factors indicate that when groups access capital by building primary commodity markets, they may unwittingly invite a variety of risks that can lead them to languish or fail. Although natural resource access can provide groups with a short-term method to finance their operations, this

initial wealth often paradoxically spells long-term disaster. These findings suggest that policymakers should consider alternate economic strategies to capitalize on the additional sources of militant group fragility stemming from primary commodity markets.

While this research moves the literature forward and increases our understanding of natural resources in conflict, it also opens opportunities for substantial additional work. Empirically, testing the robustness of the micro-level findings across a range of intrastate conflicts and further exploring any conflict or group specific conditions that impact militant groups' outcomes is a necessary step. Further, while variation in primary commodity type is minimally explored here, additional data collection and testing is needed to fully assess how commodity type may impact the types of local investors militants attract and in turn how specific markets impact rebels' outcomes.

Exploring the empirical scope of these findings will undoubtedly yield additional questions. In the meantime, this dissertation lays the groundwork for investigating remaining steps in militants' supply chain and further challenges to militants' natural resource profit. Considering 'local investors' to be a unitary actor is a useful abstraction for developing a theory of rebel primary commodity markets, but this masks important variation in the roles of suppliers, transporters, or other economic partners such as existing criminal groups or traffickers. As the bargaining power of each of these types of investors is likely to differ, this will impact militant groups' and states' success at each level of production, in turn affecting militants' conflict trajectory. Just as variation in possible collaborators will impact rebels' success, the addition of rival non-state actors can complicate militant groups' situation. Firms with strong competitors must employ different strategies than firms with a monopoly, and militant groups should be no different.

Or, for firms that *are* able to carve out a monopoly on a particular commodity, how might the assumption of exogenous price shocks differ? Groups that act as price makers rather than price takers can expect fewer consequences as a result of price volatility, but must also expend effort to ensure their primary role in the commodity's international market. Finally, additional consideration of the state's objectives is needed. This document has assumed that states are working against rebels' economic and military goals by competing for their economic support as they engage with them on the battlefield. Some states or subsets of government actors, however, become criminal partners to profit from rebels' commodity markets - which implies that relaxing the assumption that rebels' economic gains are zero sum for all state actors is another necessary step.

In short, ample work remains to definitively understand the conditions under which militant groups are affected by or avoid the resource curse. This research agenda is an important one, as it has substantial implications for limiting militant groups' power, ensuring the well-being of the civilians rebels seek to recruit as suppliers, and preventing protracted violence and criminality in the wake of civil wars. Policy suggestions that do not consider the ways in which primary commodities can either increase militants' power or their fragility are liable to increase civilian victimization and lead groups to evolve into persistent, profit-driven violent actors. In addition to more tailored strategies for reducing militants' involvement, states and non-governmental actors should focus on developing stable economic opportunities in resource-rich regions to minimize the attractiveness of participating in rebel markets.

Research in intrastate conflict often yields bleak results. The implications of this dissertation, however, should make the reader hopeful rather than discouraged. Access to substantial primary commodity wealth need not be a guarantee of militant group longevity, strength, or lethality. By identifying and capitalizing on the ways natural resources 'curse' rebels' progress, we can limit violence and destruction, safeguard against chronic conflicts, and develop appropriate post-conflict measures to prevent the evolution and resurgence of violent organizations.

APPENDIX A: SUPPORTING INFORMATION FOR CHAPTER 2

Descriptive Statistics and Additional Tables

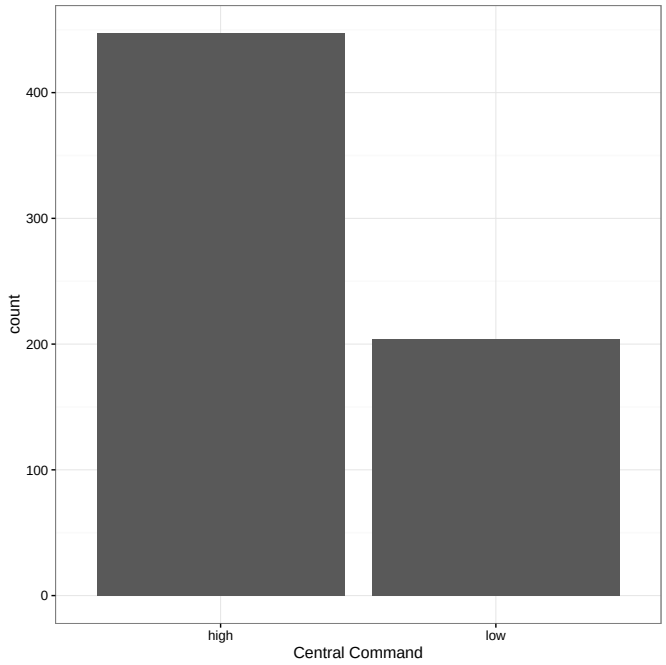


Figure A.1: Histogram, Frequency of Low/High Control

Table A.1: Descriptive Statistics, Continuous Independent Variables

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Sum Resource Cells	0.00	0.00	0.00	0.85	1.00	13.00
Total Cells	0.00	2.00	3.00	5.23	6.00	44.00
Ln(Population)	5.84	9.16	10.28	10.62	11.46	14.09
Ln(GDP)	6.92	9.47	11.11	11.33	12.85	16.05

