Adding Fuel to the Fire: An Empirical Analysis and Case Study of the Effects of Natural Resources on Political Violence in Africa

Alice Liang
yliang2@wellesley.edu

Follow this and additional works at: http://repository.wellesley.edu/thesiscollection

Recommended Citation
http://repository.wellesley.edu/thesiscollection/353

This Dissertation/Thesis is brought to you for free and open access by Wellesley College Digital Scholarship and Archive. It has been accepted for inclusion in Honors Thesis Collection by an authorized administrator of Wellesley College Digital Scholarship and Archive. For more information, please contact ir@wellesley.edu.
Adding Fuel to the Fire:  

Alice Y. Liang  

Submitted in Partial Fulfillment  
of the  
Prerequisite for Honors  
in the Department of Political Science  

April 2016  

© 2016 Alice Y. Liang
Acknowledgments

I would first like to thank my thesis advisor, Professor Paul MacDonald, for his continual guidance and valuable insight in this topic and thesis, and for his general encouragement of my pursuit of both quantitative and qualitative research methods. I am also grateful to Professor Akila Weerapana for his helpful comments and advice that helped me pull this project together. Thank you to Professor Stacie Goddard for her persistent care and support and for inspiring me to study political science from my first year, and to Professor Michal Ben-Josef Hirsch for sitting on my thesis committee. I am deeply grateful for the Jerome A. Schiff Fellowship that supported this thesis. Thank you also to Professor Joe Swingle and Professor Kristin Butcher for inspiring in me a love of statistics and econometrics.

I am so thankful to the warm support from all my friends and family in this process. Thanks especially to Amal Cheema for her edits; to Amy Wickett, Jackie Li, Taylor Cranor for their puns, friendship, and econometrics help; to Sravanti Tekumalla, Beta Beta, and Hot Pot Time Machine for keeping me sane and keeping my thesis life fun; to Pearl Li for listening to my constant worries; to Zoe Krause and Rose Owen for always making sure I’m on task; to Delia Arias de León, Mariajose Rodriguez-Pliego, Savitri Restrepo Alvarez, and Nikita Saladi for the late nights we worked together in the final stretch; and to my family for their unconditional love and belief in me.
5.2 Types of resources .................................................. 41
  5.2.1 Resource breakdowns ........................................ 41
  5.2.2 Prices .......................................................... 43
5.3 Heterogenous Effects ................................................. 45
  5.3.1 State capacity .................................................. 45
  5.3.2 Ethnicity ....................................................... 47
5.4 Robustness .......................................................... 48
5.5 Data Limitations ...................................................... 50

6 Small-N Analysis: War and Peace 52
  6.1 Niger Delta ......................................................... 53
  6.2 Western Gabon .................................................... 58

7 Conclusion ............................................................. 61

References ............................................................... 64
1 Introduction

How do natural resources affect civil conflict? While interstate wars have been declining since the end of the Cold War, civil conflicts have increased. Figure 1 shows that both the number of violent incidents by rebel groups and the proportion of regions with rebel violence have been rising. Hence, uncovering the mechanisms behind how and why political violence occurs remains salient. Fearon and Laitin (2003) contend that natural resource dependence weakens states’ institutions, which allows rebel groups to enact conflict more easily, while Collier and Hoefler (2004) argue that rebels will fight when and where they have natural resources to loot and profit from.

However, I question the methods used in their empirical analyses, which rely on broad macroeconomic variables to explain micro-level mechanisms. I instead turn to sub-national data to explore the link between conflict and natural resources within countries rather than across countries. I aggregate various geo-referenced sources to form a panel dataset of political violence, resource availability, and demographic covariates at the district level for 49 African countries from 1997 to 2014.

Understanding where conflict is likely to occur serves as a basis for understanding why political violence occurs. I hypothesize that lootable natural resources, which rebels can easily extract, increase the likelihood of violence, while unlootable natural resources, which rebels cannot access without significant infrastructure, do not. To motivate this analysis, the left graph in Figure 2 shows that the probability of rebel violence in lootable resource districts mostly exceeds the probability in districts without lootable resources. This pattern does not persist on the right graph comparing districts with and without unlootable resources.

Using a fixed effects model, I find that this hypothesis holds across several empirical specifications. Districts with lootable resources have an expected increase in the probability of rebel violence by approximately 32 percent relative to those without lootable resources, holding other district covariates constant. These effects are larger for lootable diamond and gold than for lootable petroleum, perhaps reflecting the fact that extracting the latter is
Figure 1 – Trends of violence

![Political Violence Incidence, 1997-2014](image)

**Note:** Trends of violent political interactions involving rebel groups over time in 670 African sub-national districts, shown with kernel-weighted local polynomial smoothing. Data source: Armed Conflict Location and Event Data, Raleigh et al., 2010.

a more capital-intensive enterprise while the former is a more labor-intensive enterprise. I also find that the intensity of violence, as well as the number of conflicts between multiple rebel groups, are higher in districts with lootable resources. These findings support Collier and Hoeffler’s theory of rebel looting; if resources solely affected violence through weak state institutions, we should not expect to see large differences in violence for lootable versus unlootable resource districts.

Furthermore, I hypothesize that the effects of lootable resources should be higher where state capacity is weaker and where some ethnic groups are excluded. I proxy for variation in state coercive capacity with a district’s distance from the capital and find no significant differences. State capacity and its multivariate dimensions, however, remain incredibly difficult to capture empirically. Finally, while neither Collier and Hoeffler nor Fearon and Laitin find ethnic exclusion to be significant on the national level, I find that the effects of lootable resources manifest primarily in regions with both lootable resources and excluded ethnic groups.
To deepen an understanding of how natural resources interact with state strength and ethnic exclusion, I compare two petroleum-rich regions, the Niger Delta and western Gabon, which have seen repeated rebel violence and prolonged peace, respectively. While corruption around resources in the Niger Delta has corroded the government’s ability to effectively respond to rebel violence, state coercive capacity in western Gabon appears to be incredibly strong and bolstered by external involvement, deterring violence. Importantly, ethnically excluded groups overlap with lootable resources in the Niger Delta, while ethnic relations in Gabon are much more inclusive. This comparison corroborates the empirical finding that lootable resources are associated with an increase in the probability of rebel violence when co-located with excluded ethnic groups, perhaps because these groups lack political agency otherwise through more traditional channels.

Overall, I find that resource lootability and ethnic relations, as well as state capacity to some extent, factor in combination to affect the incidence of political violence in statistically and politically significant ways. The thesis proceeds as follows: section 2 reviews and critiques the relevant literature; section 3 builds on the literature to formalize hypotheses of political violence at a sub-national level. Section 4 details the data sources, variables, and
empirical specifications to used, and section 5 presents the empirical results. To delve into
the complex interactions of resources, state strength, and ethnicity, section 6 offers a com-
parison of political violence in the Niger Delta and in western Gabon. Section 7 concludes
with a discussion of data limitations and potential avenues for future research.

2 Literature Review

Collier and Hoefler (2004) argue that civil wars are prone to start when natural resources
provide opportunities for a rebel group to be viable and even profitable. Fearon and Laitin
(2003) view a state’s wealth as a signal of state capacity and hypothesize that stronger
states tend to have lower risks of civil war. Yet they find that oil-rich states have weaker
bureaucratic institutions, and resource wealth increases the incentives for rebel groups to
gain control over a state, so oil wealth will lead to a higher probability of civil war.

The results from the Collier & Hoefler (CH) and Fearon & Laitin (FL) studies do not find
significant support for the grievance hypothesis in the greed versus grievance debate, which
argues that social, ethnic, and linguistic fragmentation lead to civil wars (Horowitz 1998;
Posen 1993). They instead highlight that economic variables proxying for the conditions
of civil war provide much more explanatory power for civil war onset than identity-related
variables. Sambanis (2004) argues that greed and grievance do not need to be mutually
exclusive explanations. Also, Alesina and Zhuravskaya (2008) find that ethnically segregated
countries are much more likely to have weak government institutions, which arguably could
also be a consequence of high resource dependency.

Examining conflict using cross-country data can lead to methodological problems. Policy
implications from CH and FL remain incredibly broad. In fact, CH and FL use the same
variables, GDP per capita, for example, in their analyses to explain different causal mech-
anisms related to resources and conflict. This wealth of plausible stories can lead to very
different policy prescriptions. The methodology I use in my thesis allows me to narrow in on
regions within a country as the unit of analysis. Furthermore, analyzing resources only as it affects the onset of civil war could obscure a causal path from resources to war. Instead, changing the outcome of interest to political violence could offer a look into the escalatory dynamics of rebel groups leading up to a war.

2.1 Ambiguous Causal Paths

Through what channels does GDP per capita decrease the likelihood of war? In empirically testing the influence of natural resources, CH find that the risk of conflict rises with resource exports but decreases for a high level of resources. They took this to signify that when commodity exports were higher, resources were more readily available for rebels to exploit, so civil wars were more likely. However, even with higher GDP per capita, the opportunity cost of joining an insurgency would be higher and thus the probability of war would be lower.

FL also use oil export data and per capita income as predictors of civil war. However, unlike CH, they find no evidence for the commodity exports-to-GDP variable. Instead, they define an indicator for oil dependency if over a third of a country’s export revenues come from fuel, which they find to be positively correlated with war, arguably due to weaker bureaucratic institutions. FL also use per capita income as a proxy for state strength, noting that states with more resources would have more power to prevent the onset of an insurgency, so low per-capita income should be correlated with less civil war incidence.

In both CH and FL, per capita GDP is correlated with a wealth of other factors that are not necessarily controlled for. For example, if firms in a country see that civil war is likely in the next few years in a certain country, then they may reduce or remove investment from that country. Moreover, GDP measures production within the state’s borders including that of foreign companies, and many multinational companies maintain a significant share of natural resource ownership in Africa. This may bias the empirical results to overestimate the negative relationship between GDP and civil war and underestimate the effect of commodity exports. Another potential source of endogeneity is that resource-rich states that foresee an
insurgency rising in coming years may increase its productions and resource exports in order to raise revenue to fund counterinsurgency operations. This explanation would be in line with FL’s hypothesis but would positively bias their coefficient on GDP and the coefficient on oil dependency. Other causal stories could be told in this vein because, as Sambanis (2004:263) argues, the authors use “macro-level data to test hypotheses about civil war that are based on ideas about micro-level behavior.” While the macro-level data show clear trends, the explanations at the micro-level, whether about individuals or institutions, lack clarification from adequately specific empirical evidence.

Even though per capita income is correlated with conflict in the same direction in both CH and FL, the variable is used to tell two very different stories. The opportunity thesis CH provide suggests that states should focus on increasing development and human capital, which will raise the opportunity cost of fighting, in order to decrease the probability of civil war. The implications of FL suggest that states should strengthen their central military and policing institutions, reduce corruption at various levels of government, and expand infrastructure out from the administrative center. Moreover, without more specific evidence supporting these two policies, these broad policies are expensive, and potentially even risky, undertakings. For instance, strengthening military presence might lead to more backlash from the public in a politically violent manner. While the two recommendations are not necessarily mutually exclusive, gaining enough political will and resources in a state to do all of them will likely be both difficult and inefficient.

### 2.1.1 State resources vs. Looting rebels

This distinction between these two seminal papers in the greed versus grievance literature points to one of the major challenges of my research question, separating the effects that natural resources can have on the strength of the state from the attraction that the presence of such resources offers to rebel groups. For example, when a rebel group takes control of a resource site, it boosts its own funding while simultaneously detracting from the economic
strength of the state. On the other hand, extensive state control of resources can also be a source of inequality in a state that contributes to political grievance leading to conflict.

In fact, hypotheses of the “political Dutch disease” also maintain that resource rich countries tend to be more corrupt and have even weaker institutions that give way to civil war (Karl 1997). De Soysa and Neumayer (2007) term FL’s hypothesis the “state capacity” model and CH’s the “looting rebels” model. They also critique the technical details of CH, finding no non-linear relationship that would suggest highly resource dependent states also have low risk of conflict because governments would have enough resources to ward off conflict. Replacing the main resource variables in CH and FL’s work with resource rents data, the results from this specification support the “state capacity” model.

Defending the state capacity mechanism, Humphreys (2005) argues that resource-rich states do not need to heavily tax their populations and so have less need to engage with citizens’ demands, and the high rents to be gained from resources give more incentive for corruption. They also do not have incentives to create bureaucratic institutions to provide public services. Weakened rule of law is particularly detrimental when it renders necessary counterinsurgency operations ineffective.

Furthermore, it is also important to consider why some states with resources do not experience civil wars in the face of weak institutions. Snyder and Bhavnani (2005) contend that state capacity is a primary determinate of conflict, but a resource-rich state can take certain actions to employ resources effectively to govern with strong institutions and prevent conflict. Yet Snyder (2006) compares cases of conflict in Sierra Leone and Burma to expand his 2005 hypothesis to say that when a state’s institutions break down, a state with natural resources opens up to a much higher risk of civil war.

The literature on the looting rebels side focuses on rebel recruitment and the finances needed to sustain political violence. Unemployment may not necessarily cause rebel violence, but unemployed individuals have less opportunity cost of joining a group, especially if a rebel group is willing to supply some salary. This is the mechanism that CH draw from
in their empirical results. Highly organized rebel groups can choose to loot or to tax in order to fund their operations, provide rebel recruits with salaries, and motivate fighting. Mueller (2000) argues that rebels in traditionally termed ethnic wars are not so much ethically motivated but are actually opportunistic “thugs” looking to profit from looting. This is perhaps an oversimplified narrative of rebel recruitment, but it points out that the consequence of attributing criminal violence to wars of immutable identity can lead to a failure to deploy effective policing and the correct counterinsurgency strategies that would prevent unnecessarily long wars.

