WEALTHY OR BLOODY SOIL?
Oil, Diamonds, and State-Sponsored
Mass-Killing during Civil Wars

Margaux Dandrifosse
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ABSTRACT

Since the end of the Cold-War, intra-state conflicts have replaced interstate wars, and civilians have become the main targets of violence. While scholars have increasingly investigated why state-sponsored mass-killing of civilians occurs in certain countries and not others, this dissertation examines a micro-level, overlooked but policy-relevant puzzle: where, *within* countries in Sub-Saharan Africa, does state-sponsored violence occur? It particularly focuses on two variables brought from the civil-war literature: the sub-national presence of onshore oil and alluvial diamonds. Based on empirical evidence from Angola, Sudan, Chad, Nigeria, and Sierra Leone, it develops a theoretical argument in the form of three hypotheses. In H1 and H2, it argues that petroleum increases state-sponsored violence against civilians through two rational logics. Following the strategic logic conveyed in H1, mass-killing is used as an extreme strategy to eliminate the exacerbated threat that rebel contestation poses in petroleum-rich areas. According to the opportunistic logic detailed in H2, states use the blurriness of war opportunistically to militarize and violently dominate oil-rich territories, particularly when these areas are occupied by excluded groups. These logics are reinforced by an opportunity mechanism according to which multinational oil facilities provide states with the capacity to conduct mass-violence. H3 hypothesizes that the presence of alluvial diamonds increases state-sponsored violence against civilians, but less than petroleum. Testing these arguments with a negative binomial and a logistic regression using data at the grid-cell level, this dissertation finds support for H1 and H2 regarding petroleum, but diamonds (H3) appear to be insignificant.

Keywords: state-sponsored mass-killing, civil wars, oil, diamonds, violence against civilians

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LIST OF ABBREVIATIONS

ACLED .... The Armed Conflict Location & Event Data Project

OLS .... Ordinary Least Squared

OSV .... One-sided Violence

RUF .... Revolutionary United Front

SSMK .... State-Sponsored Mass-Killing

UCDP-GED .... Uppsala Conflict Data Program Geo-Referenced Event Dataset

UNITA .... National Union for the Total Independence of Angola

VAC .... Violence Against Civilians

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1. INTRODUCTION

The fall of the Soviet-Union has marked the beginning of an important transformation in the nature of warfare globally. Intra-state conflicts have replaced interstate wars, and have become increasingly deadly for civilians (von Einsiedel, 2017, p.2). Over one million civilians have perished in intra-state conflicts during the last decades (Balcells & Stanton, 2021, p.46). Nevertheless, while most instances of State-Sponsored Mass-Killing (SSMK) of civilians since 1990 have taken place during civil-wars (Anderton, 2014, p.121), not all conflicts have turned into large-scale civilian massacres. A puzzling question therefore arises; why do some armed conflicts turn into mass-killing of civilians and others not?

This puzzle has been the subject of a large scholarship since the early 2000s. However, the literature has focused mainly on aggregate factors to explain the occurrence of SSMK during wars (Sullivan, 2012; Verdeja, 2012). Nevertheless, when Violence Against Civilians (VAC) occurs during armed conflicts, it often concentrates in particular areas, rather than taking place in the whole country[1] (Buhaug et al., 2011, p.817; Humphreys & Weinstein, 2006, p.434). This observation suggests that local-level dynamics must play a role in the incidence of mass-violence (Lujala, 2009, p.9). Accordingly, the aggregate focus in the study of mass-killing overlooks another relevant and under-researched puzzle: where, *within* countries, do SSMKs take place during armed conflicts? In other words, what makes a specific area prone to suffer state-sponsored violence against civilians during civil-war?

This dissertation places itself in the literature that considers mass-killing as a rational strategy, and investigates how local dynamics influence the likelihood and intensity of SSMK during armed conflicts in Sub-Saharan Africa. It particularly focuses on the sub-national location of onshore oil and alluvial diamonds as determinants of mass-atrocities. While those factors have been extensively examined in the civil-war scholarship, and are becoming increasingly relevant due to the growing economic aspects of intra-state conflicts (Dannreuther, 2013, p.84), they have been largely overlooked in researches on state-sponsored violence (Anderton, 2014, p.124). Understanding where mass-killing is more likely to occur during conflicts is not only academically salient, it is also highly policy-relevant. The proliferation of civil-wars and the growing incidence of mass-atrocities have been paralleled by inefficient international responses (Kim, 2010, p.238). Consequently, there is an imperative need to refine policies for prevention and reaction to mass-killing. This requires a thorough understanding of the local conditions under which such violence occurs, for instance, to pinpoint the high-risk locations where peace-keeping troops should be deployed (Sullivan, 2012, p.373). Additionally, it can shed light on the local-specific elements to be taken into account in peace-agreements and reconstruction efforts to prevent further violence.

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[1] Exceptions where mass-killings have occurred in the whole country include the Rwandan genocide, for instance.

This dissertation investigates the research question: How does the sub-national location of onshore oil and alluvial diamonds influence the incidence of state-sponsored mass-killing against civilians during armed conflicts in Sub-Saharan Africa? It argues that, during intra-state conflicts, the presence of petroleum in an area increases the likelihood and intensity of state-sponsored violence through two rational logics. Following the strategic logic, SSMK is used as an extreme strategy to eliminate the exacerbated threat that contestation by rebels and their civilian support represent in petroleum-rich areas. According to the opportunistic logic, state elites make opportunistic use of the blurriness brought by armed conflict to militarize and violently appropriate oil-rich territories, particularly when these areas are occupied by politically excluded ethnic groups. It is argued that these logics are reinforced by an opportunity mechanism: foreign-owned oil facilities provide the logistical capacity for governments to conduct SSMK in oil-rich areas. Finally, it claims that the presence of alluvial diamonds increases the intensity and likelihood of SSMK, although significantly less than petroleum. The quantitative analysis supports the argument for petroleum but not for diamonds which are found to be insignificant.