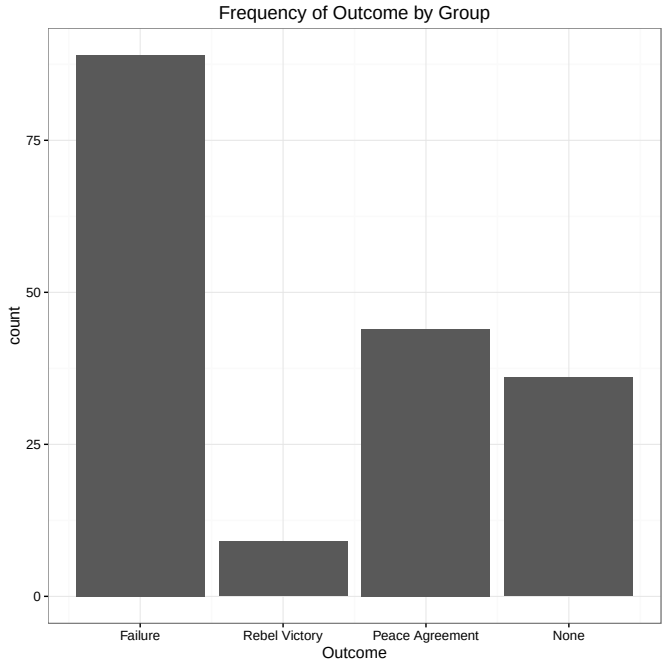


Figure A.2: Histogram, Group Outcomes

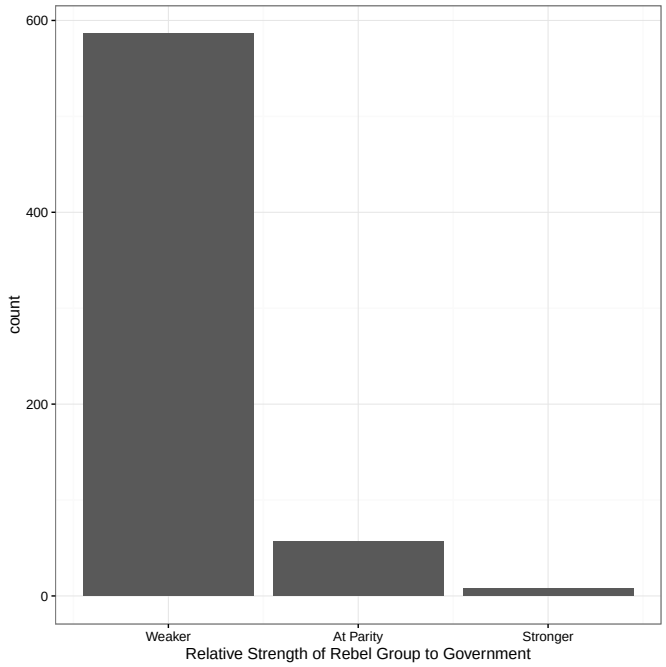


Figure A.3: Histogram, Frequency of Rebel Strength Relative to Government

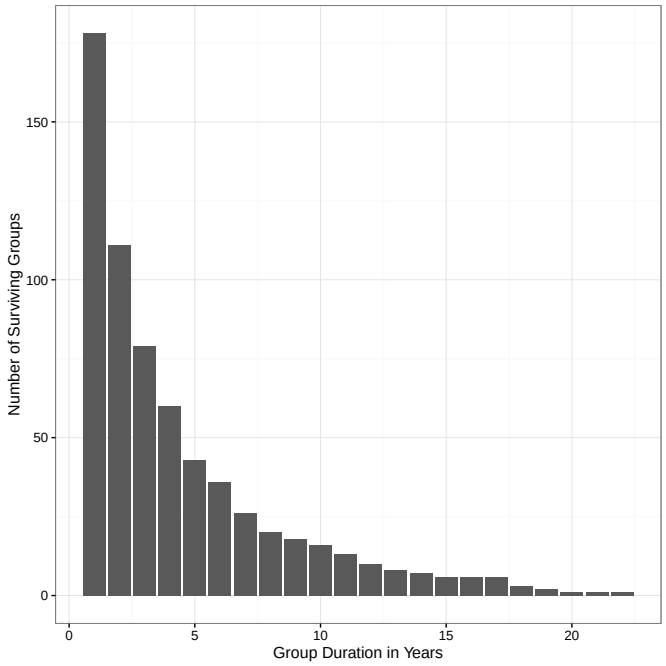


Figure A.4: Histogram, Frequency of Group Duration in Years

Table A.2: Lognormal Distribution (Failure)