Moreover, Chassang and Miquel (2009) formalize a model that argues that low opportunity costs encourage individuals to engage in insurgent violence, and imperfect information about domestic economic contractions exacerbates fears of further income decline, and that also makes joining a rebel group seem more appealing. Weinstein (2005) adds on to the complexity of resources and recruitment with another information problem, hypothesizing that rebels face a “rebel resource curse”: resource-rich insurgencies recruit financially rather than politically motivated rebels, and they are less committed to the group’s goals in the long run. These examples show that clarification on specific causal mechanisms are thus necessary to clarify macro-level empirical phenomena.

2.2 Improvements in Data

In more recent years, more detailed data that disaggregates resource types in the explanatory variable, by types of political violence in the dependent variable, and by sub-national districts for all variables have become available. This data offer many new possibilities toward improving on the foundational quantitative models proposed by CH and FL. I will review a few novel methods authors have recently used and propose others for improving empirical specifications.
2.2.1 Types of natural resources

Not all resources should be given equal weight in leading to war; the distinctions between them can give some insight on who has control of what resources. For instance, Koubi et al. (2014) find two streams in the literature: scarcity in renewable resources leads to conflict, while abundance in non-renewable resources leads to conflict, though their review of the literature only finds strong evidence for the latter. The non-renewable natural resources most often used in literature are oil, natural gas, and diamonds, provide fairly different values and require different costs. De Soysa and Neumayer (2007) only find evidence for oil rents but not minerals, and they note that data on diamonds and illicit drugs remains more limited.

Beyond these basic distinctions, Le Billon (2001) separates resources into “point-source” (concentrated) resources versus diffuse resources. Non-renewables tend to be point-source resources that rebels can extract without taking control of large expanses of land, as would be the case with agricultural products or forestry. Drawing from Le Billon’s distinctions, Ross (2003) formally categorizes resources as lootable versus unlootable, where lootable resources can be accessed relatively easily by unskilled individuals. He also draws a distinction between obstructable versus unobstructuable resources, where the first is a resource whose transportation can be taken by rebels with few weapons or tools.1 Put somewhat differently, Snyder and Bhavnani (2005: 565) define lootable goods as those are “high-value . . . with low economic barriers to entry.” For instance, onshore oil is lootable while offshore oil is not; alluvial (secondary) diamonds are lootable while kimberlite (primary) diamonds are not. Lootable resources tend to benefit rebel groups, while unlootable resources primarily benefit the incumbent government because of the infrastructure required to access them, though the government should have easy access to the former as well. Thus, the lootability of a resource serves as a helpful distinction between the state capacity and rebel looting channels.

1In the empirical analysis, I refer to “lootable” as either lootable or obstructable under Ross’s (2003) categorization. I test for robustness of the results across varying definitions.
2.2.2 Outcome of interest & Temporal disaggregation

Furthermore, using civil war as the dependent variable obscures the escalatory dynamics leading up to civil war. In this paper, I instead turn to political violence incidence as the variable of interest. If an explanatory social or economic variable influences civil war, it likely influences the political violence leading up to war and within the context of war. Analyzing political violence provides insight for more specific, targeted policy recommendations.

Literature on the state of war today suggests that fourth-generation guerrilla warfare has pushed the nature of conflict away from large scale wars in recent years, which is another reason to use political violence incidence as the dependent variable rather than civil war onset (Lind 2004; Kaldor 2007). Some political violence incidents lead to civil war, some peter out, and others result in negotiated settlements. It is also important to consider the acts and patterns of political violence that do not lead to war, as counterfactuals to find what mechanisms actually lead low-level violence to escalate to civil war (Sambanis 2004).

Moreover, the onset of political violence is of interest in its own right, not just as a precursor to civil war. In many cases, it presents challenges to economic development and to a state’s right to govern. Repeated political violence in an area makes individuals’ lives volatile, reduces incoming investment, and prevents a stable economy from forming and functioning. Thus using civil war onset as the dependent variable limits the scope of the analysis.

Besides the theoretical implications, event data also provide a statistical benefit by expanding the sample size that limited the statistical power of most previous empirical work on this subject. CH’s definition of civil war requires an internal conflict to have at least 1,000 battle deaths annually, whether civilian or military. FL’s definition requires at least 1,000 battle deaths total with a yearly average of more than 100, and with more than 100 deaths on either side.²

²They also test a specification with a threshold of at least 5,000 deaths, and the results are robust.
between 1997-2007, data from COW’s list of intrastate wars lists 21 conflicts representing 39 conflict-time periods. Six of those have the data to qualify for CH’s definition, and 5 fit FL’s definition. By contrast, there were 9,466 battles involving rebel groups in the same time period in Africa, according to data from the Armed Conflict Location and Event Data Project (ACLED). Hence, it appears more salient to understand the mechanisms behind political violence, and the greater number of observations allows for more statistical power.

In the CH model, the unit of analysis is a country by five-year period of “conflict episodes” and “peace episodes.” Noting whether or not a war will start within a five-year period leaves more room for omitted variable bias with policies, political cycles, and economic trends that occurred within each unit, and policy prescriptions will be limited. Hence, I propose narrowing the time frame to years or even to months, in which event data may provide a more precise understanding of resources and violence.

2.2.3 Spatial disaggregation

Because of data limitations, the quantitative literature in the resource-conflict nexus largely consists of country-level analysis. While country-level analysis can present interesting trends across countries, many conflicts occur regionally within countries. If the explanations and the predictions they offer could be specified geographically within a country, policy could be more targeted toward a certain region.

Econometrically, using the country as the unit of analysis supposes that countries react to a change in explanatory variables in the same way. This is a rather difficult assumption to make. For instance, an increase in education in a high-income country may significantly shift its human capital accumulation upward, raising the opportunity cost of engaging in political violence. In a low-income country where jobs are not abundant even for the educated, education may have no such effect on recruitment to political violence. Thus unit heterogeneity could bias the estimates on the explanatory variables. On a country level, this problem could potentially be overcome by interacting variables to capture heterogeneous
effects. However, CH and FL’s datasets have 450-850 observations and 5,186-6,360 observations, respectively, offering limited statistical power when only a few observations are in each category of interactions.\(^3\)

Omitted variable bias could also present an econometric challenge if there are variables correlated with resources and civil war that are included in the regressions. Examples of such variables include cultural differences or colonial memory. With the increase in sub-national and geo-referenced data in recent years, it is possible to address unobserved heterogeneity by analyzing within countries rather than across countries. For instance, Dube and Vargas (2013) analyze coffee and oil price shocks to capture the effects of different resources on municipal-level political violence in Colombia. They found that drops in coffee prices intensified violence across the country, while rises in oil prices intensified violence in oil regions. This study provides an example of robust sub-national analysis that can be expanded across countries to examine the external validity of their results.

Koubi et al. (2014) also promote disaggregated analysis in future research, arguing that the state-level unit of observation is too general to capture the micro-level mechanisms of resources and conflict. Typically neither ethnicity, resources, violence, nor power is homogeneous across a country, and this intrastate variation can be exploited for empirical work. Sambanis (2004:266) gives an example that Azerbaijan, which produces significant oil exports, experienced a civil war between 1991 and 1994, but that conflict occurred in a region that did not have any oil sites. Most country-level analyses including the models by CH and FL would incorrectly correlate that war with oil resources. A proliferation of geo-referenced and district-level data in recent years makes sub-national analysis plausible. Most recent literature in this genre shows a trend toward geo-referenced, spatially disaggregated empirical work (e.g. Hodler and Raschky 2014; Raleigh et al. 2010). To add to the literature, I propose a sub-national empirical analysis of resource and conflict to test whether the existing theories of the resource-conflict nexus at a national level still apply at the sub-national level.

\(^3\)For instance, a robustness check with fixed effects in the CH paper can only use countries that have varying peace and conflict episodes, resulting in a weak estimation with only 145 observations.
3 Theorizing Political Violence at a Sub-national Level

In this section, I outline the mechanisms between natural resource and political violence by rebel groups on a sub-national level. Differentiating between these mechanisms, as well as the interactions between them, allows us to describe why some sub-national regions experience violence when others do not, even though the country as a whole may be predicted to have a high or low risk of conflict. Districts with lootable resources offer funding for rebel groups needed to begin and further their operations, and the resources themselves are often a source of grievance. These lootable resources, however, also offer a source of income for the incumbent government that may give the government incentive to put more coercive forces in those areas. Districts with unlootable natural resources offer a comparison in that they still provide funding to the state, but rebels do not typically have access to them, and so states also have less incentive to place coercive forces in those districts. Finally, political violence incidence in both can be contrasted with incidence in districts in the same country that have no natural resources.

3.1 Rebel Groups

The definitions of different group types need to be clarified at the outset. A rebel group is defined as a group that has a long-term political goal of gaining power over the incumbent state government, often by use of political violence. In contrast, a political militia is defined to be a group that has a short-term goal of targeted violence for some political gain, but not ultimately for national power. Finally, an ethnic militia is a group that rallies around a certain identity, such as ethnicity or religion, but has no stated goal toward national power.4

In this chapter, I will focus on rebel groups that have a political interest for state-level power, which could be met through government overthrow and take-over or separation from the state. Furthermore, I define political violence incidence as the onset of an event that has three primary factors: two organized groups of actors, the use of armed force, and a political

---

4These are the definitions offered by the ACLED codebook; see Raleigh et al. (2010).
motive against an incumbent government.

What this chapter will not focus on are the normative implications of rebel groups. Depending on the situation, rebel groups could be seen as social movements, as banded thieves, as righteous or unruly. Meanwhile, a government takeover could be seen as justly or unjustly targeted depending on one’s perspective. Instead, in this thesis I ask: in what areas and under what conditions do rebel groups enact political violence?

Two primary conditions are required for the formation of a rebel group: (1) economic, political, and/or social grievances, and (2) the availability of resources or potential access to resources. Without the first condition, the group would not meet the definition of a rebel group, having some stated political intent of national power. These grievances often build up over history until a breaking point is reached. The term resources in the latter condition is meant as a broad sense of funding from any sources, from remittances to taxation to natural resources. Rebel groups need funding to purchase supplies, pay their members, and transport materials and themselves across the country. While one of the two conditions may significantly outweigh the other in varying cases, I argue that some element of both are required for the start of a rebel group. For instance, rebels might be motivated by poverty in their region to start conflict, but if so, they need a source of funding to start and sustain action. Separatist rebels even more will need a permanent source of funding for the state they plan to govern after separation. Rebels motivated by political exclusion may seek to gain a voice by taking control of economic resources, which also offers them funding to sustain such efforts.

The rebel group grows by recruiting more individuals to join, as well as by gaining legitimacy through other means, such as violence. For an individual faced with a choice whether to join a rebel group, the decision rests on a combination of income and grievances. I assume that the individuals are rational actors. The rebel group must offer them adequate salaries or at least the promise of adequate salaries in the future that are enough to take on opportunity costs of other income-generating work. An individual takes into account what
employment options are available given his or her economic environment and educational status. He or she may also consider how the local economy might decline if the rebel group is successful in the area; in that case, to hedge against the possibility of losing, the individual would join the rebel group.

Furthermore, the political objectives of the rebel group may affect the decision calculus of the individual. Significant individual grievances toward the incumbent government that line up with the rebel group’s mission would allow the individual to take on more risk: they can face short-term monetary loss for a long-term political gain, where they will also be able to have more wealth in the long run. When grievances are adequately high such that they desire to alter the status quo, the individual chooses to join the group. It should be noted that an individual is not always “free” to choose to join: a rebel group may pose a threat to personal security if the individual chooses not to join, and in that case even very risk-averse individuals will join the rebel group because of the threat of a high immediate cost. Finally, socialization factors weigh an individual’s risk tolerance relative to that of others around him or her. To explain, if others in the individual’s social circles are all joining the rebel group, the individual may update his or her preferences to joining the group. Hence, identity-based rebel groups may have more effective recruitment using in-group techniques, as opposed to solely economically-motivated rebel groups with a general recruitment audience.

Thus, rebel groups must have access to resources or at least some possibility of future access to resources. When rebel groups gain significant numbers of members and legitimacy, they may also access other channels of funding such as taxation of civilians, credit access from similar rebel groups, or international assistance from other states. Until then, I assume that for most rebel groups, none of these channels are available. While rebel groups may see the promise of state revenues after taking control of the government, it is unlikely that they have access to credit to borrow against their expected future gains. Instead, some sources of basic funding for starting rebel groups include cash crops, land control, corruption of foreign or government aid, and natural resources. Natural resources in particular provide more sta-
ble income with very high rents, as compared to the other sources, if rebels are able to access them. The subset of groups who are co-located with lootable natural resources ex-ante have particular advantage in forming a rebel group, assuming there is a market they can resell to. Furthermore, rebel groups who are not co-located with lootable natural resources have incentive to strategically move to gain control over them. They can do so by conducting political violence over a region to take control of certain natural resource reserves. Hence I hypothesize:

\[ H1: \text{Districts with lootable natural resources face higher likelihood of political violence.} \]

This hypothesis ascribes to the looting rebels theory, in which rebels access natural resources in order to profit from the rents and fund operations. If rebels are able to gain access to them, lootable natural resources by definition require little infrastructure, so rebels can extract the items of value and resell them, mostly on illicit markets. Various types of resources require different methods of looting; for instance individual rebels can mine diamonds and transport them with little weight, and rebel groups can use taps to bunker oil from pipelines and resell the oil in barrels to other countries. Diamonds and oil have very different transport costs; onshore oil takes relatively more capital from the rebel group and more road infrastructure to resell successfully. Diamonds, more so than oil, requires more labor to extract.\(^5\)

However, we might also expect no effect in districts with lootable resources given sufficient state coercive capacity. Knowing that resources are lootable, governments may exert more control over these areas in order to protect the resources vital to running the government, discouraging rebel violence pre-emptively.