The rest of the dissertation develops as follows: First, the concept of SSMK is clarified. Second, an overview of the literature places this dissertation within the scholarship. Third, the methodology is explained. Fourth, the theoretical argument is developed. Fifth, the argument is tested with two multivariate regressions.

2. CONCEPTUAL DISCUSSION

The main concept used in this dissertation is "state-sponsored mass-killing". It refers to a form of violence committed by a state's government, or actors acting on behalf of the government, and involving a lethal act. It must be distinguished from other forms of state-sponsored lethal violence: extra-judicial killing, collateral damage/indiscriminate violence, and genocide/politicide. As opposed to extra-judicial killing, SSMK represents an act of collective violence whereby a large number of people are collectively targeted. It does not include isolated cases of illegal killings by state authorities. Additionally, it is distinct from unintentional killing of civilians resulting from the fighting between two warring parties such as collateral damage or indiscriminate violence. SSMK involves the deliberate and intentional targeting of civilians. Lastly, it must be distinguished from genocide, which consists of "acts committed with intent to destroy, in whole or in part, a national, ethnical, racial or religious group" (Convention on the Prevention and Punishment of the Crime of Genocide, 1948, Article II) or politicide which refers to the intent to destroy political groups (Harff & Gurr, 1988). SSMK differs from genocide/politicide in two ways: 1) it does not require the targeting of a particular national, ethnical, racial, religious, or political group with the intent to destroy it; 2) it only includes killings. Accordingly, in this dissertation, SSMK refers to the collective and deliberate killing of a large number of civilians by government forces.

3. LITERATURE REVIEW

3.1. Mass-killings: Consensus and Debates

The study of VAC is a relatively novel field of research which has developed during the late 1980s and 1990s. Early works emerged as part of genocide studies and focused on investigating the causes of state-led genocides. A majority of these scholars have conceptualized mass atrocities as an irrational phenomenon, stressing primordial factors such as ancient racial hatred, exacerbated fear of the other, irreconcilable ethnic enmity, and a degenerated mentality (Moses, 2019, p.18). The most prominent scholars in this first wave have stressed factors such as totalitarian regimes (Rummel, 1995), ethnic polarization (Fein, 1993; Harff, 2003), low economic development, undemocratic regimes, and exclusionary ideology (Harff, 2003) to explain mass atrocities. Nevertheless, the most significant contribution of this academic literature lies in the finding that genocide and other forms of SSMKs are significantly more likely during civil-wars (Fein, 1993; Harff & Gurr, 1988; Krain, 1997; Semelin, 2002). However, this argument cannot explain why only a few armed conflicts have evolved into mass-violence.

A second wave of literature has developed in the 2000s to explain this puzzle. Those scholars have sought to bridge the gap between genocide and civil-wars studies. This scholarship has produced two main contributions to the study of SSMK. The first one lies in their recognition that the causes of mass-killing should not be studied in a vacuum, and are rather closely intertwined with conflict dynamics. Second, they have conceptualized mass-killing as a rational strategy pursued by governments during civil-wars. The theory developed by Valentino et al. (2004) represents a major contribution. The authors have argued that SSMK should be understood as a government-led rational counterinsurgency strategy to weaken insurgents by reducing their civilian support base, particularly when faced with strong guerrilla insurgencies with large popular backing (p.377). Fjelde and Hultman (2014) have added an ethnic dimension to this theory. They emphasize that civilians are targeted along ethnic lines because ethnicity serves the strategic purpose of identifying communities supporting the insurgents. Additionally, Kim (2010) claims that political grievances fuel popular support for insurgents and thereby increase the likelihood of states resorting to mass-killing (p.240). Fjelde et al. (2016) advance that ethnic exclusion and inequalities increase the risk of state-sponsored atrocities during conflicts. Azam (2002) offers an alternative to these models by presenting VAC as resulting from looting by low-productivity ethno-regional groups. However, Azam and Hoeffler (2002) find that, in addition to looting incentives, mass-killing is also a terror military strategy. These studies, therefore, conceptualize SSMK as a counter-insurgency strategy to weaken the support base of insurgents during wars. Furthermore, scholars have applied economic constrained-optimization models to examine states' decisions to commit mass-killing as a function of their capacity (e.g. Anderton, 2014; Bae & Ott, 2008; Ferrero, 2013). In his model, Ferrero (2013) argues that mass atrocities are used by rulers when alternative options are more costly. Whereas a large number of authors agree that SSMK is a rational strategy of war, they have nevertheless

found contrasting results concerning the impact of military and state capacity, economic development, territorial contestation, and ethnic polarization (Anderton, 2014; Azam & Hoeffler, 2002; Bae & Ott, 2008; Balcells & Stanton, 2021; Kim, 2010; Valentino et al., 2004).

This second wave of scholarship has made significant advances in the study of SSMK. It has provided theoretical models to study the phenomenon as part of a rational strategy used by states to defeat insurgents during wars, and closely intertwined with conflict dynamics. However, despite these contributions, no clear consensus has been reached as to which factors/conditions increase the likelihood of SSMK during armed conflicts.

3.2. Filling the Gap: Natural Resources and Sub-National Analysis

This research contributes to the second-wave interdisciplinary debate on the rational causes of SSMK during conflicts in two ways: 1) it focuses on natural resources; 2) at the subnational-level.