Variable	**Coefficient**	**(Std. Err.)**
Resource Cells	0.006	(0.068)
Central Control	-0.185	(0.219)
Central Control*Resource Cells	-0.024	(0.092)
Ln(Pop)	0.176	(0.126)
Ln(GDP)	-0.097	(0.097)
Total Cells	0.051*	(0.025)
Rebel Strength: Parity	0.272	(0.333)
Rebel Strength: Stronger	-0.253	(0.524)
Intercept	0.534	(0.635)
N	651	
Log-likelihood	-181.229	
$\chi^2_{(8)}$	10.858	

Table A.3: Cox PH Model (Failure)

Variable	**Coefficient**	**(Std. Err.)**
Resource Cells	-0.007	(0.085)
Central Control	0.219	(0.231)
Central Control*Resource Cells	0.045	(0.103)
Ln(Pop)	-0.224†	(0.116)
Ln(GDP)	0.142	(0.099)
Total Cells	-0.032	(0.027)
Rebel Strength: Parity	-0.364	(0.416)
Rebel Strength: Stronger	0.215	(0.659)
N	651	
Log-likelihood	-397.649	
$\chi^2_{(8)}$	8.274	

Table A.4: Lognormal Distribution (Rebel Victory)

Variable	**Coefficient**	**(Std. Err.)**
Resource Cells	-0.169	(0.113)
Central Control	1.135†	(0.679)
Central Control*Resource Cells	-0.191	(0.134)
Ln(Pop)	-0.744**	(0.257)
Ln(GDP)	0.714**	(0.232)
Total Cells	0.029	(0.040)
Rebel Strength: Parity	-1.196†	(0.626)
Rebel Strength: Stronger	-2.835**	(0.959)
Intercept	3.951**	(1.268)
N	651	
Log-likelihood	-28.048	
$\chi^2_{(8)}$	53.537	

Table A.5: Cox PH Model (Rebel Victory)

Variable	Coefficient	(Std. Err.)
Resource Cells	0.195	(0.127)
Central Control	-1.539	(1.691)
Central Control*Resource Cells	0.254	(0.225)
Ln(Pop)	1.187*	(0.595)
Ln(GDP)	-1.014†	(0.593)
Total Cells	-0.018	(0.043)
Rebel Strength: Parity	1.783†	(0.941)
Rebel Strength: Stronger	3.496**	(1.325)
N	651	
Log-likelihood	-29.662	
$\chi^2_{(8)}$	46.3	

Table A.6: Lognormal Distribution (Negotiation)

Variable	Coefficient	(Std. Err.)
Resource Cells	0.038	(0.085)
Central Control	0.158	(0.299)
Central Control*Resource Cells	5.374**	(0.461)
Ln(Pop)	0.016	(0.136)
Ln(GDP)	0.219†	(0.122)
Total Cells	0.101*	(0.042)
Rebel Strength: Parity	0.506	(0.317)
Rebel Strength: Stronger	6.040**	(0.481)
Intercept	-1.002	(0.647)
N	651	
Log-likelihood	-99.193	
$\chi^2_{(8)}$	246.6	

Table A.7: Cox PH Results (Negotiation)

Variable	**Coefficient**	**(Std. Err.)**
Resource Cells	-0.044	(0.124)
Central Control	-0.439	(0.364)
Central Control*Resource Cells	-44.378	(0.000)
Ln(Pop)	0.110	(0.205)
Ln(GDP)	-0.406*	(0.189)
Total Cells	-0.122*	(0.051)
Rebel Strength: Parity	-0.391	(0.405)
Rebel Strength: Stronger	-45.038	(0.000)
N	651	
Log-likelihood	-174.485	
$\chi^2_{(6)}$	28.208	

Results and Tables, Bayesian Analysis

Model Setup: Bayesian Competing Risks Framework

The likelihood function for competing risks is commonly written as in Equation 1. This assumes that the likelihood of termination due to cause j can be estimated by treating termination by all other causes as equivalent to censoring. Due to the presence of time-varying explanatory variables, the vector of covariates x_i can be dependent on t_i.

$$\mathcal{L} = \prod_{i=1}^{n} \prod_{j=1}^{m} \lambda_j(t_i, x_i(t_i))^{d_{ij}} e^{-\Lambda_j(t_i, x_i(t_i))} \tag{1}$$