Furthermore, there are several other conflict-related mechanisms that may be in play in districts rich in natural resources. For instance, multiple rebel groups might seek control

\(^5\)This is a distinction made by Snyder and Bhavani (2005), “Diamonds, Blood, and Taxes.”
of the area, causing inter-rebel group conflict. The government may maintain control over these natural resources in a way that its residents are able to clearly see an inequitable distribution of resource wealth. Natural resources often also attract foreign corporations. In fact, in some instances such as in the Niger Delta, governments have taken over land rich in natural resources to hand over to foreign corporations, causing much antagonism from the residents of that land, leading to more conflict. Groups without national political agency may resort to violence as the only means of drawing attention to a particular issue, or even taking control of the government completely in order to gain power. Hence in theory, multiple factors can compound with rebel looting to increase the likelihood of political violence in areas with natural resources relative to areas in the same country without natural resources.

A second hypothesis then follows:

\textit{H2: Districts with both lootable natural resources and ethnically excluded groups face higher likelihood of political violence than those without either condition.}

Moreover, the impact of government control and foreign companies may be more applicable to unlootable natural resources, such as offshore oil, primary diamonds, and vein gold that require significantly more infrastructure to extract. Rebels are not able to access unlootable resources easily, if at all. Thus, in following with the rebel looting narrative, I hypothesize:

\textit{H3: Districts with unlootable natural resources should see no difference in rates of political violence relative to states with no natural resources.}

With adequate funding, rebels are able to purchase weapons and supplies, pay salaries and hire new recruits, and thereby fund further operations. New recruits choose whether to join a rebel group based on initial predicted cost benefit calculations, but as operations go
on, salaries and the risk associated with the group may change.

To a large extent, rebel groups are price takers for natural resources in the international market, as they are able to enter the illicit market by undercutting the market price. Thus rebel groups will have less funding as commodity prices decrease. Commodity prices should also affect state capacity if states rely heavily on their natural resources, but in practice states should have more reserves and futures contracts that allow them to shift strategies more slowly. Hence we should able to observe in the data what happens to rebel group violence when commodity prices change:

*H4: Districts with lootable natural resources face higher likelihood of political violence when the prices of those resources rise in the short-run.*

Though H4 follows the CH rebel looting narrative, CH find no statistically significance when replacing commodity exports with prices. However, in their study of sub-national conflict in Colombia, Dube and Vargas (2013) contend that changes in commodity prices affect the onset of political violence through two channels, the opportunity cost effect and the rapacity effect. In the former, higher incomes in the formal sector would raise the cost of joining an insurgency, preventing recruitment. In the latter, an increase the rents of the lootable resources causes an increase in the demand for those lootable goods and competition over it, especially as rebels have more to gain from looting. Dube and Vargas found evidence for the opportunity cost effect with price hikes in coffee and evidence for the rapacity effect for the same in oil. Focusing on natural resources, H4 stems from the rapacity effect. Although the illicit market does not take the same price as the formal market, prices on the illicit market should follow the same trends as that of the formal market. Yet, there may also be a difference between resource whose extraction is unobstructed but labor-intensive. Then as the price increases, a rebel group may choose to allocate more of its time to extract resources for future use than to enact violence in the moment.
I assume that formation of a rebel group goes mostly unobserved until it enacts some form of political violence. With each iteration of violence, the rebel group is able to gain attention and thus attract new recruits at a lower cost. This attention can also lend it legitimacy, whether from the media, state, civilians, or external powers. In this way, political violence can turn into legitimacy that becomes a basis for coercive power. This can lend a rebel group some ability to govern and hence takes away from the power of the incumbent government.

Each iteration of political violence also provides a strategic escalation; repeated iterations may reveal formalization of a strategy for the rebel group. The rebel group will want to take hold of resource regions and maintain control over the ones they already have. Rebels may want to take hold of supply networks, for instance the infrastructure between an oil field, the pipeline, and the roads needed for export. Finally, rebels will also want to take hold of centers of power such as national capitals, regional capitals, and key cities or towns.

In districts where rebel resources already have control over the territory, they are likely to be able to fund their operations and recruit more individuals to join under the rebel looting theory. Then, there is more opportunity for their operations to continue. Further political violence in the same region may be used to maintain control of their resources, or to reach their political demands with the resources that they now own. It may also be that having control over resources in one region allows groups to expand to neighboring regions, while maintaining the first as a base of funding.

3.2 State Responses

A rebel group can advance only if it has enough resources to withstand government efforts to counter it, assuming that the state will act against the group in order to maintain its power. By attacking natural resource sites, rebels gain the double advantage of adding to their own coffers while taking away from the state’s income. If the rebel group’s operations can be large enough to circumvent government funding, targeting natural resources becomes more
than a source of funding to a tactical strategy in itself. States also require strong coercive capacity to present a counterinsurgency against a rebel group once it has enacted political violence. I hypothesize:

*H5: Districts where state coercive capacity is weaker face higher likelihood of political violence. In particular, districts with low coercive capacity and with lootable resources should see even higher rates of political violence.*

National governments that are wealthy in and dependent on natural resources tend to have less need for strong institutions. Following the FL “weak states” narrative, resource-rich states do not need to tax residents if oil supports government revenues, and there is less need to enact social services to maintain a quality of life for their citizens. Natural resource dependence tends to be correlated with corruption measures, as the high rents from resources such as oil allow for some profits to be easily skimmed for personal gain.

Snyder and Bhavnani (2005) theorize that states choose to allocate earned revenues to either increasing tax capacity, coercive capacity, or public goods provision. The authors further outline that the spending from these natural resources affect conflict in different ways: it could heighten state capacity and decrease violence if put into military and policing, it could increase non-coercive institutional capacity if put into social services thereby diminishing grievances, or it could increase grievances if put into corrupt hands.

Sub-national analysis expands this to theoretically allow resource allocations to differ by type of district, rather than assuming capacities are uniform across a country. If natural resources are a major source of income for the government, these governments will also be highly protective of the sites of lootable natural resources. Their ability to maintain strong coercive structures also depends on the revenue available to the government from natural resources. States may anticipate rebel groups rising in advance and thus choose to allocate a significant portion of the budget to military and police controlling forces. Still, the govern-
ment will need to decide whether, when, and where to deploy these counterinsurgent forces, and the strength of deployment may decrease with respect to distance from a state’s administrative center. Governments will choose to retaliate when rebels present viable threats to their existence or perhaps to citizens’ safety, if strong police, military, and other coercive institutions are equipped to do so.

Hypothesis 5 refers specifically to coercive capacity and not capacity in terms of public good provision. It relies on the assumption that when facing a threat, the incumbent government will be more effective in countering rebels in places in which it can deploy strong coercive capacity. I discuss potential proxies for sub-national state coercive capacity in the next section.

Overall, natural resources provide incentives for maintaining order for governments, while they provide incentives for creating disorder for rebels. On a sub-national level, these incentives are magnified for districts within a country that has natural resources, and lootable natural resources as well as ethnic grievances in particular. I make the strong assumption that these incentives hold for rebel groups regardless of motive, because at least the execution of a rebel group’s motive will be related to its funding. Furthermore, I assume that governments have incentives for order regardless of regime, across countries. This allows me to embark on sub-national analysis that compares if and how this tension between order and disorder collide in certain regions of a country and not in others.

4 Data & Empirical Specification

4.1 Data

While many authors in the resource and conflict literature make compelling arguments about how natural resources affect conflict, country-level analysis has limited ability to separate how resources affect rebel funding versus how they affect state capacity to govern. Sub-national variation in resources between different regions within a country is more suitable
for distinguishing between these two channels because resources that fund the state can theoretically come from anywhere in the country, but resources for rebel groups tend to be local. Table 1 shows summary statistics for the variables used in the empirical analysis.

4.1.1 Political violence

The Armed Conflict Location & Event Data Project (ACLED) is a geo-referenced data set of 39,480 individual incidents of political violence involving rebel groups and militias across Africa between 1997 and 2014. Unlike previous computer-coded data generated from article searches, ACLED is human coded and the events do not have a minimum fatalities requirement. Each event records the date, type of conflict, main actors, number of fatalities, and coordinates of a conflict. All actors are organizations with “an official name, a political purpose and use violence for political means.” The actors included here are rebel groups, political militias, and ethnic militias. The majority of events are geo-referenced with coordinates to two to four decimal places, which can identify areas within 1.1 kilometers to 11 meters.

While the level of detail in this data is remarkable, the time span from 1997-2014 is quite narrow, and it may be difficult to say anything about conflicts at large, over time, if conflicts in recent decades systematically differ from those in previous decades. In contrast, CH use data between 1960-1999, and FL’s data span 1945-1999. However, several authors have noted that conflict is different after the Cold War era, as states previously dependent on external support turned to alternative sources of funding (Ross 2004:349; Keen 1998). More recent conflicts are not sponsored proxy wars of ideological hegemons, and most African states are years removed from colonial independence by this time. Finally, if the ultimate goal of this area of research is not only to understand past conflicts but make prescriptions for how to deal with future ones, it may be even more appropriate to focus on recent events.

Another potential limitation is that ACLED only covers Africa. Fortunately, it is ex-

---

6This definition is given by the ACLED codebook; see Raleigh et al. (2010).
Table 1 – Summary Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Political Violence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rebel battle</td>
<td>144720</td>
<td>0.031</td>
<td>0.173</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Number of rebel battles</td>
<td>144720</td>
<td>0.111</td>
<td>1.116</td>
<td>0</td>
<td>88</td>
</tr>
<tr>
<td>Non-rebel battle</td>
<td>144720</td>
<td>0.026</td>
<td>0.160</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Number of non-rebel battles</td>
<td>144720</td>
<td>0.061</td>
<td>0.640</td>
<td>0</td>
<td>52</td>
</tr>
<tr>
<td>Log fatalities in rebel battles</td>
<td>144720</td>
<td>0.047</td>
<td>0.395</td>
<td>0</td>
<td>10.445</td>
</tr>
<tr>
<td>Number of active rebel groups</td>
<td>144720</td>
<td>0.008</td>
<td>0.135</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Rebel versus rebel battle</td>
<td>144720</td>
<td>0.002</td>
<td>0.040</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td># events in neighbors in last 6 months</td>
<td>136080</td>
<td>15.984</td>
<td>37.296</td>
<td>0</td>
<td>717</td>
</tr>
<tr>
<td><strong>Resources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lootable resource</td>
<td>144720</td>
<td>0.333</td>
<td>0.471</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unlootable resource</td>
<td>144720</td>
<td>0.242</td>
<td>0.428</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Onshore petroleum</td>
<td>144720</td>
<td>0.203</td>
<td>0.402</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Secondary diamonds</td>
<td>144720</td>
<td>0.118</td>
<td>0.323</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Placer gold</td>
<td>144720</td>
<td>0.031</td>
<td>0.174</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Offshore petroleum</td>
<td>144720</td>
<td>0.107</td>
<td>0.310</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Primary diamonds</td>
<td>144720</td>
<td>0.066</td>
<td>0.247</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Vein gold</td>
<td>144720</td>
<td>0.099</td>
<td>0.298</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Log crude oil price</td>
<td>144720</td>
<td>3.831</td>
<td>0.695</td>
<td>2.343</td>
<td>4.887</td>
</tr>
<tr>
<td>Log diamond price</td>
<td>144720</td>
<td>4.623</td>
<td>0.056</td>
<td>4.554</td>
<td>4.753</td>
</tr>
<tr>
<td>Log gold price</td>
<td>144720</td>
<td>6.386</td>
<td>0.658</td>
<td>5.545</td>
<td>7.480</td>
</tr>
<tr>
<td><strong>Controls</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least 1 excluded ethnic group</td>
<td>144720</td>
<td>0.561</td>
<td>0.496</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Distance from capital (100 km)</td>
<td>144720</td>
<td>3.659</td>
<td>2.908</td>
<td>0.037</td>
<td>16.837</td>
</tr>
<tr>
<td>Log population density, 1995</td>
<td>144720</td>
<td>3.339</td>
<td>1.849</td>
<td>-1.909</td>
<td>9.056</td>
</tr>
<tr>
<td>Child malnutrition rate (percentage)</td>
<td>142560</td>
<td>23.301</td>
<td>12.280</td>
<td>1.587</td>
<td>51.612</td>
</tr>
<tr>
<td>Number of bordering countries</td>
<td>143640</td>
<td>0.949</td>
<td>0.929</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Percent mountainous</td>
<td>144720</td>
<td>0.198</td>
<td>0.269</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Percent urban</td>
<td>144720</td>
<td>0.004</td>
<td>0.018</td>
<td>0</td>
<td>0.198</td>
</tr>
</tbody>
</table>
pansive over nearly all African states rather than choosing a few select ones where data could be found, as data availability is plausibly correlated with types of governance. For instance, Afrobarometer data only covers countries where interviewees can speak freely and where funding is available, and ethnic segregation data from Alesina and Zhuravskaya (2008) select countries that released census data publicly or where Demographic and Health Survey sample data were available.

Events in the ACLED data are labeled with the first administrative district in which they took place. Using the Database of Global Administrative Areas (GADM), I compiled a dataset of 670 first administrative districts across 49 African states, for each of the 216 months between 1997-2014 for a total of 144,720 district-months. I then also aggregated ACLED events to district-months, though because events are geo-referenced, the analysis could also be performed at the second or third administrative district levels, or even by 0.5 x 0.5 degree cells. However, going smaller than the first level may capture an area smaller than the span of one resource site, and it opens more error from estimates in the ACLED data. I then projected the geo-referenced resource and control variables to first administrative districts. The spatial data also allows for variables that code for whether a district borders another state, and whether neighboring states had conflicts in previous periods, in order to capture some spillover effects. Using monthly data narrows down the time frame and can potentially better track changes and recurrences in political violence.

While previous research has focused on onset of civil war, the availability of event data by actor with ACLED allows the analysis to reveal a more nuanced pattern of political violence; the geographic data allows for potential analysis of trends and movements of actors.