 First, it examines the role of natural resources, which, despite being prominent in the civil-war literature, has been largely overlooked in the SSMK scholarship. Indeed, numerous authors have linked resources, specifically oil and diamonds, to violent conflict onset, duration, and intensity (Basedau & Wegenast, 2009; Buhaug & Rød, 2006; De Soysa, 2015; Obi, 2010; Ross, 2003; 2015), as well as to the repression of social protests (Christensen, 2018) and human rights violations (DeMerrit & Young, 2013). Anderton (2014) emphasizes that, due to the strong interconnection between the two processes, economic factors that play a role in the dynamics of violent conflicts such as natural resources are also likely to affect the incidence of mass-killing (p.121). Moreover, the growing framing of mass-atrocities as a rational war strategy renders a focus on natural resources salient. Von Einsiedel (2017) suggests that warring actors in intra-state conflicts are increasingly linked with transnational crime and trade on illegal markets (p.4). According to Renner (2002), conflicts are increasingly about controlling and capturing resources (p.152). Schutte (2017) further points out that the scholarship on VAC has overwhelmingly focused on conflict dynamics, overlooking "exogenous geographic determinants" of violence (p.381). It is therefore surprising that little attention has been paid to high-value resources in the SSMK scholarship. Only few authors have included resources in their research on SSMK, and they have not reached an agreement as to their effect. Brehm (2017, p.76) and Wimmer and Miner (2020, p.17) find that resource abundance does not influence mass-killing. Querido (2009) and Esteban et al. (2015) assert that both onshore oil and diamonds increase the likelihood of SSMK during conflicts. Accordingly, this work aims to expand the large literature on natural resources from the civil-war scholarship to the study of SSMK, and contribute to the debate between the few authors that have done so.

Second, this dissertation conducts an analysis at the disaggregated level as it looks at the sub-national location of natural resources to determine where state-sponsored violence occurs within countries.

Previous studies linking SSMK to natural resources such as Brehm (2017) and Querido (2009) have looked only at aggregated measures of resources, at the country-level. Verdeja (2012) emphasizes the lack of disaggregated study of mass-killing, and the need to look at sub-national variables (p.313). Aggregate studies cannot examine where violence is more likely to ensue *within* countries. A growing number of civil-war scholars have adopted this trend and investigated how local-level variables impact armed conflicts. Researchers have particularly looked at how the geographical location of resources influenced the onset/occurrence (Arezki et al., 2015; Basedau & Pierskalla, 2014; Basedau & Wegenast, 2009; Berman et al., 2014; Buhaug & Rød, 2006; Hegre et al., 2009; Hunziker & Cederman, 2017; Obi, 2010), severity (Hinkkainen & Kreutz, 2019; Lujala, 2009; Rigterink, 2020) and duration (Lujala, 2010) of conflicts. They have found results that greatly differ from findings at the country-level, underlining the relevance of disaggregated studies to examine the link between natural resources and violence. Lujala (2009) argues that aggregated studies may lead to erroneous conclusions as they overlook sub-national dynamics particularly relevant to natural resources (p.5). For instance, Christensen (2018) finds that social protests in resource-rich rural areas are more likely to be violently repressed. Benson (2018) suggests that further research investigate how the presence of natural resources impacts the geography of VAC (p.17). Accordingly, examining micro-level dynamics is becoming increasingly relevant in the study of violence and natural resources.

Certain scholars of VAC have begun to explore sub-national dynamics. However, authors in the SSMK scholarship that have investigated micro-level patterns have largely focused on dynamics of territorial control and contestation of the battlefield (e.g. Fjelde & Hultman, 2014; Raleigh, 2012; Schneider et al., 2012; Sullivan, 2012). Scholars that have explicitly focused on the sub-national role of resources have done so either by examining selective patterns of violence by rebel groups (e.g. Humphrey & Weinstein, 2006), or by focusing on agricultural resources (Azam, 2002; Koren & Bagozzi, 2017). Notably, these studies have linked violence to resources emphasizing a looting logic.

The only prominent research on the sub-national impact of natural resources on SSMK was conducted by Esteban et al. (2015). The authors have found that SSMK is more likely on oil or diamonds-rich territories, occupied by ethnic minorities, with low labor-productivity, that advance democratization claims (p.1090). However, the analysis is conducted at the ethnic-group level to identify which groups are more likely to be targeted. Contrarily to these findings, Wimmer and Miner (2020), including natural resources as control variables in their analysis, find that groups occupying resources-rich territories are not more likely to suffer violence during conflicts. In contrast to this dissertation's focus on *state-sponsored* mass-killing, the authors examine aggregate violence, including both state and non-state actors. Additionally and similarly to Esteban et al., Wimmer and Miner focus solely on cases of ethnic targeting. This is problematic as SSMK does not always target a defined ethnic group. Fjelde et al. (2016) find that ethnic targeting occurred in only half of the cases identified as state-sponsored one-

sided violence (p.16). In contrast, this paper focuses on the grid-cell level and not ethnic territories, and takes civilian rather than ethnic targeting as dependent variable. It allows investigating the influence of sub-national natural resources on SSMK beyond ethnically delimited territories and ethnic targeting.

To conclude, this dissertation fills out a gap in the scholarship on state-sponsored VAC. It does so by bringing in the role of natural resources from the civil-war literature and focusing on their geographical location to systematically examine the subnational-level dynamics linking resources to the likelihood and intensity of SSMK during conflicts.