Assuming a Weibull baseline hazard for each cause j:

$$\lambda_j(t, x(t)) = \lambda_{j0}(t) e^{x(t)'\beta}$$

With an overall baseline hazard:

$$\lambda_{j0} = \lambda_j p_j (\lambda_j t)^{p_j - 1}$$

The model used to test my hypotheses has causes m=3, with $j \in$ [failure, victory, peace agreement]. There are 651 observations in total, with 157 unique conflicts represented with random intercepts to capture within-conflict variation. The vector $x_i(t_i)$ represents the following 6 covariates: Sum of Resource Cells, Central Control, Ln(GDP) (continuous), Total Cells, Relative Strength, and the interaction Sum of Resource Cells * Central Control. The minimum conflict duration is 1 year, with a maximum of 22 years.

The model is estimated with Stan through RStan, and uses the following priors and hyperprior for σ:

$$\text{Conflict Intercepts} \sim \mathcal{N}(0, \sigma)$$

$$\sigma \sim \text{Cauchy}(0, 3)$$

$$p_j \sim \text{Lognormal}(0, 0.5)$$

$$\beta \sim \text{Cauchy}(0, 5)$$

$$\text{y} \sim \text{Weibull}(p_j, \lambda_j)$$

The model is estimated with 3 chains and a burn-in of 25,000 iterations per chain. For each parameter estimated, the number of effective samples is greater than 500 and the R hat is 1.

APPENDIX B: SUPPORTING INFORMATION FOR CHAPTER 3

Incomplete Information Solution

Case 1: G plays Arm:

L accepts R's offer when:

$$\theta(1-(1/\beta)p) - c_L \geq \beta p - k$$

$$c_L \leq k + \theta - \frac{p(\beta^2+\theta)}{\beta}$$

The critical probability c_L for when G co-opts L ($c_{LA}{}^*$) is then equal to the right hand side of the equation in line 2. Multiplying this by R's possible payoffs yields:

$$(k+\theta-\frac{p(\beta^2+\theta)}{\beta}) * (\lambda-\theta)(1-(1/\beta)p-c_R) + (1-(k+\theta-\frac{p(\beta^2+\theta)}{\beta})) * (\lambda(1-\beta p)-cR)$$

Taking the derivative of this expression with respect to θ, setting it to 0 and solving for theta is R's optimal offer for this case:

$$\theta_A = \frac{k\beta + p(\lambda-\beta^2(1+\lambda))}{2(p-\beta)}$$

Substituting this offer θ_A into the expression for R's payoffs yields R's overall payoff for making this offer, given that the outcome is probabilistic based on L's costs cL:

$$[(k+\frac{k\beta+p(\lambda-\beta^2(1+\lambda))}{2(p-\beta)} - \frac{p(\beta^2+\frac{k\beta+p(\lambda-\beta^2(1+\lambda))}{2(p-\beta)})}{\beta}) * ((\lambda-\theta)(1-(1/\beta)p-c_R)) +$$

$$(1-(k+\frac{k\beta+p(\lambda-\beta^2(1+\lambda))}{2(p-\beta)} - \frac{p(\beta^2+\frac{k\beta+p(\lambda-\beta^2(1+\lambda))}{2(p-\beta)})}{\beta})) * (\lambda(1-\beta p)-cR)]$$

$$=$$

$$\frac{(-4c_R\beta^2+k^2\beta^2+p^2\beta^4+2kp\beta(\beta^2(-1+\lambda)-\lambda)+4\beta^2\lambda+2p^2\beta^2\lambda-4p\beta^3\lambda-2p^2\beta^4\lambda+p^2\lambda^2-2p^2\beta^2\lambda^2+p^2\beta^4\lambda^2)}{4\beta^2}$$

Prior to solving for G's decision of whether to co-opt the local investors or negotiate with the rebels, it is necessary to solve the right hand side of the tree.

Case 2: G plays Offer Negotiation:

L accepts R's offer when:

$$\theta(1-(1/\beta)p)-c_L \geq p-k$$
$$c_L \leq k+\theta-\frac{p(\beta+\theta)}{\beta}$$

The critical probability c_L for when G offers negotiation ($c_{LO}{}^*$) is then equal to the right hand side of the equation above. Multiplying this by R's possible payoffs yields:

$$(k+\theta-\frac{p(\beta+\theta)}{\beta})*(\lambda-\theta)(1-(1/\beta)p-c_R)+(1-(k+\theta-\frac{p(\beta+\theta)}{\beta}))*(\lambda(1-p)-cR)$$