7The first administrative district is the first level of division after a state’s boundaries, e.g. provinces, states, departments.

8Moreover, 4.85% of ACLED events do not have information beyond the first administrative district. For those, the coordinates for the district’s capital are given as substitutes.

9Disaggregating finer than a month is not desirable because only 6.4% of the ACLED data is estimated to a weekly precision level, and 5.4% is estimated at the monthly level with the monthly mid-point as the date. For both first district and month data, certain types of conflict or degrees of openness in a country may be correlated with less precise information; hence, I chose the first district-month level as my unit of analysis.
over time. Finally, ACLED also codes each event by type of event, including battles, riots, violence against civilians, and remote violence, and it also includes some non-violent events such as establishing headquarters and protests. For the purposes of this paper, I focus on battles, which are defined as “violent interaction[s] between two politically organized armed groups at a particular time and location.”\(^{10}\)

Ultimately, unless otherwise noted, the main dependent variable I will use is an indicator for having a rebel battle in a district-month. Of the district-months that have a rebel battle, or a battle in which a rebel group is at least one of the armed groups, 46.7% have one, and 73.22% have three or less, but the number of rebel battles reaches up to 88.

### 4.1.2 Natural resources

New datasets of natural resources and their locations from the Peace Research Institute of Oslo (PRIO) offer geo-referenced data on petroleum, diamonds, gold, and gems (Lujala, Rod, and Thieme 2005; Gilmore et al. 2005; Balestri 2015, respectively). In order to determine which districts within a country have natural resources, I project the grid cells of natural resource deposits to each district, creating an indicator for whether a type of resource exists in a district and verify these with map intersections on ArcGIS. The resources can be easily able to be separated into lootable and unlootable categories by definitions from Ross (2003). Conditional on state capacity and other district covariates, these natural resource location variables offer comparisons between regions with lootable resources, unlootable resources, and no resources, thereby lending insight into the rebel looting hypothesis. In the analysis below, lootable resources include onshore petroleum, secondary (alluvial) diamonds, and placer (alluvial) gold, which can be bunkered or extracted on the surface. Unlootable resources include offshore petroleum (within 50 kilometers from the coast), as well as primary (kimberlite) diamonds and vein gold, which require mining infrastructure.

For the price analysis I use monthly global prices for oil, diamonds, and gold from the

\(^{10}\) As defined in the ACLED codebook, see Raleigh et al. (2010).
International Monetary Fund Primary Commodity Prices Data, from the U.S. Import and Price Indexes, and World Gold Council monthly spot prices, respectively.

4.1.3 Ethnicity

I draw from the ethnic grievance literature (e.g. Horowitz 1998, Posen 1993) to ask whether influence of natural resources interacts with ethnic grievances. Though CH and FL do not find strong evidence of ethnicity-related measures, a sub-national view may provide a different perspective. Here, I draw from the categorization provided by the Ethnic Power Relations dataset (Vogt et al. 2015) as of 1995, to avoid endogeneity with conflict incidence. This data define excluded groups as those that are powerless, discriminated against, or self-excluded from the national government. That is, they are either not represented in the national government, prevented from accessing the national government, or have removed themselves from political activity from the central government for other reasons. Sub-national analysis allows for comparison within countries and asks whether districts where excluded groups live face higher conflict, adding an additional nuanced layer to the greed-grievance debate.

4.1.4 State capacity

Relative to data on rebel movements and natural resources, state capacity remains more difficult to quantify, especially sub-nationally. For example, FL use per capita income to proxy for a “government’s police and military capabilities and the reach of government institutions into rural areas,” or a state’s coercive capacity to prevent insurgencies.\textsuperscript{11} A broader definition of state capacity may also reflect public good provision. If people have adequate access to health care services and school systems, they may be less likely to join an insurgency.

State capacity, rarely quantified on a national level, presents an even more difficult challenge to capture on the sub-national level. Distance from the country’s administrative center should proxy for a government institution’s “reach,” following the loss-of-strength gradient

theory proposed by Boulding (1962). Rustad et al. (2011) also use distance from the capital as a proxy for state capacity when build a model for sub-national variation in conflict in Asian countries.

It should be noted that many empiricists, for example De Juan and Pierskalla (2015), criticize this measure, instead employing data on bureaucratic and security personnel in South Sudan to determine correlates of conflict. However, in absence of a better measure of state capacity that is wide ranging over the panel that ACLED covers, I use distance from the capital as a crude approximation of state coercive capacity.12

The effect of lootable natural resources on political violence should be stronger as distance from the capital increases.13 In this case, state institutions are weaker and there are resources for rebels to access, potentially compounding the effects of each of these to even further increase the likelihood of political violence. Finally, there are two ideas regarding the appropriate measure of how distance from the capital might affect state capacity. One is an argument for using absolute distance, that given a state’s military capacity, it can project coercive power over some set distance. For instance, a ground force can only travel over distance in some given time, so far-away districts will be hard to respond to. The other is based on relative distance within a state, that states will be able to project power less to the farthest district from the capital relative to close districts, regardless of the absolute size of the state. In fact, a state may have military technology that allows it to go anywhere in a country in a relatively short amount of time, but in the face of rebel forces aiming for national power, the state may need to focus on rebel groups closest to the capital. I test both absolute and relative measures of distance from the capital in the analysis.

12I also tested correlations of capacity versus distance from the capital using household survey data from Afrobarometer. Drawing from Luna (2014) and Luna and Soifer (2015), I constructed indices of tax capacity and corruption and found them to be negatively and positively correlated with distance from the capital, respectively, as expected. However, Afrobarometer surveys are only conducted in a sample of a few thousand randomly selected households in 12 countries in 1998 and 34 countries in 2015. These are countries where field researchers are allowed to survey, and there are not always sufficient observations in each district within countries, so I do not use Afrobarometer measures in the main analysis.

13Correlations between distance from the capital and resources are relatively low, ranging from 0.0117 to 0.0915 in absolute value for different types of resources.
4.1.5 Controls

Further geo-referenced and sub-national data is available for many other possible controls, including population, poverty estimates, and terrain. Most of these are available through PRIO-GRID 2.0 at 0.5 x 0.5 decimal degree grids (Tollefsen et al. 2012).

Even though I would hypothesize that regions with higher unemployment and where individuals have lower expected income should be expected to have more rebel recruits because there is a lower opportunity cost for joining. Accurate data on sub-national measures of education and unemployment is hard to come by. Thus, as a rough approximate of poverty, I propose using an indicator for child malnutrition rates, or the percent of children less than 5 years old who are malnourished within a district, to proxy for the effects of poverty on conflict specifically. In these regions in which daily resources are scarce, the presence of lootable natural resources may have an even more significant effect to motivate or fund rebel operations. I also control for district-level log population density as of 1995 to capture simple differences in demographics across districts.

Conditional on the above variables, when comparing within a country, the likelihood of political violence should increase in regions with high percentage of rough terrain and mountainous land relative to other regions, or that are highly urbanized relative to other regions. Much of the country-level empirical literature has put forth arguments and evidence about the effect of rough terrain and mountains, which providing hiding places for rebel groups as described in the literature surrounding fourth generation warfare. Sub-national analysis that compares these regions offers a better counterfactual of one another than comparing countries that have different proportions of mountainous areas. Urban areas on face seem to be the opposite of mountainous terrain, but complex networks in cities also offer distractions and hiding places, echoing the narrative of Maoist guerrilla warfare fought by subversion and hiding in mountains. In both, rebels who know the details of the land or certain parts of city

---

14This is a snapshot estimate from Center for International Earth Science Information Network in 2000, as aggregated by PRIO-GRID.
better have an advantage in navigating battles and in targeting in other forms of political violence.

Finally, regions that sit on an international border may be more prone to political violence as it spills over across borders. Generally, violence is likely prone to spill over across administrative district borders. Hence, I calculate neighboring districts and countries for each district using ArcGIS, and I control for the number of countries that a district borders, as well as how many political violence events involving rebels occurred in bordering districts in the preceding six months.\(^\text{15}\)

### 4.2 Regression Models

To start, a basic OLS model provides the foundation of the research design:

\[
y_{dt} = \beta_0 + \beta_1 \text{lootable}_d + \beta_2 \text{unlootable}_d + \lambda y_{d,t-1} + \gamma X_{dt} + \epsilon_{dt} \tag{1}
\]

where the dependent variable indicates a political violence event in district \(d\) in month \(t\). Other dependent variables such as number of rebel battles and number of fatalities will also substitute in some specifications in place of an indicator for a rebel battle. Furthermore, the regression includes a control for an incidence of political violence in the same district in the previous time period, as well as a set of other covariates as discussed in the previous subsection.

With the sub-national and panel nature of this analysis, the basic OLS regression can be improved on with fixed effects, with

\[
y_{dt} = \beta_0 + \beta_1 \text{lootable}_d + \beta_2 \text{unlootable}_d + \lambda y_{d,t-1} + \gamma X_{dt} + \alpha_c + \theta_t + \epsilon_{dt} \tag{2}
\]

where \(\alpha_c\) represents an indicator for each country and \(\theta_t\) represents an indicator for each month. These fixed effects capture the unobserved heterogeneity between countries, ad-

\(^{15}\)This includes battles, violent riots, and violence against civilians.
dressing omitted variable bias from variables that are not easily quantified at the country level. In effect, this implies that the analysis uses within-country district-level variation, which are to be captured in the explanatory variables and covariates.

However, there still may be a concern that some district-level variation correlated with resources and violence is excluded. A variable for commodity prices also allows for the analysis to use district-by-time variation and use district fixed effects to absorb potential unobserved variation. Following from a similar model proposed by Dube and Vargas (2013), a price-based specification follows:

\[
y_{dt} = \beta_0 + \sum_{i \in R} \beta_i \text{resource}_{id} \times \ln(\text{global price})_{it} + \lambda y_{d,t-1} + \alpha_d + \theta_t + \varepsilon_{dt} \tag{3}
\]

for each resource \(i\) in a set of resources \(R\).\(^{16}\) The previous chapter also offered hypotheses on how changes in commodity prices for lootable goods affect political violence onset. In particular, I argue that short-term changes affect rebel groups’ actions more drastically than incumbent governments’ actions. Positive findings from the coefficients on the lootable interaction term would provide more evidence toward the rebel looting hypothesis.\(^{17}\)

The previous chapter indicated that there may be several mechanisms that would lead differences in ethnic tensions and state capacity in a district to generate heterogeneous effects for natural resources. The interacted model below attempts to extrapolate how the effects of lootable resources might vary with ethnic exclusion:

\[
y_{dt} = \beta_0 + \beta_1 \text{lootable}_d + \beta_2 \text{unlootable}_d + \beta_d(\text{ethnic exclusion})_d + \]

---

\(^{16}\)This includes onshore petroleum, secondary diamonds, placer gold, offshore petroleum, primary diamonds, and vein gold.

\(^{17}\)Still, if a large conflict in a country causes the price of a lootable good to change, this variable may be endogenous. In that case, as Dube and Vargas (2013) used for coffee prices in Colombia, these prices could be instrumented with production volumes in the largest non-Africa exporting countries of each resource as a test.
\[
\beta_4 (\text{ethnic exclusion} \times \text{lootable})_d + \beta_5 (\text{ethnic exclusion} \times \text{unlootable})_d \\
\lambda y_{d,t-1} + \gamma X_{dt} + \alpha_c + \theta_t + \varepsilon_{dt}
\]

where (ethnic exclusion)$_d$ could be replaced with ln(distance from the capital)$_d$. To reiterate, the previously proposed hypothesis is that $\beta_3$ is positive for both ethnic exclusion and distance from the capital.

A district hypothesized to be most prone to political violence would be one with lootable natural resources, an existing rebel group, and ethnic tensions or weak state capacity. If possible, a fully interacted model in this vein would interact the indicator of an existing rebel group with the above estimates and remove the covariate for an event in the previous time period. Unfortunately, while the ACLED dataset offers data on actors of violence, it does not observe the existence of a rebel group unless an act of political violence occurs.

## 5 Empirical Results

In this section, I present three main sections of results. The first shows that lootable resources are associated with a statistically significant increase in the probability of rebel violence, the probability of violence between rebel groups, and the intensity of violence. A second set of specifications breaks down resource types and uses changes in global resource prices to find that lootable diamonds and gold affect conflict incidence differently from lootable petroleum. Finally, I find no heterogeneous effects when interacting resources with distance from the capital, as a proxy for state capacity, but significant differences when interacting resources with ethnicity. In particular, districts with both lootable resources and excluded ethnic groups have a significantly higher probability of political violence than those with one of these conditions or with neither.
5.1 Resources & conflict dynamics

5.1.1 Base specifications

Table 2 shows results from a set of OLS specifications for which the dependent variable is an indicator for the incidence of a battle in which at least one side is a rebel group. Columns 1 and 2 show the unconditional correlations between the presence of resources in a district and the incidence of a rebel battle. While no effect is seen when the explanatory variable is aggregated to any resource, the expected effects of resources differ for lootable and unlootable resources. Column 3 adds country fixed effects and month fixed effects to compare districts within countries and to control for time trends. Further controls are included in column 4. Controls capturing measures of poverty, log population density, bordering countries, mountainous terrain, and urban land, which have been argued to be correlated with civil war and/or political violence in other literature, are not statistically significant in these results. Ethnic exclusion is positively correlated with violence, while distance from the capital bears insignificant results. Events of political violence in neighboring districts in the last six months are also positively correlated with rebel battles, representing spillover of rebel violence across district borders.