4. METHODOLOGY

4.1. Operationalization

Mass-killing is operationalized as one-sided violence. The two words are therefore used interchangeably. One-sided violence is defined by the UCDP one-sided violence dataset as "the use of armed force by a formally organized group, against civilians, which results in at least 25 deaths per year and per actor. Extrajudicial-killings are excluded" (Pettersson, 2020, p.3). While this definition includes violence by both state and non-state perpetrators, this dissertation exclusively captures one-sided violence committed by state perpetrators (state-sponsored) due to its limited scope and the large differences between dynamics of state and non-state violence during wars (Raleigh, 2012, p.469). This was possible because the UCDP Geo-Referenced Event dataset (UCDP-GED) (Sundberg & Melander, 2013), which provides the location of SSMKs, disaggregate one-sided violence events per actor. This definition was chosen as it represents the best suited definition to examine violence at the local-level. It excludes collateral damage by focusing on direct and intentional killing (Fjelde & Hultman, 2014, p.1239). Moreover, it does not set a too high threshold which would exclude smaller but nonetheless widespread instances of violence (Schneider & Bussmann, 2013, p.635). Other common conceptualizations of mass-killing include the definition of SSMK as "the intentional killing of at least 1000 civilians during the course of an armed conflict […] by the government of a state" (e.g. Querido, 2009; Ulfelder and Valentino, 2008) or the similar definition laid by the Political Instability Task Force (Marshall et al., 2010) used by Esteban et al. (2015). However, these large-scale and aggregate definitions, by setting high thresholds, obscure the local dynamics of violence and overlook numerous instances. Von Einsiedel (2017) shows that large-scale mass atrocities have decreased since the 1980s and violence has increasingly taken the form of smaller massacres, better captured with a threshold of 25 civilian deaths per year (p.6). A growing number of authors have also used this definition to study mass-killing (e.g. Clayton & Thomson, 2016; Eck & Hultman, 2007; Fjelde and Hultman, 2014; Fjelde et al., 2016; Schneider & Bussmann, 2013). This research only considers SSMK events that have taken place during an active armed conflict as defined by the UCDP/PRIO Armed Conflicts dataset.

Natural resources at the sub-national level are operationalized as the presence of onshore oil and/or alluvial (secondary) diamonds in a geographical area as given by the PRIO-GRID dataset (Tollefsen et al., 2012). Petroleum and diamonds were selected due to their prominence in the civil-war literature. While evidence is mixed regarding the influence of gold, gemstones, coca, timber, and other resources, there is a close consensus that oil and diamonds do affect the onset, dynamics, and severity of armed conflicts (Berman et al., 2014; De Soysa, 2015; Lujala, 2009; Ross, 2015). The two resources are expected to illustrate different dynamics following Ross's (2003) classification: diffuse and labor-intensive diamonds versus point and capital-intensive oil. Alluvial diamonds represent a lootable and diffuse (spatially spread-out) resource which can easily be extracted without machinery. In contrast, kimberlite (primary) diamonds require mining installations and machinery for extraction, and are, therefore, not considered. Onshore oil represents a less lootable and point (spatially concentrated) resource, which requires heavy machinery and installations for its extraction. It was chosen to focus exclusively on onshore petroleum as offshore petroleum is not suitable for the research's purpose.

Finally, this dissertation focuses on Sub-Saharan Africa for two reasons. First, it is the region which counts the largest number of both civil-wars and one-sided violence deaths during conflicts (Eck & Hultman, 2007, p.238). From the 2021-2023 genocide forecast, eight countries out of fifteen are situated in Sub-Saharan Africa (Atrocity Forecasting Project, 2021). Second, the region is rich and highly dependent on natural resources, resulting in conflicts with a growing economic dimension (Dannreuther, 2013, p.84). It can therefore be expected that, if there is a link between natural resources and SSMK, it will be particularly salient in Sub-Saharan Africa.

4.2. Design

To answer the research question, this dissertation adopts a positivist epistemology, assuming that inferences about the world can be drawn from empirical observations. The analysis is divided into two parts. The first section develops the theoretical argument and the three hypotheses, drawing from empirical cases and the SSMK scholarship. To construct a generalized argument, it builds on several cases: the Angolan civil-war and the insurgency in the oil-rich Cabinda region, Southern Chad, Sudan, Sierra Leone, and the Niger Delta. The sources used include academic journals and reports published by international organizations.

The second section tests the hypotheses with a negative binomial and a logistic regression. Those methods, the data, and the variables used are discussed in section 6.

5. THEORETICAL ARGUMENT

This section develops the theoretical argument linking oil and alluvial diamonds to SSMK. It derives from the established understanding of mass-killing as a rational strategy used by governments during armed conflicts (Anderton, 2014; Bae & Ott, 2008; Valentino et al., 2004). This approach contrasts with the alternative conceptualization of mass-atrocities as an irrational phenomenon, rooted in primordial racial animosity, ancient hatred, and extreme ideology (Moses, 2019, p.18). It is assumed that, during conflicts, governments are rational actors that weigh the costs and benefits of various courses of action and choose the one that maximizes benefits at the lowest cost (Anderton, 2014; Ferrero, 2013). It argues that the presence of oil in an area increases the likelihood and intensity of SSMK during conflicts through two distinct but not mutually exclusive logics: a strategic and an opportunistic logic. These logics are reinforced by an opportunity mechanism according to which the presence of oil facilities provides an opportunity for governments to commit mass-violence.

According to the strategic logic, governments will use mass-killing in petroleum-rich areas as an extreme strategy to rapidly eliminate the local support-base and capacity of rebels, because rebels and their supporters operating in oil-rich territories represent a larger threat to governments than in other areas. In Sub-Saharan Africa, oil represents a significant, often the most important, source of revenues that directly benefits government elites. During the 1990s, oil constituted 80 percent of state revenues in Nigeria, and 90 percent of the Angolan government's income (Renner, 2002, pp.163-167). Ensuring that oil rents continue flowing or that oil-rich territories remain fit for exploration in the prospect of future gains is, therefore, a vital priority for governments (Obi, 2010, p.221). Particularly, states commonly use oil revenues or exploration licenses as future booties to obtain rapid loans. In these cases, governments become even more dependent on oil-rents or exploration to pay off their debts (Renner, 2002, p.163). Accordingly, petroleum-rich areas are particularly valuable and strategic for governments.