Taking the derivative of this expression, setting it equal to 0 and solving for θ provides the optimal offer R makes when G has played Offer:

$$\theta_O=\frac{k\beta+p(\beta+\lambda-\beta\lambda)}{2(p-\beta)}$$

Substituting this offer θ_O into the expression for R's payoffs yields R's overall payoff for making this offer, given that the outcome is probabilistic based on L's costs cL:

$$[(k+\frac{k\beta+p(\beta+\lambda-\beta\lambda)}{2(p-\beta)}-\frac{p(\beta+\frac{k\beta+p(\beta+\lambda-\beta\lambda)}{2(p-\beta)})}{\beta})*(\lambda-\theta)(1-(1/\beta)p-c_R)+$$
$$(1-(k+\frac{k\beta+p(\beta+\lambda-\beta\lambda)}{2(p-\beta)}-\frac{p(\beta+\theta)}{\beta}))*(\lambda(1-p)-cR)]$$
$$=$$
$$\frac{(-4c_R\beta^2+k^2\beta^2+p^2\beta^2+2kp\beta(\beta(-1+\lambda)-\lambda)+2p^2\beta\lambda+4\beta^2\lambda-4p\beta^2\lambda-2p^2\beta^2\lambda+p^2\lambda^2-2p^2\beta\lambda^2+p^2\beta^2\lambda^2)}{4\beta^2}$$

These are R's payoffs for offering θ_O. To determine whether R will accept G's offer of negotiation or not, we compare this payoff to R's payoff from negotiation:

$$\frac{(-4c_R\beta^2+k^2\beta^2+p^2\beta^2+2kp\beta(\beta(-1+\lambda)-\lambda)+2p^2\beta\lambda+4\beta^2\lambda-4p\beta^2\lambda-2p^2\beta^2\lambda+p^2\lambda^2-2p^2\beta\lambda^2+p^2\beta^2\lambda^2)}{4\beta^2}$$
$$\geq(1-p)$$

Solving this inequality for the value of λ at which R is indifferent between the two options gives us the critical value λ^*:

$$\lambda^* = 1/(p^2(-1+\beta)^2)\beta(kp - p^2 - 2\beta + 2p\beta - kp\beta + p^2\beta + 2\sqrt{p^3(-1+\beta) + p(k(-1+\beta) - 2\beta)\beta + \beta^2 + p^2(1 + c_R(-1+\beta)^2 + (-1+k)\beta - (-1+k)\beta^2)})$$

When $\lambda < \lambda^*$, R will accept negotiation. If $\lambda > \lambda^*$, indicating that the value of natural resources is high, R prefers to offer the optimal θ in the hopes of securing cooperation from local investors.

G's decision: Arm Locals or Offer Negotiation:

Due to assumptions made about G's preferences for the sake of simplifying the game, G has two dominant strategies depending on the choice R has made. If R will choose to negotiate (because p and λ are low or because p is very high), G will then offer negotiation. This is because I assume $p > \beta p - c_G$. If, however, R anticipates a high value of λ and extends an offer to L rather than accepting G's offer of negotiation, G weakly prefers to co-opt the locals because $(1/\beta)p - c_G = (1/\beta)p - c_G$ and $\beta p = c_G > p - c_G$.

Complete Information Solution

There are two cases: 1) when G will co-opt the locals, and 2) when G will offer negotiation.

For case 1, the θ needed for L to accept R's offer is:

$$\begin{aligned} \theta(1 - (1/\beta)p) - c_L &\geq \beta p - k \\ \theta(1 - (1/\beta)p) &\geq \beta p + c_L - k \\ \theta &\geq \frac{\beta p + c_L - k}{(1 - (1/\beta)p)} \end{aligned}$$

L will choose A when θ is greater than or equal to this amount, and reject R's offer otherwise.

Because of the assumption that R prefers the outcome in which L cooperates with them, R will always offer:

$$\theta = \beta p + c_L - k(1 - (1/\beta)p)$$

Which means that G will receive:

$$(1/\beta)p - c_G - x$$

For case 2, the θ needed for L to accept R's offer is:

$$\theta((1/\beta)p) - c_L \geq p - k$$
$$\theta \geq \frac{p + c_L - k}{1 - (1/\beta)p}$$

L will choose Accept when θ is greater than or equal to this amount, and reject R's offer otherwise.

R will offer

$$\theta = \frac{p + c_L - k}{(1 - (1/\beta)p)}$$

when their payoff for L's cooperation is greater than the negotiation outcome, or when:

$$(\lambda - \theta)(1 - (1/\beta)p) - c_R > 1 - p$$
$$(\lambda - \theta) > \frac{1 - p + c_R}{1 - (1/\beta)p}$$
$$\theta < \lambda - \frac{1 + p - c_R}{1 - (1/\beta)p}$$

R negotiates with G otherwise.