In columns 2-4, an indicator variable for lootable resources is positively correlated in a highly statistically significant manner with the incidence of a rebel battle. With an overall mean probability of rebel battle in a district month at 3.1 percent, a 0.99 percentage point increase from the presence of lootable resources, holding all else constant, represents a 31.9% increase in the probability of the incidence of a rebel battle. Unlootable resources have no statistically significant effect across specifications. These results seem to substantiate the rebel looting theory at the sub-national level. If resources indeed generate incentives for rebel conflict, districts with lootable resources should see higher rates of conflict relative to districts with unlootable resources and with no resources, as the results reflect. States could potentially pre-emptively increase policing in lootable district in anticipation of more
Table 2 – Resources and Political Violence

<table>
<thead>
<tr>
<th></th>
<th>(1) Resource</th>
<th>(2) Lootability</th>
<th>(3) Fixed Effects</th>
<th>(4) Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of resources</td>
<td>0.0038</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0059)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lootable resources</td>
<td></td>
<td>0.0162***</td>
<td>0.0167***</td>
<td>0.0099***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0067)</td>
<td>(0.0060)</td>
<td>(0.0034)</td>
</tr>
<tr>
<td>Unlootable resources</td>
<td></td>
<td>−0.0091</td>
<td>0.0030</td>
<td>0.0012</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0070)</td>
<td>(0.0060)</td>
<td>(0.0035)</td>
</tr>
<tr>
<td>At least 1 excluded ethnic group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0038*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0021)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance from capital (100 km)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0003</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0009)</td>
<td></td>
<td></td>
</tr>
<tr>
<td># events in neighbors in last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0012***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log population density</td>
<td></td>
<td>0.0016</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child malnutrition rate</td>
<td></td>
<td>0.0003</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td># of bordering countries</td>
<td></td>
<td>0.0030</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0026)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent mountainous</td>
<td></td>
<td>−0.0026</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0092)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent urban</td>
<td></td>
<td>0.0192</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0585)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.0293***</td>
<td>0.0278***</td>
<td>0.0178***</td>
<td>−0.0097</td>
</tr>
<tr>
<td></td>
<td>(0.0033)</td>
<td>(0.0032)</td>
<td>(0.0063)</td>
<td>(0.0137)</td>
</tr>
<tr>
<td>Country Fixed Effects</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Month Fixed Effects</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Lagged Dependent</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>144720</td>
<td>144720</td>
<td>144720</td>
<td>137550</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.000</td>
<td>0.002</td>
<td>0.072</td>
<td>0.264</td>
</tr>
</tbody>
</table>

Note: Dependent variable: Rebel battle in district-month. Robust standard errors clustered at the district level shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. 

36
<table>
<thead>
<tr>
<th></th>
<th>(1) Rebel battle</th>
<th>(2) Non-rebel battle</th>
<th>(3) Number of rebel groups</th>
<th>(4) Rebel vs. rebel battle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lootable resources</td>
<td>0.0099***</td>
<td>0.0036</td>
<td>0.0052***</td>
<td>0.0010**</td>
</tr>
<tr>
<td></td>
<td>(0.0034)</td>
<td>(0.0026)</td>
<td>(0.0019)</td>
<td>(0.0004)</td>
</tr>
<tr>
<td>Unlootable resources</td>
<td>0.0012</td>
<td>0.0028</td>
<td>−0.0007</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td>(0.0035)</td>
<td>(0.0033)</td>
<td>(0.0035)</td>
<td>(0.0006)</td>
</tr>
<tr>
<td>At least 1 excluded ethnic group</td>
<td>0.0038*</td>
<td>0.0016</td>
<td>−0.0001</td>
<td>−0.0000</td>
</tr>
<tr>
<td></td>
<td>(0.0021)</td>
<td>(0.0025)</td>
<td>(0.0013)</td>
<td>(0.0003)</td>
</tr>
<tr>
<td>Distance from capital (100 km)</td>
<td>0.0003</td>
<td>0.0007</td>
<td>0.0023**</td>
<td>0.0003*</td>
</tr>
<tr>
<td></td>
<td>(0.0009)</td>
<td>(0.0010)</td>
<td>(0.0011)</td>
<td>(0.0002)</td>
</tr>
<tr>
<td># events in neighbors in last 6 months</td>
<td>0.0012***</td>
<td>0.0004***</td>
<td>0.0003***</td>
<td>0.0001***</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0000)</td>
</tr>
<tr>
<td>Log population density</td>
<td>0.0016</td>
<td>0.0018</td>
<td>0.0023</td>
<td>0.0003</td>
</tr>
<tr>
<td></td>
<td>(0.0014)</td>
<td>(0.0014)</td>
<td>(0.0016)</td>
<td>(0.0002)</td>
</tr>
<tr>
<td>Child malnutrition rate</td>
<td>0.0003</td>
<td>0.0004</td>
<td>0.0001</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>(0.0003)</td>
<td>(0.0003)</td>
<td>(0.0002)</td>
<td>(0.0000)</td>
</tr>
<tr>
<td># of bordering countries</td>
<td>0.0030</td>
<td>0.0041*</td>
<td>0.0035</td>
<td>0.0003</td>
</tr>
<tr>
<td></td>
<td>(0.0026)</td>
<td>(0.0025)</td>
<td>(0.0027)</td>
<td>(0.0004)</td>
</tr>
<tr>
<td>Percent mountainous</td>
<td>−0.0026</td>
<td>0.0123*</td>
<td>0.0058</td>
<td>0.0005</td>
</tr>
<tr>
<td></td>
<td>(0.0092)</td>
<td>(0.0072)</td>
<td>(0.0078)</td>
<td>(0.0011)</td>
</tr>
<tr>
<td>Percent urban</td>
<td>0.0192</td>
<td>0.0421</td>
<td>0.0286</td>
<td>0.0044</td>
</tr>
<tr>
<td></td>
<td>(0.0585)</td>
<td>(0.0387)</td>
<td>(0.0197)</td>
<td>(0.0049)</td>
</tr>
</tbody>
</table>

Observations: 137550
Adjusted $R^2$: 0.264

Note: Dependent variable: Rebel battle in district-month. Country fixed effects, month fixed effects, and a one-month lagged dependent are included in each regression. Robust standard errors clustered at the district level are shown in parentheses.

*p < 0.10, **p < 0.05, ***p < 0.01.

Conflict, which would place a downward effect on having lootable resources. The positive coefficient on lootable resources in the results suggests that the rebel looting mechanism outweighs any effects of added capacity in districts with lootable resources. In fact, as the case study will explore, resource-based grievances can directly lead to rebel groups choosing a strategy that involves looting the state’s natural resources.
5.1.2 Types of actors and events

Table 3 reiterates the results from the preferred specification in column 4 of Table 2 but varies the dependent variable for different actor types. Non-rebel groups in the data are politically organized actors that do not have a stated intent toward national power. In this case, shown in column 2, the effects of both lootable and unlootable resources are now statistically insignificant.

Compared to rebel groups, non-rebel militias may not need to gather resources to the same extent as a rebel group, which needs significant resources to enact prolonged violence that will allow it to take over a state. For rebels, ownership of natural resources can be a form of reducing state power in itself. This null finding for non-rebel groups questions a narrative of pure rebel criminality in which solely rent-seeking actors, rather than politically-motivated actors, commit violence and loot resources for profit.\textsuperscript{18} Because ACLED captures even events without fatalities, low-level violence from such criminals should be captured in the data. In that case, violence in districts with lootable resources should be higher than in those districts without resources, for both rebel and non-rebel groups.

Furthermore, more than one rebel group could have a battle within a district month. Column 3 shows that having lootable resources is expected to increase the number of active rebel groups in a district month by .0052, a 65.2\% increase relative to its mean at .00797. Column 4 shows that lootable resources are also associated with higher rebel versus rebel battles, leading to an expected increase in the probability of a rebel versus rebel battle of 0.1 percentage points, or a 62.9\% increase relative to the mean probability of 0.159 percent. This further lends support to the rebel looting theory, as where there are lootable resources, there are low barriers to entry to obtain these resources. Multiple groups may be gathered in one resource site, leading to conflict over a set of scarce resources.
Table 4 – Resource and Political Violence Intensity

<table>
<thead>
<tr>
<th></th>
<th>(1) Log fatalities</th>
<th>(2) Log fatalities if battle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lootable resources</td>
<td>0.0257***</td>
<td>0.2180***</td>
</tr>
<tr>
<td>Unlootable resources</td>
<td>0.0013</td>
<td>-0.0875</td>
</tr>
<tr>
<td>At least 1 excluded ethnic group</td>
<td>0.0043</td>
<td>-0.0557</td>
</tr>
<tr>
<td>Distance from capital (100 km)</td>
<td>0.0008</td>
<td>0.0201</td>
</tr>
<tr>
<td># events in neighbors in last 6 months</td>
<td>0.0023***</td>
<td>0.0015***</td>
</tr>
<tr>
<td>Log population density</td>
<td>0.0034</td>
<td>0.0490</td>
</tr>
<tr>
<td>Child malnutrition rate</td>
<td>0.0008</td>
<td>0.0197***</td>
</tr>
<tr>
<td># of bordering countries</td>
<td>0.0069</td>
<td>0.0480</td>
</tr>
<tr>
<td>Percent mountainous</td>
<td>-0.0167</td>
<td>-0.1369</td>
</tr>
<tr>
<td>Percent urban</td>
<td>0.0157</td>
<td>-0.4350</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.0311</td>
<td>0.1791</td>
</tr>
<tr>
<td>Observations</td>
<td>137550</td>
<td>4282</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.181</td>
<td>0.168</td>
</tr>
</tbody>
</table>

Note: Dependent variable: Rebel battle in district-month. Country fixed effects, month fixed effects, and a one-month lagged dependent are included in each regression. Robust standard errors clustered at the district level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. 
5.1.3 Conflict intensity and type

Beyond the incidence of political violence, resources may also affect the intensity of each battle, as measured by fatalities.\textsuperscript{19} Column 1 shows results from a regression on log fatalities.\textsuperscript{20} Relative to districts with no lootable resources, lootable resources are associated with an approximately 2.57% increase in fatalities in rebel battles.

One additional advantage to analyzing resource-conflict dynamics at the political violence level is that it allows for intensity analysis within districts with political violence only. In country-year analyses, the sample of countries with ongoing conflict in which intensity can be measured is incredibly limited, drawing low statistical power. Column 2 restricts the regression to district-months with rebel battles only, and the dependent variable is a log transformation of the number of fatalities in rebel battles. The coefficient indicates that, for district-months with a rebel battle, having lootable resources is correlated with a 21.8% increase in fatalities on average, holding all else constant. The coefficient is robust and even higher in magnitude when restricting the analysis to district months that have a rebel battle with at least one fatality.

Some of the mechanisms relating resources to conflict intensity differ from those relating to conflict incidence. As an example, rebels may be able to exchange lootable petroleum for more lethal weapons, leading to increased intensity. While Addison, Le Billon, and Murshed (2002) hypothesize that looting in a conflict means rebels should cause less intense conflicts, Lujala (2009) also finds that conflict is more severe when rebels are co-located with hydrocarbon production and gemstones, including petroleum and diamonds respectively. My results find that pattern existing specifically when rebels are co-located with lootable resources. Weinstein (2005) posits that rebels motivated by looting make them more prone to indiscriminate violence, leading to higher rates of fatalities.

\textsuperscript{18}For example, as theorized by Mueller (2000), “The Banality of Ethnic War.”
\textsuperscript{19}However, the ACLED data does not distinguish between whether these fatalities are waged on rebels, militias, or the government.
\textsuperscript{20}The log transformation is taken as the log of fatalities plus one so that district-months with no fatalities are still transformed to zero.
Table 5 – Resources and Political Violence, by Resource Type

<table>
<thead>
<tr>
<th>Resource types</th>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lootable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onshore petroleum</td>
<td>0.0043</td>
<td>0.0043</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0048)</td>
<td>(0.0048)</td>
<td></td>
</tr>
<tr>
<td>Secondary diamonds</td>
<td>0.0036</td>
<td>0.0081***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0058)</td>
<td>(0.0028)</td>
<td></td>
</tr>
<tr>
<td>Placer gold</td>
<td>0.0299</td>
<td>0.0127</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0196)</td>
<td>(0.0151)</td>
<td></td>
</tr>
<tr>
<td>Unlootable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offshore petroleum</td>
<td>0.0018</td>
<td>0.0031</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0035)</td>
<td>(0.0034)</td>
<td></td>
</tr>
<tr>
<td>Primary diamonds</td>
<td>-0.0072</td>
<td>-0.0032</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0050)</td>
<td>(0.0034)</td>
<td></td>
</tr>
<tr>
<td>Vein gold</td>
<td>0.0029</td>
<td>-0.0003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0068)</td>
<td>(0.0056)</td>
<td></td>
</tr>
<tr>
<td>Lootable, without onshore petroleum</td>
<td></td>
<td></td>
<td>0.0105**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.0045)</td>
</tr>
<tr>
<td>Unlootable, with onshore petroleum</td>
<td></td>
<td></td>
<td>0.0051</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.0036)</td>
</tr>
<tr>
<td>Observations</td>
<td>137550</td>
<td>135660</td>
<td>137550</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.264</td>
<td>0.247</td>
<td>0.264</td>
</tr>
</tbody>
</table>

Note: Dependent variable: Rebel battle in district-month. Country fixed effects, month fixed effects, a one-month lagged dependent, and a set of controls as shown in Table 2 are included in each regression. Robust standard errors clustered at the district level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.2 Types of resources

5.2.1 Resource breakdowns

In order to explore whether the effects of lootable resources are driven by particular types of resources, Table 5 disaggregates the different types of lootable and unlootable resources in each district. These regressions otherwise use the preferred specification shown in column 4 of Table 2. Placer gold is in fact a lootable natural resource that could facilitate rebel financing, and recognized as one in the PRIO-GRID data and in Le Billon (2004). When controlling for other types of resources, placer gold has a much stronger magnitude of correlation with rebel battles than lootable petroleum or diamonds, though standard errors are high and the
coefficients are statistically insignificant. This result brings into question why most of the literature in this subfield has focused on research about oil and diamond wealth relative to gold.