When insurgents operate in those areas, they represent a significant threat to these valuable oil revenues flowing to state elites. Rebels frequently attack and damage oil installations which can result in halting of the exploration/exploitation activities, steal oil from the pipelines, and kidnap or kill oil workers (Paes, 2004, p.95). Rebel groups in Cabinda (Porto, 2003, p.4) and the Niger Delta (Obi, 2010, p.220) have become well-known for frequent and violent abductions of oil workers and the destruction of installations. As a result, rebel activities have the potential to significantly disrupt governments' access to oil revenues. Watts (2007) claims that "direct assaults on oil installations and infrastructure cost the Nigerian government $6.8 billion losses in revenue between 1999 and 2004" (p.639). Particularly, when foreign firms operate the oil installations, rebel attacks and the ensuing sense of insecurity might result in these companies cancelling exploration contracts or leaving the installations. In 1984, Chevron stopped oil extraction in Sudan after several workers were abducted and killed by rebel groups (Travis,

2008, p.43). During the Angolan civil-war, UNITA's attacks on the Soyo oil fields halted the production during several months (Frynas & Wood, 2001, p.592).

Additionally, not only can rebels disturb the flow of oil revenues to governments, they also tend to be particularly strong in petroleum-rich territories. Local populations in these areas usually possess grievances and resentment towards the government. Oil exploration/exploitation produces large negative effects on the surrounding population, and brings little benefits. It generates pollution, environmental destruction, and noise disturbance (Watts, 2007, p.641). It also involves mass displacement and land appropriation with little compensation (Renner, 2002, p.154). Moreover, in Sub-Saharan Africa, oil concessions are operated by large foreign companies which bring their own foreign labor, and create enclaves separated from the local population. Porto (2003) describes how foreign workers in Cabinda reached the oil facilities in helicopter and were almost never seen in the local town (p.3). Reyna (2007) emphasizes that, from the few Chadians employed by ExxonMobile in the oil facilities, most did not come from the Southern oil-rich region (p.84). This, combined with the fact that oil exploitation/exploration is mainly capital-intensive, signifies that it does not represent a source of employment for local populations, who find themselves alienated by these foreign enclaves (Le Billon, 2001, p.61; Mähler, 2010, p.18). Seign-goura (2017) points to the environmental degradation, inflation, increased poverty and sense of injustice, and reduced freedoms resulting from oil exploration in Southern Chad (p.78). Rebel groups can easily tap into these grievances to recruit from the disillusioned local residents or to gain material and financial support (Obi, 2010, p.224). Furthermore, the presence of oil in a territory and its exploitation by foreign companies and state elites provide a powerful narrative that rebels can exploit to fuel local nationalism. They can build on this petro-nationalism to articulate autonomy or secessionist demands which can spur local civilian mobilization and resistance to the state's oil exploitation. Seign-goura (2017) explains that Southerners in Chad believed that oil is a "gift from God" that has been passed to the inhabitants of oil-rich territories by their descendants, and thereby feel entitled to benefit from the oil's wealth (p.69). In Angola, the majority of Cabindans supported the autonomy claims of rebel insurgents (Porto, 2003, p.2). In the Niger Delta, the Ogoni and Ijaw-based rebel groups have fuelled oil-related ethno-nationalism in the region (Watts, 2007, p.652).

Consequently, rebels operating in oil-rich areas are particularly threatening to the government due to their potential disruption of highly valuable oil-rents to state elites and the local support they can generate. Porto (2003) emphasizes that the Angola government framed activities by the Cabindan rebels as "terrorism" (p.7). Similarly, Obi (2010) shows that resistance in the Niger Delta was declared a security threat by the government (p.232). According to Valentino et al. (2004), states use mass-killing as a last-resort strategy when confronted with strong rebel insurgencies that pose a significant threat. Anderton (2014) claims that civilian victimization increases when governments face an "existential threat", and when the benefits surpass the costs (p.340). As a result, it is argued that governments will

use extreme measures to eliminate rebels and their supporters from oil-rich areas, due to the exacerbated security threat that they represent and the enormous costs they can impose on governments by disrupting oil-rents. SSMK is, therefore, used as an extreme strategy to crush the rebel threat to the government's oil revenues and eradicate the civilian population's will and capacity to challenge the state and the oil exploration/exploitation.

Whereas this logic applies to territories where crude oil is explored or extracted, one could ask whether the argument can travel to areas where oil is processed, such as refineries. This dissertation suggests that it does not. Refineries in Sub-Sahara Africa are often situated in neighboring countries or outside the productive region, in less marginalized areas firmly under state control, and commonly benefiting from the oil revenues. These areas are, therefore, significantly less prone to the formation of both local grievances and rebel activities, which organize in remote and more grievances-ridden zones. Refineries are found in Khartoum to process Southern Sudanese oil, in Southern Nigeria and Ivory Coast for the Niger Delta oil, in Luanda to process Cabindan oil[2], and in Cameroun for Chadian oil. Additionally, operating refineries does not depend on specific territories. It not only does not generate local grievances through the appropriation of local communities' land, it can also more easily be moved or transferred to other operation sites including in neighboring or developed countries if necessary. Accordingly, oil refineries are both less strategic and less vulnerable than petroleum exploration/exploitation sites. The argument is therefore limited to petroleum-rich areas. The first hypothesis is:

H1: *During intra-state armed conflicts, areas that are rich in petroleum, and that are zones of previous contestation, will experience more state-sponsored violence against civilians than areas not rich in petroleum.*

According to the opportunistic logic, governments will use the situation of intra-state armed conflict opportunistically to establish full control over petroleum-rich areas by displacing populations from the oil fields and repressing resistance. As for the strategic logic, the incentive to establish full control and "clean" oil-rich areas arises due to the highly valuable revenues that oil provides to government elites. Travis (2010) emphasizes that "Genocide can represent economic policy carried out by means of mass murder" (p.4). Due to the blurriness of war, governments can justify the militarization of the region and the violent displacement of populations without attracting large criticisms from the international community. When a conflict breaks out in the country, state elites will make opportunistic use of the chaotic war situation to militarize oil-rich territories to ensure full control over their most valuable source of revenues, appropriate the necessary land by violent means, and eliminate resisting or disturbing local populations. Von Einsiedel (2017) claims that violence can be used as a mean to displace civilians from strategic areas (p.6). Travis (2010) argues that "the allocation of oil and mineral

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[2] A project to construct an oil refinery in Cabinda is ongoing in 2022.

exploitation rights play major roles in nearly all campaigns of genocide" (p.4). Frynas & Wood (2001) emphasize that war conditions provide particularly lucrative opportunities for resources extraction that would not be possible under peaceful conditions. The authors point out the militarization of the Cabinda region in Angola for oil exploration and extraction as oil was crucial for the Angolan government to sustain the country-wide war with UNITA (pp.596-597). This logic implies that SSMK will occur in oil-rich regions, regardless of whether these are contested areas during the conflict.

Furthermore, it is argued that SSMK is likely to occur on a larger scale when the territories are occupied by excluded ethnic groups, as the government will not face political costs for the violent actions. In Chad, SSMKs occurred in the 1990s in the oil-rich Doba region, occupied by the politically marginalized Southerners (Massey & May, 2005, p.267). A concrete example of this logic can also be found in Sudan. Le Billon and Cervantes (2009) explain that, after the announcement of oil discovery in the South, the Sudanese government decided to break the 1972 peace agreement with Southern rebels and re-start the conflict. The Sudanese government subsequently engaged in mass-displacement and mass-killing of the populations living on the oil fields to enable the installation of the petroleum facilities (p.841). Gadzikwa (2021) points to the large displacement and killing of populations, particularly marginalized non-Arab groups such as the Nuba, to allow for oil extraction in Southern Sudan (p.21). Accordingly, the second hypothesis is:

H2: *During intra-state armed conflicts, areas rich in petroleum will experience more state-sponsored violence against civilians than areas not rich in petroleum. This effect is stronger when they are also occupied by excluded groups.*

It is argued that these two logics – strategic and opportunistic – are reinforced by an opportunity mechanism. Oil facilities provide an opportunity for governments to conduct mass-killing. Anderton and Brauer (2016) emphasize the importance of taking logistics into account when considering where mass-violence takes place in a country. Similarly, Anderton (2014) and Bae & Ott (2008) assert that mass-killing is dependent on the capacity of states to conduct large-scale violence. This dissertation claims that oil installations provide significant logistical capacity to government to commit mass-killing. In Sub-Saharan Africa, multi-national foreign companies such as Shell (in Nigeria), Chevron (in Sudan, Nigeria, Cabinda, and Chad), ExxonMobil (in Chad), Talisman Energy (in Sudan), Elf (in Chad and Nigeria), or Petronas (in Sudan and Chad) are involved in oil exploration/exploitation either exclusively or jointly with a domestic organization. These companies are disposed to invest large sums of money to ensure undisturbed exploitation of the lucrative fields. They not only turn a blind eye to government atrocities, but also finance and contribute to mass-violence. They have developed large infrastructures, logistical capacity, and equipment around the oil facilities they operate such as phones, trucks, roads, helicopters and helicopter ramps, but also weapons and military materials, which they put at the disposition of state security forces (Frynas & Wood, 2001, p.596). Moreover, they commonly hire

private security firms to guard the installations, which subsequently join and support state forces to repress local civilians (Mähler, 2010, p.20). Renner (2002) shows that in Sudan, the army used the roads and air ramps of Chevron to attack and destroy villages close to the oil fields (p.150). In the Niger Delta, the petroleum companies have provided military units, equipment and training to Nigerian security forces (p.155), and their helicopters have been reportedly used in attacks on the local populations (p.168). Paes (2004) asserts that oil companies in the Niger Delta, Cabinda, and Sudan have not only provided airplanes, helicopters and other military equipment to state forces, they have also financed the salaries of the military and contracted "external security experts" to train state forces (p.97). Accordingly, oil installations and the foreign firms that run them provide governments with the logistical capacity to conduct mass-killing in the oil-rich areas through the supply of infrastructure, equipment, weapons, and soldiers.

Building on the strategic logic, this dissertation also argues that alluvial diamonds-rich areas will experience more SSMK during conflicts than resource-poor areas. However, they will experience significantly less violence than oil-rich territories. Similarly to petroleum, the presence of secondary diamonds makes an area particularly valuable and strategic for governments. It not only provides government elites with important revenues from the diamonds trade, it also provides rents through the selling of exploitation rights. Moreover, when rebels occupy diamond rich-areas, they can easily appropriate the rents from the illegal extraction and selling of diamonds to strengthen their military capacity, and therefore increase the threat they pose to the state. In the 1990s, UNITA rebels possessed almost full control over the diamond exports from Angola and used the revenues to finance the insurgency (Renner, 2002, p.161). Accordingly, diamonds-rich territories are strategic areas for governments due to the diamond rents and the exacerbated threat that rebels in these areas represent. Governments will, therefore, have incentives to resort to mass-killing as an extreme strategy to eliminate rebels and their supporters from the area, and continue to benefit from the diamond revenues. In Angola, diamond-rich areas were given as payments to private security firms such as Executive Outcome in exchange for driving UNITA rebels out of these territories (Human Rights Watch, 1999). In Sierra Leone, the government concentrated most of its efforts on re-taking the most important diamond-rich areas from the RUF rebels (Dudek, 2021).