Given that R will always strike a deal with L if offered, G will always play Offer Negotiation, as

$$(p; \delta p - c_G) > \delta p - c_G - x$$

□

This means that in complete information and given key assumptions, there are only two equilibria: (G plays Offer Negotiation, R plays Negotiate) and (G plays Offer Negotiation, R plays $\theta = \frac{p+c_L-k}{(1-\delta p)}$, L accepts).

Statistical Appendix

Table B.1: Descriptive Statistics, Continuous Variables

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Sum All Resource Cells	0.00	0.00	0.00	1.64	1.00	39.00
Distance from the Capital, Scaled by Country	0.00	0.08	0.18	0.36	0.35	8.85
Relative Political Reach	0.29	0.71	0.92	0.93	1.15	1.62

Figure B.1: Distribution of Groups' Territorial Control

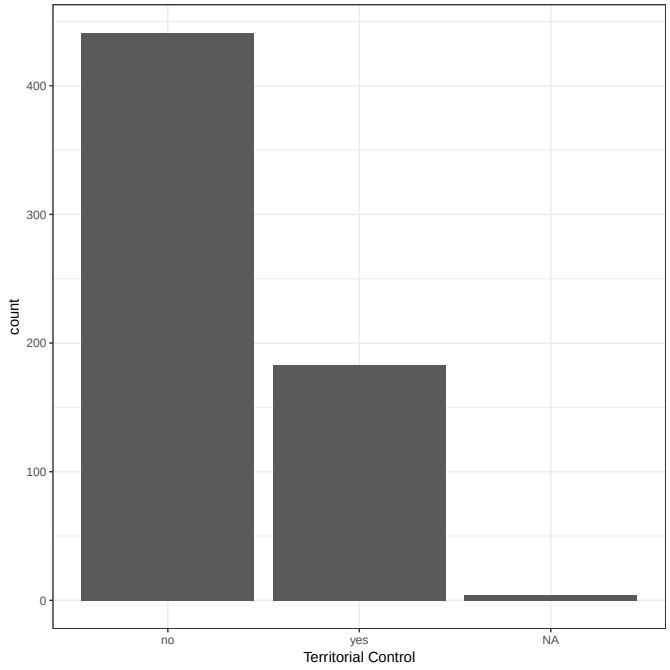


Figure B.2: Survival Function, Cox PH Model, H1

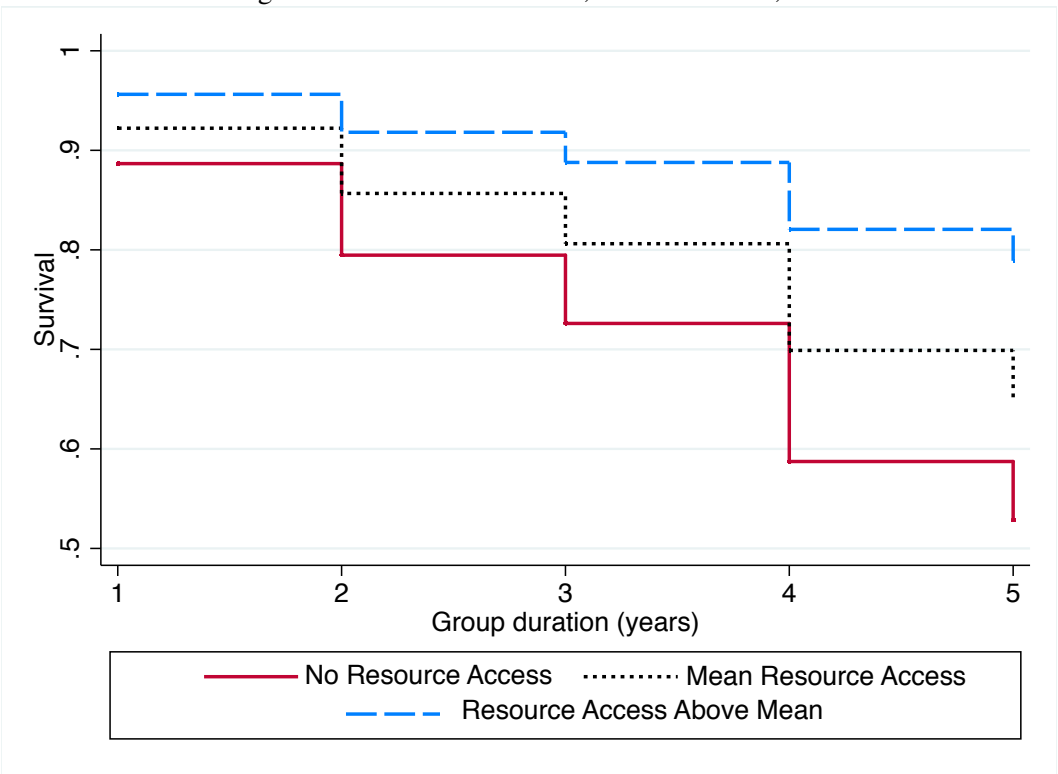


Table B.2: Additional Models, DV=Time to Negotiation

	(1)	(2)	(3)
Sum, Natural Resource Cells	0.144*	0.172*	0.155*
	(0.0578)	(0.0609)	(0.0580)
Dummy, Territorial Control	-0.319	-0.398	-0.374