In the 2000s in the Democratic Republic of the Congo, fighters began to mine in the open pits and river beds of the northeastern districts of the country along the Agola River.²¹ In one interview conducted by Human Rights Watch, a local witness stated, “Every time there was a change of armed group, the first thing they did was to immediately start digging for gold,” signifying the importance of lootable gold in rebel operations. In the same set of interviews by Human Rights Watch, other combatants in the Nationalist and Integrationist Front (FNI) rebel group in this region detailed the gruesome process by which rebel leaders forced them forced to look for gold. Between 20-60 kilograms of gold were extracted from the area per month, generating hundreds of thousands of dollars of profit for the rebel group, and interviews confirmed that these profits funded rebel leaders’ salaries and arms purchases. Yet, as in the case studies to follow, rebels often justified their actions with their grievances against a government that had not distributed the wealth from these resources. The leader of the FNI pointedly said of the group’s gold extraction, “This is not looting as I am Congolese.”²²

Much of the overlap between lootable gold resources and rebel conflict indeed took place in the Democratic Republic of the Congo. When removing the country from the analysis in column 2, the effects of gold are reduced and statistically insignificant, while secondary diamonds show a strong positive effect.

The results in column 1 of Table 5 could suggest that onshore petroleum is not as lootable as diamonds or gold, and in fact there has been debate about whether onshore petroleum is technically lootable. Column 3 shows that when categorizing only secondary diamonds and placer gold as lootable and onshore petroleum as unlootable, lootable resources have a slightly higher statistically significant effect while unlootable resources remain insignificant.

²²Ibid.
Table 6 – Resource Prices and Violence

<table>
<thead>
<tr>
<th></th>
<th>(1) Country Fixed Effects</th>
<th>(2) District Fixed Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log oil price * Onshore petroleum</td>
<td>0.0015</td>
<td>0.0110***</td>
</tr>
<tr>
<td></td>
<td>(0.0013)</td>
<td>(0.0038)</td>
</tr>
<tr>
<td>Log diamond price * Secondary diamonds</td>
<td>0.0011</td>
<td>-0.2410***</td>
</tr>
<tr>
<td></td>
<td>(0.0013)</td>
<td>(0.0490)</td>
</tr>
<tr>
<td>Log gold price * Placer gold</td>
<td>0.0048</td>
<td>-0.0074</td>
</tr>
<tr>
<td></td>
<td>(0.0031)</td>
<td>(0.0085)</td>
</tr>
<tr>
<td>Log oil price * Offshore petroleum</td>
<td>-0.0001</td>
<td>-0.0056</td>
</tr>
<tr>
<td></td>
<td>(0.0009)</td>
<td>(0.0038)</td>
</tr>
<tr>
<td>Log diamond price * Primary diamonds</td>
<td>-0.0014</td>
<td>0.0007</td>
</tr>
<tr>
<td></td>
<td>(0.0010)</td>
<td>(0.0032)</td>
</tr>
<tr>
<td>Log gold price * Vein gold</td>
<td>0.0010</td>
<td>0.0058</td>
</tr>
<tr>
<td></td>
<td>(0.0011)</td>
<td>(0.0045)</td>
</tr>
</tbody>
</table>

Country Fixed Effects Yes No
District Fixed Effects No Yes
Observations 144050 144050
Adjusted $R^2$ 0.235 0.274

Note: Dependent variable: Rebel battle in district-month. In addition, month fixed effects are included in the regression, as well as a lagged dependent. Robust standard errors clustered at the district level are shown in parentheses.

*p < 0.10, ** p < 0.05, *** p < 0.01.

Scholars have agreed that onshore petroleum is at least highly obstructable, or able to be “blocked by a small number of individuals with a few weapons,” since its transport along pipelines can be disrupted fairly easily.\(^{23}\) Hence, I will refer to “lootable” in this paper as encompassing “obstructable” and discuss the lootability of petroleum in a case study to follow.

5.2.2 Prices

Some concerns may remain that the specifications in the preceding tables do not capture all district-level covariates that affect both resources and violence, which could lead to omitted variable bias in the results. Borrowing from Dube and Vargas (2013), I exploit variation across global commodity prices by month and cross-sectional variation by resource location

\(^{23}\text{Ross (2003), “Oil, Drugs, and Diamonds: The Varying Roles of Natural Resources in Civil War,” 54-55.}\)
across districts. Table 6 shows results from an analysis of how prices of natural resources affect the onset of rebel battles by interacting resource prices with resource presence in a district-month. Column 2 shows results with district fixed effects, which capture the unobserved characteristics of each district. As compared to a specification with country fixed effects in column 1, two coefficients become statistically significant and the coefficient on secondary diamond price changes signs.

For a district with petroleum relative to one without petroleum, a one percent increase in oil prices leads to an expected increase of approximately 0.0110 percentage points in the likelihood of a rebel battle. In contrast, for a district with secondary diamonds relative to one without, increases in diamond prices are associated with a significant decrease in the probability of violence. Changes in resources prices do not have statistically significant additional effects on the probability of violence for districts with unlootable resources versus those without.

How rebels react to changes in oil prices and diamond prices may be due to differences in the modes of extraction of each resource. Rebels often extract lootable oil resources by bunkering, or attaching mechanized taps to pipelines, which requires more start-up capital relative to diamonds, though much less than unlootable offshore oil. When prices are high for onshore petroleum, rebels may choose to employ more capital and take on more risk against pipeline patrollers to withdraw oil at higher volumes. On the other hand, much of alluvial diamond extraction requires “digging and sifting through mud, sand and gravel using shovels, sieves, or even bare hands,” a labor-intensive process. Snyder and Bhavnani (2005) contend that states with lootable resources whose primary mode of extraction is “artisanal,”

---

24 There may be a concern that global commodity prices are endogenous to conflict, especially since African countries contribute a significant portion of international mineral trade. I instrument each of the interaction terms shown in Table 6 with the production volume in the top three non-African exports of that resource. Only annual production data are available, so I run a specification with district-year as the unit of observation. The coefficients on the interaction terms for onshore petroleum and secondary diamonds remain statistically significant and have the same direction and similar magnitudes.

25 Between 1997 and 2014, oil prices increased by 195 percent, diamond prices increased by 11.9 percent, and gold prices increased by 347 percent.

26 “What is Alluvial Mining?,” United States Geological Survey.
or requiring small-scale labor, rather than “industrial” have higher likelihood of collapse. Within a rebel conflict, increased rents in labor-intensive rebel resources such as diamond and gold may lead rebel groups to reallocate time toward rent-seeking resource extraction, postponing rather than enacting conflict while prices are high.

5.3 Heterogenous Effects

5.3.1 State capacity

Table 7 explores the interaction between state capacity and natural resources, using increasing distance from the capital as a rough proxy for decreasing state coercive capacity. In this sense, variation in state capacity can either be compared either within a country for relative distance, or across countries in terms of absolute distance. My hypotheses assumed that lower state capacity would lead to a higher probability of violence as the state is not able to prevent rebel attacks.

Column 1 displays results with lootable and unlootable resources interacted with relative distance quartiles within a country; column 2 shows results with absolute distance from the capital and column 3 with log absolute distance. However, none of these different specifications show statistically significant heterogeneous effects. It may be that sub-national differences state capacity has no real impact on violence, or that this particular variable, distance from the capital, is simply a poor proxy for state capacity and offers weak statistical power in this estimation. Furthermore, Snyder and Bhavnani (2005) argue that “state capacity” is multidimensional, encompassing at least tax capacity, coercive military capacity, and public good provision. Factors of corruption and weak institutional capacity, especially as related to resources, may also contribute to the presence of political violence. Future empirical analyses should be cautious in using single dimensional proxies of state capacity. In my thesis, I will further investigate the effects of state military and institutional capacity as they relate to resources in the case study to follow.
Table 7 – Resources, Political Violence, and Distance from the Capital

<table>
<thead>
<tr>
<th></th>
<th>(1) Quartiles</th>
<th>(2) Distance</th>
<th>(3) Log distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lootable resources</td>
<td>−0.0004</td>
<td>0.0035</td>
<td>−0.0134</td>
</tr>
<tr>
<td></td>
<td>(0.0051)</td>
<td>(0.0059)</td>
<td>(0.0230)</td>
</tr>
<tr>
<td>Unlootable resources</td>
<td>0.0041</td>
<td>−0.0079</td>
<td>−0.0341</td>
</tr>
<tr>
<td></td>
<td>(0.0047)</td>
<td>(0.0068)</td>
<td>(0.0208)</td>
</tr>
<tr>
<td>2nd quartile distance from capital</td>
<td>−0.0026</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0038)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd quartile distance from capital</td>
<td>−0.0006</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0045)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th quartile distance from capital</td>
<td>−0.0063</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0057)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lootable resources * quartile 2</td>
<td>0.0001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0058)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lootable resources * quartile 3</td>
<td>−0.0057</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0068)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lootable resources * quartile 4</td>
<td>0.0061</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0109)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unlootable resources * quartile 2</td>
<td>−0.0046</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0060)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unlootable resources * quartile 3</td>
<td>−0.0008</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0087)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unlootable resources * quartile 4</td>
<td>0.0144</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0120)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lootable resources * distance from capital (100km)</td>
<td>0.0017</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unlootable resources * distance from capital (100km)</td>
<td>0.0025</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0022)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance from capital (100 km)</td>
<td>−0.0009</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0008)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lootable resources * log distance from capital</td>
<td>0.0041</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0040)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unlootable resources * log distance from capital</td>
<td>0.0064</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0041)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log distance from capital</td>
<td>−0.0058**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0027)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observations | 137550    | 137550    | 137550
Adjusted $R^2$ | 0.258     | 0.257     | 0.257

Note: Dependent variable: Rebel battle in district-month. Country fixed effects, month fixed effects, a one-month lagged dependent, and a set of controls as shown in Table 2 are included in each regression. Robust standard errors clustered at the district level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. 
Table 8 – Resources, Political Violence, and Ethnicity

<table>
<thead>
<tr>
<th></th>
<th>(1) Rebel battle</th>
<th>(2) Ethnic militia battle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lootable resources</td>
<td>-0.0019</td>
<td>-0.0015</td>
</tr>
<tr>
<td></td>
<td>(0.0029)</td>
<td>(0.0017)</td>
</tr>
<tr>
<td>Unlootable resources</td>
<td>0.0046</td>
<td>-0.0005</td>
</tr>
<tr>
<td></td>
<td>(0.0034)</td>
<td>(0.0018)</td>
</tr>
<tr>
<td>At least 1 excluded ethnic group</td>
<td>-0.0021</td>
<td>-0.0006</td>
</tr>
<tr>
<td></td>
<td>(0.0032)</td>
<td>(0.0031)</td>
</tr>
<tr>
<td>Lootable * At least 1 excluded</td>
<td>0.0212***</td>
<td>0.0047</td>
</tr>
<tr>
<td></td>
<td>(0.0052)</td>
<td>(0.0033)</td>
</tr>
<tr>
<td>Unlootable * At least 1 excluded</td>
<td>-0.0066</td>
<td>0.0038</td>
</tr>
<tr>
<td></td>
<td>(0.0058)</td>
<td>(0.0040)</td>
</tr>
<tr>
<td>Observations</td>
<td>137550</td>
<td>137550</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.264</td>
<td>0.059</td>
</tr>
</tbody>
</table>

Note: Dependent variable: Rebel battle in district-month. Country fixed effects, month fixed effects, a one-month lagged dependent, and a set of controls are included in each regression. Robust standard errors clustered at the district level are shown in parentheses.

5.3.2 Ethnicity

Finally, Table 8 shows that lootable resources vary differentially with ethnic exclusion in a district. In those with lootable resources but no excluded ethnic groups, the effect of lootable resources is statistically insignificant. Similarly, districts with excluded ethnic groups but with no lootable resources also do not have a statistically significant difference in rebel violence from those without excluded groups. Yet when a district has both lootable resources and at least one excluded group,\(^{27}\) violence increases by 1.72 percentage points on net, representing a 55.5% increase in the likelihood of political violence in a district-month. In contrast, unlootable resources have an insignificant effect on the likelihood of political violence, with or without excluded ethnic groups.

As a comparison, Column 2 shows results when the dependent variable is the incidence of a battle involving an ethnic militia rather than a rebel group. Ethnic militias rally around a common identity but do not have a stated goal of taking over the government. In this case,\(^{27}\) the results are similar when using a measure of the number of excluded ethnic groups.
both the main effects and interactions are statistically insignificant. They may be voicing concerns, but do not necessarily need to take resources to disrupt government revenues or fund large-scale operations that could take over the state.

Theoretically, this suggests that excluded ethnic groups, who by definition lack of political agency otherwise, may choose to enact conflict when co-located with resources that can be taken. Individuals facing political exclusion and unequal distribution of resources will be better off separating from the state or removing the incumbent state from power. Looting resources serves as a means to symbolically signal their grievances and to fund rebel operations that can further their mission. For districts with unlootable resources, there is no such opportunity to fund further operations.

Importantly, this finding differs from CH and FL’s cross-country results, perhaps because an average of ethnic fractionalization masks differences across a country, or that rebel groups motivated by ethnic exclusion may be less likely to escalate to the full-fledged civil war measures used in their studies. This finding warrants further investigation across different models in the future. I will use the case studies that follow to explore how sub-national ethnic exclusion interacts with lootable resources for political violence in concrete terms.

5.4 Robustness

Within the time sample of 1997-2014, it may be of concern that the rates of conflict rise sharply after 2012. I run the preferred specification from column 4 of Table 2 again in column 1 of Table 9, limiting the time period to 1997-2011. The results are robust to this specification, as well as one that excludes the first few years of the time sample in column 2.