However, it is argued that this effect will be significantly weaker than for petroleum. Primarily, governments are less able to entrench diamonds in a continued system of revenues on legal markets. It is difficult to systematically control who extracts the diamonds as they do not require large capital investments and can be extracted with basic tools. As governments have significantly less control over alluvial diamond revenues than over oil-rents, they will represent a less important source of revenues. Le Billon (2001) claims that the Angolan government could never fully include diamonds into the "formal economy" due to their spread-out locations in the rural and marginal North-East area (p.67).

Additionally, he advances that the extraction of alluvial diamonds is labor-intensive and does not require particular skills or installations (p.70). As a result, the government will have significantly less incentives to displace or eliminate local populations from these areas as they represent well-need labor force. Furthermore, the presence of rebels on diamond-rich territories does not systematically prevent governments from beneficiating from the diamond revenues. Indeed, in Sierra Leone, there have been several instances of government-rebels collusion in these areas whereby state elites receive a percentage of benefits for selling legal certificates for the diamond trade to rebels or by selling diamonds from rebel-held areas on the legal market themselves (Abiodun, 1999, p.50). As alluvial diamond exploitation does not require large capital investments, they are not operated by powerful foreign firms that develop large infrastructure in the region (Paes, 2004, p.95). Accordingly, governments do not benefit from increased logistical capacity in these areas. On the contrary, diamond mines are commonly found in rural or mountainous areas which are more difficult to access for state forces (Le Billon, 2001, p.67). As a result, diamond-rich territories will be significantly less valuable for governments than oil-rich ones and rebels operating in these regions will present a lesser threat to governments. Finally, due to the labor-intensive and low infrastructure nature of alluvial diamonds' exploitation, SSMK will be more costly than in oil-rich areas. Consequently, the hypothesis is:

H3*: During intra-state armed conflicts, areas that are rich in alluvial diamonds, and are zones of previous contestation, will experience more state-sponsored violence against civilians than resources-poor areas, but less than oil-rich territories.*

The following section tests these three hypotheses quantitatively.

6. QUANTITATIVE ANALYSIS

6.1. Data

The datasets chosen to conduct the analysis are the UCDP-GED dataset 20.1 (Sundberg & Melander, 2013) and the PRIO-GRID dataset 2.0 (Tollefsen et al., 2012). The UCDP-GED provides geo-spatial data on the location and intensity of one-sided violence events by government and non-state perpetrators between 1989 and 2019. The only known alternative to the UCDP-GED[3] to obtain systematic data on violence at the micro-level is the ACLED data. However, ACLED only provides data starting in 1997. It would greatly limit the timeframe for the analysis which ends in 2003, as that is the last year for which data on the location of diamonds and petroleum is available in the PRIO-GRID. A wide range of authors that have conducted micro-level studies on violence have used the UCDP-GED (e.g. Arezki et al., 2015; Fjelde and Hultman, 2014; Hinkkainen & Kreutz, 2019; Höglund et al., 2016; Rigterink, 2020; Schutte, 2017). Accordingly, using UCDP-GED facilitates comparison and appeared as the most suitable option.

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[3] Schneider & Bussmann (2013) have developed the KOSVED based on UCDP-GED and ACLED, but it only includes 17 conflicts, not all in Africa.

The PRIO-GRID contains data on the location of alluvial diamonds and onshore petroleum from 1989 to 2003. Those variables have been taken from the PETRODATA (Lujala et al., 2007) and DIADATA (Gilmore et al., 2005) datasets. PRIO-GRID also provides data to control for sub-national characteristics. This dataset has been used by numerous authors working on micro-level resources (Arezki et al., 2015; Buhaug et al., 2011; Hinkkainen & Kreutz, 2019; Koren & Bagozzi, 2017; Rigterink, 2020).

The UCDP-GED is a panel dataset that uses dyadic events as units of observation, but also includes the spatial/temporal geographical grid-cells that form the units of observations in the PRIO-GRID dataset. These grid-cells have a resolution of 0.5 decimal degrees of latitude/longitude, approximately equating to 55×55km at the equator (Tollefsen et al., 2015, p.3). The PRIO-GRID is constituted of two datasets: a cross-sectional one with static variables, and a panel dataset with yearly variables. For the analysis, the UCDP-GED was merged with the two PRIO-GRID datasets. The observations have been aggregated per year, to obtain one grid-cell per year, and filtered for observations in Sub-Saharan Africa. The data is purposefully limited to the period 1989-2003. The final dataset contains 2816 observations with the cell-year as unit of analysis.

6.2. Variables

The dependent variable is operationalized in two different ways. First, to proxy the intensity of SSMK, the dependent variable is the count of civilians killed by government forces in a cell-year (deaths_by_governm). Second, to proxy the likelihood of SSMK, the dependent variable is a dummy coded as 0 if no SSMK occurred in a grid cell-year and 1 if SSMK (at least 25 civilian deaths) occurred (osv_gov). Both variables are constructed using the best fatality estimates from the UCDP-GED. Additionally, both variables are replicated using rebels as perpetrators (deaths_by_rebels and osv_rebel), to provide an overview of the different patterns of violence between government and rebel actors. The independent variables consist of two dummies taken from the PRIO-GRID. For petroleum, it is coded as 0 if there is no petroleum deposit in a cell-year and 1 if there is. For diamonds (diam_sec), it is coded as 0 if there is no alluvial diamond deposit in a cell-year, and 1 if there is at least one.