	(0.2789)	(0.2741)	(0.2589)
Distance From Capital, Scaled by State	-0.0477	0.0572	0.00324
	(0.2262)	(0.2137)	(0.2021)
Ln(Military Expenditures)	0.283*		
	(0.0574)		
Ln(Real GDP Per Capita)		0.386*	0.339*
		(0.1257)	(0.1361)
Explicit External Rebel Support**		-1.207*	-1.207*
		(0.4284)	(0.4755)
No External Rebel Support**		-1.034*	-1.130*
		(0.4167)	(0.4567)
Dummy, Democratic State			0.461
			(0.3765)
Constant	-1.345	0.332	0.588
	(0.7636)	(0.9636)	(1.0201)
N	574	598	575
AIC	144.1	178.1	174.0
BIC	170.3	213.2	213.2

Standard errors in parentheses

* $p \leq 0.05$

** Excluded category: Alleged Rebel Support

Table B.3: Additional Models, DV=Time to Negotiation

Sum, Mined Resources Only	0.271*
	(0.1159)
Dummy, Territorial Control	-0.618*
	(0.2892)
Distance From Capital, Scaled by State	0.0480
	(0.2412)
Relative Political Reach	-0.698
	(0.4796)
Constant	3.047*
	(0.5433)
N	606
AIC	182.8
BIC	209.3

Standard errors in parentheses

* $p < 0.05$

Figure B.3: Survival Function, Cox PH Model, H2

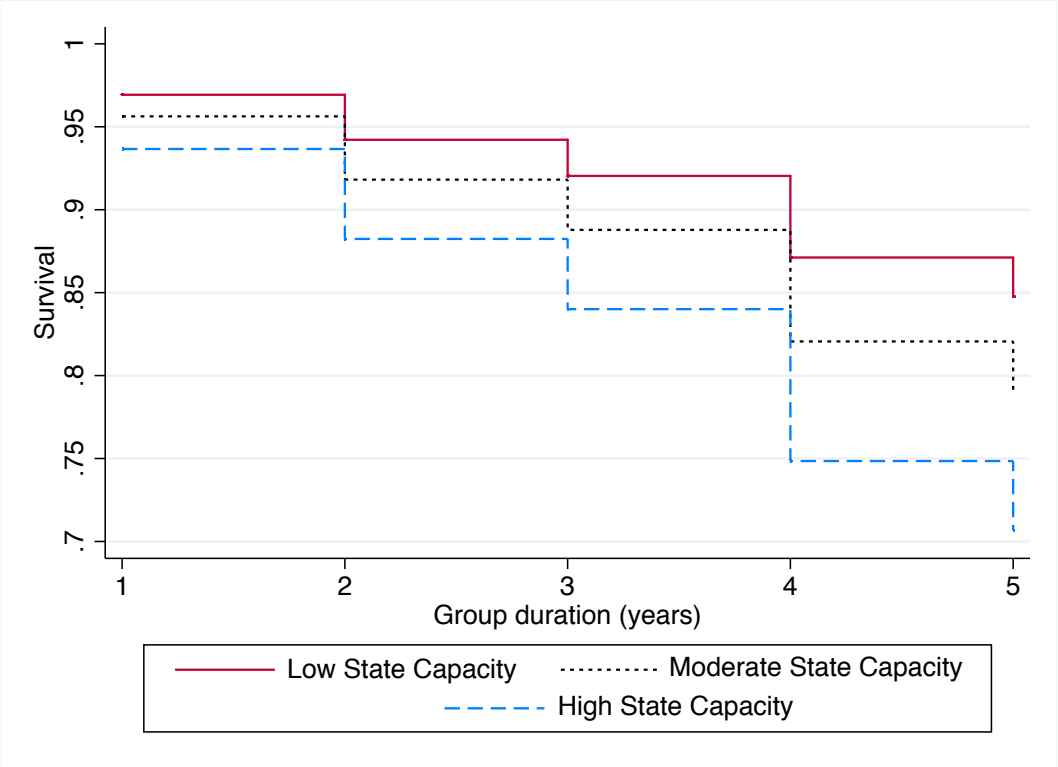
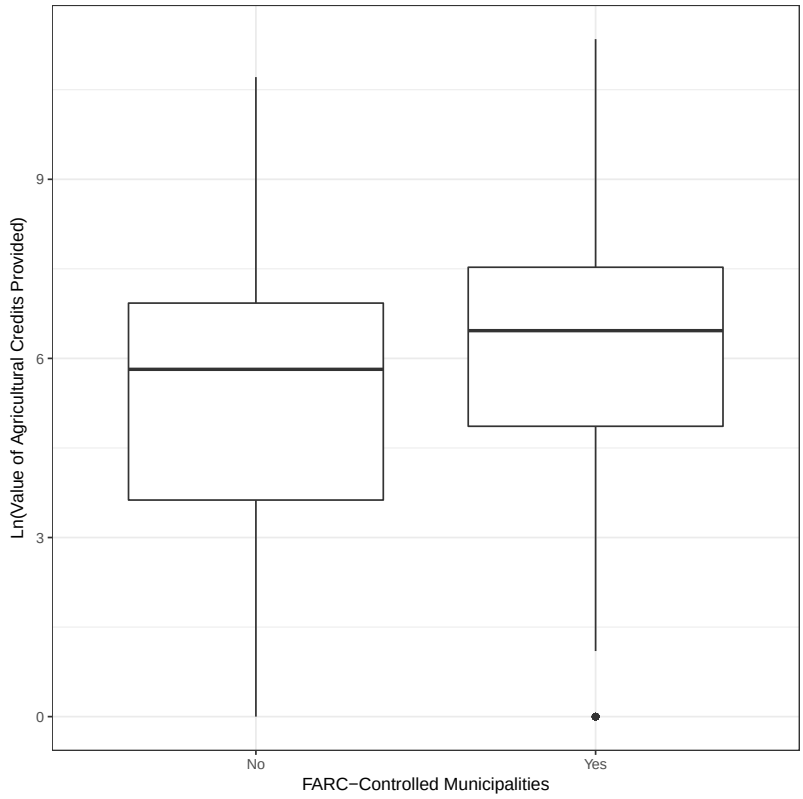