It may also be of concern that the events of the commonly termed “Arab Spring” were correlated across countries, and somehow different from other observations in the dataset. Column 3 excludes district-month observations from North Africa, and the results remain similar.

28This includes Algeria, Egypt, Libya, Morocco, Sudan, and Tunisia.
### Table 9 – Robustness Checks

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1997 -</td>
<td>2000 -</td>
<td>Without</td>
<td>Using</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>2014</td>
<td>North Africa</td>
<td>splines</td>
</tr>
<tr>
<td>Lootable resources</td>
<td>0.0093***</td>
<td>0.0099***</td>
<td>0.0166***</td>
<td>0.0118***</td>
</tr>
<tr>
<td></td>
<td>(0.0036)</td>
<td>(0.0037)</td>
<td>(0.0045)</td>
<td>(0.0045)</td>
</tr>
<tr>
<td>Unlootable resources</td>
<td>0.0016</td>
<td>0.0008</td>
<td>0.0019</td>
<td>0.0005</td>
</tr>
<tr>
<td></td>
<td>(0.0036)</td>
<td>(0.0036)</td>
<td>(0.0043)</td>
<td>(0.0045)</td>
</tr>
<tr>
<td>Observations</td>
<td>113970</td>
<td>117900</td>
<td>103740</td>
<td>137550</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.234</td>
<td>0.257</td>
<td>0.309</td>
<td>0.192</td>
</tr>
</tbody>
</table>

|                  | (5)       | (6)       | (7)       | (8)       |
|                  | Number of battles | Including other violent events | At least 1 fatality | At least 25 fatalities |
| Lootable resources | 0.1043*** | 0.0094**  | 0.0072**  | 0.0031*** |
|                  | (0.0296)  | (0.0038)  | (0.0030)  | (0.0012)  |
| Unlootable resources | −0.0229   | 0.0008    | 0.0005    | −0.0003   |
|                  | (0.0271)  | (0.0039)  | (0.0029)  | (0.0011)  |
| Observations     | 137550    | 137550    | 137550    | 137550    |
| Adjusted $R^2$   | 0.175     | 0.290     | 0.210     | 0.111     |

Note: Dependent variable: Rebel battle in district-month. Country fixed effects, month fixed effects, a one-month lagged dependent, and a set of controls as shown in Table 2 are included in each regression. Robust standard errors clustered at the district level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. 

49
In column 4, I replace the lagged dependent and month fixed effects used in previous regressions with a cubic spline on months since the last rebel battle in a district. This captures the temporal dependence of violent conflict in a different form, and the results are again robust to this statistical specification.

I also check for differences in results with varying definitions of a rebel battle in the dependent variable, and the results are robust to these changes. Column 5 replaces the indicator for number of rebel battles, scaling up the coefficient. Column 6 includes not only rebel battles, but also other incidents of armed rebel violence in the ACLED data, including violent riots, violence against civilians, and remote violence.

Also, Eck (2012) critiques the ACLED data that it includes events with no fatalities, whereas other data sets limit armed conflict to a certain threshold of fatalities. For example, the UCDP Armed Conflict Dataset only includes events with 25 or more fatalities, though this also seems to be a somewhat arbitrary line. The author then notes that this puts into question “what constitutes armed conflict.”\(^{29}\) To address this concern, I limit the dependent variable to events with at least one fatality and at least 25 fatalities per the UCDP threshold. The results, in columns 7 and 8, are robust to these changes. Still, violent interactions between armed groups, whether or not they result in fatalities, may be disruptive to everyday life. Whether one person dies as a result of a confrontation can be due to a host of many other factors, such as distance from a hospital or specific type of weaponry rebels or governments have. Non-fatal violent occurrences may also signal escalation toward violence with fatalities and toward civil war at large, offering a broader lens into conflict dynamics at large.

5.5 Data Limitations

There remain several limitations to the data and the empirical analysis. Authors such as Gleditsch, Metternich, and Ruggeri (2013) question the quality, accuracy, and precision of event data such as ACLED. Measurement error in the dependent variable could cause higher

\(^{29}\)Eck (2012), “In data we trust?”, 127.
standard errors in the results. More importantly, though data at the sub-national level has
grown in availability and improved in quality in recent years, the measures available across
large geographic spans remain somewhat crude relative to country-level data. Measurement
error in the independent variables could attenuate the results toward zero, leaving interpre-
tation of null results ambiguous and potentially underestimating the other results. More
precise measures of resources with district-time variation, for example with a measure of
production value of each resource in a district, would improve this analysis.

Also, the data in this analysis uses district borders as defined in 2015, but these district
borders may be endogenous to conflict and correlated with historical patterns of conflict
that are not captured in the data.\textsuperscript{30} Moreover, PRIO-GRID data, which are already based
on estimates from various sources, were presented in 0.5x0.5 degree cells, which were then
projected onto the districts the cells overlapped with, and this may have also introduced
some measurement error in the explanatory variables.

Ideally for causal inference, a dataset would present where a rebel was based prior to
incidents of violence, allowing better understanding of whether and when a rebel group
relocates to a district with lootable resources or remains in a non-lootable district. More
detailed information about oil pipelines could also improve the analysis, since currently
the petroleum data only track oil fields. Though pipelines and fields are clearly spatially
correlated, geo-referenced pipeline data would allow for tracking of potential rebel groups
along that pipeline, which might provide further evidence toward the rebel looting theory
for petroleum.

Another model that may become available with better data could be a difference-in-
differences comparison of violence in sub-national districts before and after oil discovery in
districts with and without oil.\textsuperscript{31} However, oil discovery in the second half of the 20th century
often happen in similar timeframes as wars of independence and post-independence, and

\textsuperscript{30}The earliest version of the administrative district data is available from 2009, which is still within the
time frame of the ACLED data.
\textsuperscript{31}Cotet and Tsui (2010) run this type of analysis on a country level.
only a few districts have discovered oil since 1997.\textsuperscript{32} Such future research should take care to note how these countries may learned and adapted from neighboring resource-rich countries’ patterns of violence and responses. Finally, micro-data from household surveys have been expanding in availability in this region, and as more data are collected, an empirical analysis can use wage and income data to question how resources and price changes in resources affect opportunity costs when individuals are choosing whether to join a rebel group.\textsuperscript{33}

Ultimately, though there are several limitations to this section of the paper that need to be acknowledged, the empirical results present a significant finding toward the influence of lootable resources on the incidence and intensity of political violence. I will further explore the potential interactions of ethnic exclusion and state capacity with lootable resources in the case study below.

6 Small-N Analysis: War and Peace

Both the Niger Delta region of Nigeria and in western Gabon are rich in lootable resources, yet reside on opposite ends of a spectrum between war and peace.\textsuperscript{34} Nigeria presents a case of persistent political violence in which onshore petroleum resources presented both opportunity and motive for conflict. The convergence of those two factors in alliance with weak state institutions and a history of ethnic exclusion in the region instigated and prolonged war in the region. Yet, the case of Gabon demonstrates that oil is not deterministic. While the regions share similar resource, economic, and geographic profiles, violence in petroleum-producing regions of Gabon remains strikingly minimal and seems to be an exception to the model. This begs the question of why some districts with lootable resources do not see conflict. I argue that, in this comparison, strong government control, external involvement, and ethnic inclusion are the primary differences between the conflict in the Niger Delta and peace in

\textsuperscript{32}New oil discoveries have mostly occurred in Chad and Equatorial Guinea.

\textsuperscript{33}Dube and Vargas (2013) run this analysis to capture the effects of changes in the price of coffee on the opportunity cost of joining rebel groups, but only in Colombia.

\textsuperscript{34}The Niger Delta includes the Cross River, Akwa Ibom, Rivers, Bayelsa, Delta, and Edo, Imo, Abia, and Ondo States. Western Gabon includes Estuaire, Ogooué-Maritime, Nyanga, Moyen-Ogooué, and Ngounié.
western Gabon.

6.1 Niger Delta

Started in 2006, the Movement for the Emancipation of the Niger Delta (MEND) grew from several existing armed conflict groups in the region, namely the Movement for the Survival of the Ogoni People in the 1990s and the Ijaw Youth Council in the early 2000s, as well as its militant offshoot, the Niger Delta People’s Volunteer Force.\(^{35}\)

Petroleum exports make up $88.67 billion of the $94.8 billion in annual exports from Nigeria, or 93.5% of its exports, and the vast majority of the country’s onshore oil fields rest in the Niger Delta districts. Onshore petroleum played two major roles in the rebel group’s strategy, underscoring the rationale behind violence as opportunity to profit and move the group forward.

Importantly, this case brings in a key third group of actors—multinational oil firms. These firms must follow where the oil is and incur high initial fixed costs for petroleum discovery and extraction. Resource-rich governments have often provided incentives for such businesses with tax breaks or particular property privileges, and the oil firms often work in tandem with a national branch of the government that oversees the oil. Companies including Shell Petroleum Development Company, ExxonMobil, Chevron-Texaco, ENI, ElfTotalFina, Occidental have profited from oil resources in the region, working with the Nigerian National Petroleum Corporation. Moreover, subsection 4.44.3 of the 1999 Constitution codifies minerals, mineral oils, and natural gas in Nigeria’s territory as national assets, giving the central government sole jurisdiction over these assets and the land under which these assets lie.

Ukiwo (2011) argues that conflicts in the Niger Delta have arisen through a process of accumulation by dispossession, a structure in which states and elites within the state become

\(^{35}\) As an umbrella group encompassing multiple previously separate armed groups even across ethnic divides, MEND is the only group named as a “rebels group” with national intent in the ACLED data. It should be noted that neither the Correlates of War nor the UCDP Armed Conflict Dataset capture fighting between the state and the MEND, yet the wide destruction of property and lives around this conflict from both sides since the 2000s should be worth studying in the resource and conflict literature.
richer at the expense of the economically and ethnically excluded. Ethnic politics on the national level for many decades have separated groups from access to political power since the 1940s, and many of these groups such as the Ogoni and the Ijaw are situated in the Niger Delta.  

Years of environmental degradation as a result of petroleum extraction and spills in the region have disrupted the large fishing and agricultural sources of livelihood in the region. Furthermore, in spite of the country’s extensive oil wealth, many inhabitants in the oil-producing region remain impoverished. World Bank estimates of sub-national headcount poverty ratios of people under the national poverty line average at 39.1%, ranging from 26.5% to 55.5%, in Niger Delta districts as of 2004. High unemployment for locals persists despite the many expatriate jobs MNOCs have brought into the region, and many companies have ethnicity requirements for employment. In the Delta, while organized groups have differed across time, all have in common a goal of reclaiming “resource control and self determination” as their primary demands, revealing that the use of violence is a way to force their political voice to be heard where otherwise silenced. A MEND spokesperson gave a statement of its goals summarizing this sentiment:

"We are asking for justice. We want our land, and the Nigerian government to transfer all its involvement in the oil industry to host communities which will become shareholders in these oil companies."

In this sense alone, oil is a grievance-based factor in Nigeria’s resource-conflict nexus. It fuels the undercurrents of rebel resources and gives motive for rebel groups to organize.

Furthermore, the amount of petroleum resources returned to local government has decreased since the discovery of oil; the 1999 Constitution now institutes the “13 percent rule,”

---

39 Ibid., 21.
in which a minimum of thirteen percent of petroleum revenues to the government must be remitted to the states from which it came. Still, because the petroleum land itself is legally bound to the federal government, local governments do not have incentive to protect it and thus often assist rebel groups’ transportation of oil resources. This is in line with theoretical predictions from Humphreys (2005) and provides justification for the theoretical approach used in previous sections that focused on national power projection rather than local governments’ power. Bøås (2011) terms this type of system one of “dysfunctional neopatrimonialism” that perpetuates an environment for conflict in lootable resource regions.

The difference between lootable and unlootable resources stands in that rebels are able to use lootable petroleum as a source of opportunity to fund their fighting. This study offers a glimpse into how exactly oil resources can translate into funding for rebel groups. Since violence in the 1990s started and groups evolved into MEND, individual actors have improved the technology to bunker pipelines. They attach taps to pipelines that stem from oil fields, then sell the oil on illicit markets to neighboring countries in West Africa and even around the world. Crude estimates have concluded that bunkering removes approximately 100-250 million barrels of oil per year, or $1.5 to 4 billion in revenue. To get a sense of what this would mean for the rebel group, some estimates show that an average day of bunkering funds weapons purchases for approximately 1,500 rebels for two months. Others have estimated that oil bunkering has reduced Nigeria’s total oil output by one-third.

The profit from these sales can go toward rewards and salaries for fighters and leaders, as well as to purchase arms for future acts of violence. Some trades have also cut out the middlemen, directly exchanging oil for arms. A study of the arms trade in the Niger Delta

---

42In very recent years as MEND progresses, it has been able to attack offshore sites as well, for example by interrupting underwater pipelines, but only rarely.
by Duquet (2009) concludes that greater access to a steady source of oil resources thus leads to more arms acquisition and better weapons, which therefore allows the groups to enact more violence and with greater intensity.

MEND rebels have also exploited different forms of profiting from oil resources, such as kidnapping expatriates employed in oil firms, which also serves as a way of drawing international media attention to their group and legitimizing their status as a rebel group. Clearly, this differs from the traditional understanding of “lootability” of resources, but perhaps it is a definition that needs to be expanded. In turn, some oil companies have offered “contracts” to rebel actors as ransom payments or as compromises for them to stop bunkering pipelines. This may be a rational choice for the firm at the moment, as it is less expensive for them to pay rebels off rather than continue to lose billions in oil revenues, but the payments in turn go to fund more violence.

To reconcile these two narratives, for some of these organized groups, destruction of state and firm ownership of oil both led to the fulfillment of their goals as well as funded the groups individually and collectively. The high price of the oil meant more profits for rebel leaders and fighters, but it also meant that the state could not continue to exclude the demands of this group from the national agenda. While resources can fund arms trade, the International Crisis Group argued that “the most potent weapon in the militants’ arsenal is the growing anger among the region’s twenty million inhabitants.” Overall, this draws out the very critique that Sambanis (2004) put forward, that the distinctions between greed and grievance “illusory,” that they are “usually shades of the same problem.”