Table B.4: OLS: Impact of Agricultural Credits on FARC-Supported Coca Farming, Year F.E.

	Dependent variable:
	Log(Hectares of Coca)$_{t+1}$
FARC-Controlled Departments	4.678*
	(0.179)
Log(Value of Agricultural Credits)	−0.046*
	(0.007)
FARC Control*Agricultural Credits	−0.331*
	(0.029)
AUC	0.696*
	(0.046)
Gini, Land Ownership	−3.040*
	(0.160)
2001	−0.178*
	(0.074)
2002	−0.143*
	(0.075)
2003	−0.054
	(0.075)
2004	0.013
	(0.075)
2005	0.109
	(0.074)
2006	0.226*
	(0.075)
2007	0.274*
	(0.075)
2008	0.339*
	(0.076)
Constant	2.659*
	(0.123)
Observations	9,013
Note:	*p<0.05

Figure B.4: Agricultural Credits Given to FARC-Controlled Departments vs. Others



APPENDIX C: SUPPORTING INFORMATION FOR CHAPTER 4

Descriptive Statistics and Additional Tables

Table C.1: Distribution of Municipalities' Ln(GDPPC)

Min. :12.73	Median :15.60	Mean :15.50	Max. :17.67	Missing :72

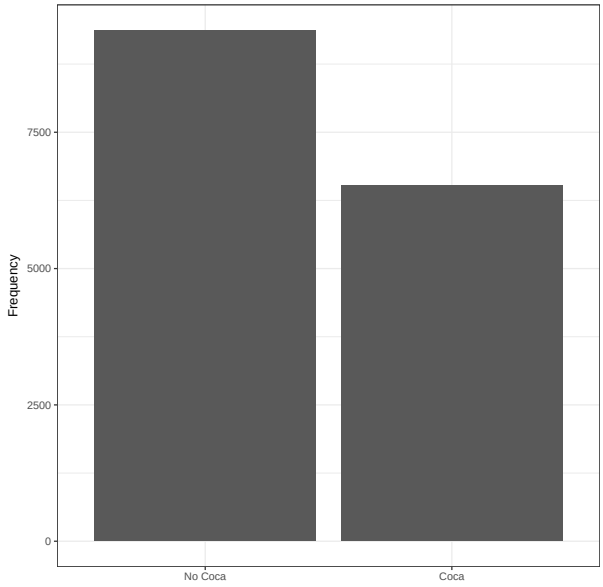


Figure C.1: Distribution of Coca Crops

Table C.2: Descriptive Statistics, Dependent Variables

	Counts of FARC victimization	Counts of Paramilitary Victimization
Min.	0.00	0.00
Median	0.00	0.00
Mean	0.161	0.318
Max.	61.00	77.00
Missing	1296	1296

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