Reflecting the FL model, weak state capacity in this model from oil dependence has also fostered an environment for conflict. Poor policing of pipelines from disorganization, extensive bribery, and poor equipment allows MEND rebels to effectively loot crude oil. As MEND’s actions progress despite increased military spending, more of the state’s inability

---

46Ibid., 178.
to maintain order is exposed.\textsuperscript{49} One resident, Isaac Asume Osuoka, Director of Social Action Nigeria, gave an interview a reporter with language directly aligning with the weak states narrative: “With all the oil money coming in, the state doesn’t need taxes from people. Rather than being a resource for the state, the people are impediments.”\textsuperscript{50} In this way, the narrative of injustice, whether benign or as a source of profit, will likely continue to feed into motive for conflict.

The International Crisis Group maintained in 2006 that “removing the incentives for violence will require granting a degree of resource control to local communities” and encouraged transparent dialogue from the state to local residents.\textsuperscript{51} Yet prior to 2009, the primary state response was one of military reaction, with the special operations Joint Task Force (JTF) sent as a counterinsurgency force to the Niger Delta. But MEND’s militants had competitive advantage over their familiar but objectively difficult to navigate terrain.\textsuperscript{52} Even more, civilians were caught between fighting between the JTF and MEND, leaving hundreds dead.\textsuperscript{53}

Snyder and Bhavnani (2005) theorize that the state chooses to allocate its resource revenues to coercive capacity, tax capacity, and public good provision. Though some development projects from both the state and government around building schools and hospitals have begun in the region, many have faltered, leaving the region “littered with failed projects.”\textsuperscript{54} Committees such as OMPADEC and the NDDC created in response to similarly rooted violence in the 1990s also failed when allocated funds were lost to bureaucratic corruption.\textsuperscript{55} With a strong interest to protect oil resources that bring in tax revenue as well as personal benefits to elites in the government, the state then chooses increasing coercive capacity in order to protect resources. In response, organized groups located in these districts, especially

\footnotesize{\textsuperscript{49}Obi and Rustad (2011), Oil and Insurgency in the Niger Delta.} \\
\footnotesize{\textsuperscript{50}O’Neill (2007), “Curse of the Black Gold.”} \\
\footnotesize{\textsuperscript{51}“Fuelling the Niger Delta Crisis,” International Crisis Group, 2006.} \\
\footnotesize{\textsuperscript{52}Hanson (2007), “MEND: The Niger Delta’s Umbrella Militant Group.”} \\
\footnotesize{\textsuperscript{54}O’Neill (2007), “Curse of the Black Gold.”} \\
\footnotesize{\textsuperscript{55}Imobighe (2004), “Conflict in the Niger Delta.”}
those excluded from national politics, have no expectation that the government will meet these demands in the future with the status quo and therefore choose violence against the government in order to change its incentives.

In 2009, the national government began an amnesty plan that would allow rebels to turn their weapons and begin to receive 65,000 naira per month, which far exceeds the minimum wage equivalent at 18,000 naira per month.\textsuperscript{56} By 2012, the government’s expense in this program had risen to over 200 billion naira. Still, this salary was lower than the average 100,000 naira per month salary within the rebel movement.\textsuperscript{57} Moreover, rarely did all 65,000 naira make it to the militants with rampant corruption from both government officials and rebel leaders along the way; some stated only receiving 10,000 per month, signaling another issue with weak government institutions.\textsuperscript{58} As a result, violence ensued again following a shift of leadership in the national government, and MEND made a direct statement of war in early 2010.

In the greed narrative, there is still profit to be made; in the grievance narrative, economic and ethnic inequality still persists in the region. In terms of lootable resources, neither motive nor opportunity have shifted from the counterinsurgency tactics of the state. With the amnesty expiring in January 2016 and the federal government combatting Boko Haram in the northern part of the country, recent flares of new MEND activity on oil sites could be a portent of a new wave of political violence in the Delta.

### 6.2 Western Gabon

As with the Niger Delta, the western districts of Gabon including Estuaire, Ogooué-Maritime, Nyanga, Moyen-Ogooué, and Ngounié have onshore petroleum resources, and the first three are also located near offshore reserves. Geographically, Gabon lies along the west coast of Africa, not far from several countries that have experienced oil-related conflict, including

\textsuperscript{57}Aghedo (2013), “Winning the War, Losing the Peace,” 275.
\textsuperscript{58}Ibid.
Nigeria, Angola, and the Democratic Republic of the Congo, but has seen almost no political violence itself. This brings up a puzzle of why a district full of lootable resources that could give way to both greed and grievance remains relatively stable, shedding light on what other mechanisms might be excluded in the empirical analysis.

Although levels of poverty are slightly lower, at an average of .1254 in the Multidimensional Poverty Index in Gabon compared to .1405 in the Niger Delta, there are many similarities between the two regions.\textsuperscript{59} MNOCs such as Shell and Elf have been long been stationed in these districts over roughly the same time period as those in the Niger Delta. Miles of pipelines along the shore make the western territories similarly vulnerable to bunker- ing. Hydrocarbons make up 90 percent of the country’s export revenues,\textsuperscript{60} just as is the case in Nigeria.\textsuperscript{61} Though Nigeria has far more overall oil reserves overall, petroleum captures about 56 percent of GDP in Gabon compared to 35 percent in Nigeria, showing even more oil dependence in Gabon.\textsuperscript{62} As in Nigeria, reports show that oil resources contribute to significant corruption and patronage at multiple levels of government.\textsuperscript{63} Gabonese President Omar Bongo stayed in power from 1967 until his death in 2009, at which point his son took office. This centralized, oil-dependent structure hence creates an environment with most of the predictors of political violence and civil war as shown in FL, as well as in my empirical analysis. Why, then, is there an absence of conflict in its onshore petroleum resource regions?

Volman (2002) posits that in comparison to its neighbors, Gabon’s strong government control over oil revenues and politics have managed to rein in violence. Oil-based grievances are not absent from the region; the demands that have been recorded confirm the desire for resource control as in the Niger Delta, likewise reflecting a narrative of accumulation by dispossession. The 2004 clash by Ngounié residents followed a list of grievances that

\textsuperscript{59}Alkire and Robles (2015), “Multidimensional Poverty Index 2015.” This index includes measures of health and education to make a more direct comparison. Sub-national World Bank estimates of poverty are not available for Gabon.

\textsuperscript{60}“Gabon 2014,” The Oil & Gas Year.

\textsuperscript{61}Organization of the Petroleum Exporting Countries.

\textsuperscript{62}Ibid.

residents had compiled in 2001 relating to high unemployment and inequitable distribution of oil resources controlled by Panafrican Energy at the time.\textsuperscript{64} Funds supposedly allocated to the region to alleviate poverty have yet to be disbursed, while elites reportedly continue to profit from oil resources.\textsuperscript{65} Reports of these incidents mirror similarly to those in the Niger Delta but are few and far between. In contrast to some events in the Delta, Gabonese military were quickly on site in the Ngounié incident, violently countering the protestors and resulting in two fatalities and seven wounded. This may have created a deterrent effect for future organized groups.

The few incidents that have arisen in the 2000s in western Gabon also build on previous conflicts in the decades past, as in Nigeria’s case. In 1990, a large labor strike escalated to violence on onshore oil production sites in Ogooué-Maritime, primarily around the city of Port-Gentil. Yet in a fundamental divergence from the Nigeria case, French military were on the ground with quick response and were able to airlift their expatriates from oil sites, which preventing continued kidnapping as was the case with some organized groups in Nigeria.\textsuperscript{66} External involvement stemmed from a lasting colonial legacy in the country, as well as a large stake the French government had in the government’s resources through the oil company Elf. In fact, as the strikes went on, French forces quickly and “effectively crushed all anti-government resistance in the country’s oil capital.”\textsuperscript{67} This coercive influence of the French government, which some have noted as a form of neocolonialism, contributed to the end of this conflict and also likely deterred future attacks on Gabon’s oil resources.

Finally, and crucially, ethnic relations in western Gabon have not been as fraught as in the Niger Delta.\textsuperscript{68} Though the Fang, Orungu, Myene, Nkomi, and Eshira/Bapounou ethnic groups overlap in the region, the national government under President Bongo has encour-

\textsuperscript{64}As recorded in ACLED, Raleigh et al. (2010).
\textsuperscript{65}“Gabon: Unrest Forces Temporary,” Integrated Regional Information Networks.
\textsuperscript{66}Yates (1996), The Rentier State in Africa: Oil Rent Dependency and Neocolonialism in the Republic of Gabon.
\textsuperscript{67}Ibid., 130.
\textsuperscript{68}In the Ethnic Power Relations dataset used in the empirical analysis, all ethnic groups in Gabon marked as “dominant” or “excluded” in 1967 were marked as junior or senior “partners” in terms of political power by 2000.
aged interethnic marriage even within political elites, forming “careful ethnic balancing” and “integration of powerful political opponents.” The federal government rapidly expanded public posts in the 1970s and 1980s with an intention to include elite representatives of diverse ethnic groups, with Bongo himself a member of the Bateke, a minority ethnic group primarily located in eastern Gabon and neighboring countries. This fundamental difference between western Gabon and the Niger Delta suggest that the CH finding that ethnic polarization was insignificant, at minimum, has some exceptions.

Taking the above factors into account, Basedau and Lacher (2006) therefore conclude that research in the resource-conflict literature have overattributed the effects of lootable resources in the face of different ethnic relations and different choices for state capacity between countries. State strength, external involvement, and ethnic relations factored in maintaining peace despite oil wealth in western Gabon. These brief cases in conjunction simply suggest that “oil is never the only factor.”

7 Conclusion

Using sub-national conflict and resource data in 670 sub-national African districts from 1997-2014, I find that lootable natural resources are correlated with the onset of political violence in a statistically significant manner. While measures of primary commodity exports could represent a variety of government choices, as well as international supply and demand factors, lootable resource location is a variable closer to the rebel looting narrative CH provide. The results do not find statistically significant support for the hypothesis that weaker state capacity, as measured by farther distance from the capital, increases the effect of lootable

71 Ross (2013), The Oil Curse, 136.
72 As a final aside, this thesis has adopted terms of “lootability” and “greed” for its theory from the existing literature, which implicitly pits looting rebels as criminals. But with this language, policy implications will always tend to favor incumbent governments, though they may perpetuate grievances foundational to many spells of political violence, and it may bias the perspectives of analysis that authors can offer. What qualifies as jus ad bellum in resource-based violence, however, primarily remains outside of the scope of this thesis.
resources on violence. This may be because distance from the capital is a poor proxy; weak institutional capacity around petroleum resources in the Niger Delta has perpetuated violent conflict while state strength in Gabon has prevented it.

Based on these results, an effective counterinsurgency strategy for incumbent governments facing rebel violence could be to implement stronger policing of vulnerable locations of lootable resources, such as petroleum pipelines and mineral-rich river beds. In order to reduce long term grievances, increasing political agency for excluded groups may be key in preventing further conflict. For a rebel group with national intent, gaining control of regional natural resources can serve as a way to rectify grievances as well as a crucial strategy to ensure funding for future operations. Rebel groups that are not co-located with lootable resources, then, should be expected to strategically move to those regions. Further theory and empirical work, perhaps with a structural model to capture the temporal and spatial dependence of this research question, is needed to untangle how these choices between governments and rebel groups play out in equilibrium.

Furthermore, differences in ethnic tensions between the Niger Delta and western Gabon support the empirical finding that the combination of ethnic exclusion and lootable resources in a district is positively correlated with higher likelihood of political violence. This interpretation contrasts with CH’s conclusion that rebels’ motives are “substantially disconnected from large social concerns of inequality, political rights, and ethnic or religious identity.”

Policy implications from my finding suggest that promoting ethnic inclusion may mitigate the effects of lootable resources on violence. Further research should continue to unpack the interacting mechanisms between lootable resources and ethnic exclusion that could lead to rebel violence.

This paper has aggregated several sub-national data sources, offering insight into where within a country conflict is more likely to occur. As more sub-national data have become available within the last few years, statistically rigorous empirical analysis on this subject

---

will improve with time. For instance, much more detailed micro-data across a span of countries in Africa have provided more insights about wages, poverty, education, and other individual-level variables that might factor into an individual’s choice to join an insurgency.\textsuperscript{74} ACLED has also recently begun to aggregate data on political violence in certain Asian countries, providing a lens into whether these results have external validity outside of Africa. As detailed in the data limitations section above, there is a wealth of promising avenues for empirical research that will improve our knowledge of the exact mechanisms between resources and violence. Still, for this subfield of literature specifically, case study approaches should continue to inform and even question quantitative results by revealing a more complex web of interactions than aggregated variables in empirical analyses can directly show.

Natural resources will continue to make up a large portion of many African economies, especially with the rise of recent deals with China and other countries channeling further investment into natural resource extraction. With incentives pushing rebels toward looting, elites toward corruption, and states toward weak institutions, it is unlikely that rebel violence will decline greatly in the years to come. Hence, it remains crucial for research in this field to accurately capture the mechanisms behind resources and political violence.

\textsuperscript{74}Some examples include Afrobarometer and the Sub-national African Education and Infrastructure Access Data projects.
References


Imobighe, T. A. "Conflict in the Niger Delta: A Unique Case or a Model for Future Conflicts in Other Oil-Producing Countries?". Oil Policy in the Gulf of Guinea: Security and
Conflict, Economic Growth, Social Development.


"Integrating Data on Ethnicity, Geography, and Conflict: The Ethnic Power Relations Data Set Family". *Journal of Conflict Resolution*.