A number of control variables are included in the analysis. It takes into account a dummy for the presence of gold deposits in a cell-year taken from the PRIO-GRID. Ross (2003) finds that gold can also have an effect on the incidence of violence. Furthermore, it controls for battle events in a cell-year to ensure that SSMK is not just a byproduct of battles between government and rebels. Additionally, lagged dummies for battle events and SSMK in the previous year, taken from the UCDP-GED, are included to account for temporal dependence (see Clayton & Thomson, 2016; Fjelde & Hultman, 2014; Raleigh, 2012). It controls for spatial and demographic characteristics of the cells: the logged distance from the nearest border, the logged distance from the capital, the light density at night in a cell, and the logged

cell's population density (see Fjelde & Hultman, 2014; Hegre et al., 2009; Hinkkainen & Kreutz, 2019; Raleigh, 2012; Schutte, 2017). These variables are taken from the PRIO-GRID. The intensity of night lights is commonly used in the literature to proxy for the level of economic development in an area (e.g. Arezki et al., 2015; Esteban et al., 2015). For the few missing observations, the mean was imputed. For population density, the PRIO-GRID contained data for five years intervals and thus data was available only for the years 1990, 1995, and 2000, considerably reducing the number of observations. Accordingly, the variable was imputed by extrapolating data based on the available years. For the few observations that remained missing (when there were no observations for neither 1990, 1995, nor 2000 for a given cell), the mean value was imputed. As the mean imputations for night lights and population density applied only to a small number of observations, it is not expected to bias the results.

Finally, the analysis includes a control variable for the presence of politically excluded ethnic groups in a cell-year, taken from the Geo-Referenced Ethnic Power Relations dataset (Vogt et al., 2015). This variable is a factor with three levels: no excluded group (base category), one excluded group, and two or more excluded ethnic groups in the cell. This variable is particularly relevant as numerous authors have found that violence is more likely to occur on the territory of politically marginalized ethnic groups (e.g. Basedau & Pierskalla, Buhaug et al., 2011; Clayton & Thomson, 2016; Esteban et al., 2015; Fjelde et al., 2016; Hunziker & Cederman, 2017; Wegenast & Schneider, 2017). Including this control variable, therefore, ensures that the effect of petroleum/diamonds on the incidence of SSMK is not in fact due to the targeting of the excluded groups found in the cell. It controls for the unobserved presence of ethnic groups within grid-cells.

6.3.   Descriptive Statistics and Method

a)   Descriptive Statistics

This section describes important characteristics of the data. Table 1 below presents descriptive statistics for the count independent variable (deaths_by governm), its rebel replicate (deaths_by_rebels), and the four continuous control variables.

Table 1. Descriptive statistics for continuous variables**.**

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
gid	2,816	130,933.000	15,011.000	87,535	117,760.0	142,179	162,396
year	2,816	1,996.000	4.380	1,989	1,993	2,000	2,003
deaths_by_governm	2,816	86.100	2,483.000	0	0	0	119,609
deaths_by_rebels	2,816	19.500	158.000	0	0	1	5,809
capital_distance	2,816	537.000	419.000	5.180	227.000	777.000	1,911.000
border_distance	2,813	177.000	145.000	0.095	55.800	270.000	647.000
night_lights	2,816	0.037	0.050	0.000	0.022	0.037	0.664
pop_density	2,816	79.200	168.000	0.195	15.400	79.200	2,365.000

Regarding the discrete variables, the data shows that rebels were more often involved in events of mass-killing than governments, with 863 events as compared to 530 for government actors. Nevertheless, as shown in table 1 above, government actors were four times deadlier than rebels. This observation underlines the relevance of focusing on *state-sponsored* mass-killing, and echoes Eck and Hultman (2007)'s findings. The data also shows that the presence of secondary diamonds and petroleum is relatively rare. Out of 2816 cell-years, 172 contain at least one secondary diamonds deposit, and 176 possess petroleum. Battle events have occurred in roughly half of the cell-years. In 888 cell-years, there was no excluded group present, while there were 1207 observations with one excluded group, and 295 cell-years with two or more excluded groups. This variable is the only one that contains missing values (426). There were no cell-years that contained both diamonds and petroleum, eliminating any potential problem of multi-collinearity between the two independent variables. Table 2 and table 3 below show that SSMK events are rare, as evidenced by the large majority of zero as compared to ones. SSMK occurred in 55 cell-years that contain petroleum and in 28 that contain diamonds.

Table 2. Frequency of SSMK and petroleum.

	osv_gov	petroleum	N
1	0	0	2165
2	0	1	121
3	1	0	475
4	1	1	55

Table 3. Frequency of SSMK and secondary diamonds.

	osv_gov	diam_sec	N
1	0	0	2142
2	0	1	144
3	1	0	502
4	1	1	28

Figure 1 below shows the distribution of state-sponsored civilian deaths over time for the six deadliest countries, excluding Rwanda. Rwanda was excluded as, with close to 125,000 civilian deaths in one cell in 1994, it is an outlier which obscured the pattern in other countries (see Figure 1, Annex). Each point represents a grid-cell within the country. The deadliest cell is found in Nigeria in 1999 with 2500 deaths, followed by cells in the Democratic Republic of Congo in 1997 with 2000 and close to 1000 civilian deaths in 1998, Liberia with over 1000 deaths in 1990, and Sudan in 1989 with 1000 civilian deaths.

Figure 1. Number of state-sponsored civilian deaths in the six deadliest countries over time, excluding Rwanda.

Civilian deaths per country and year, excluding Rwanda
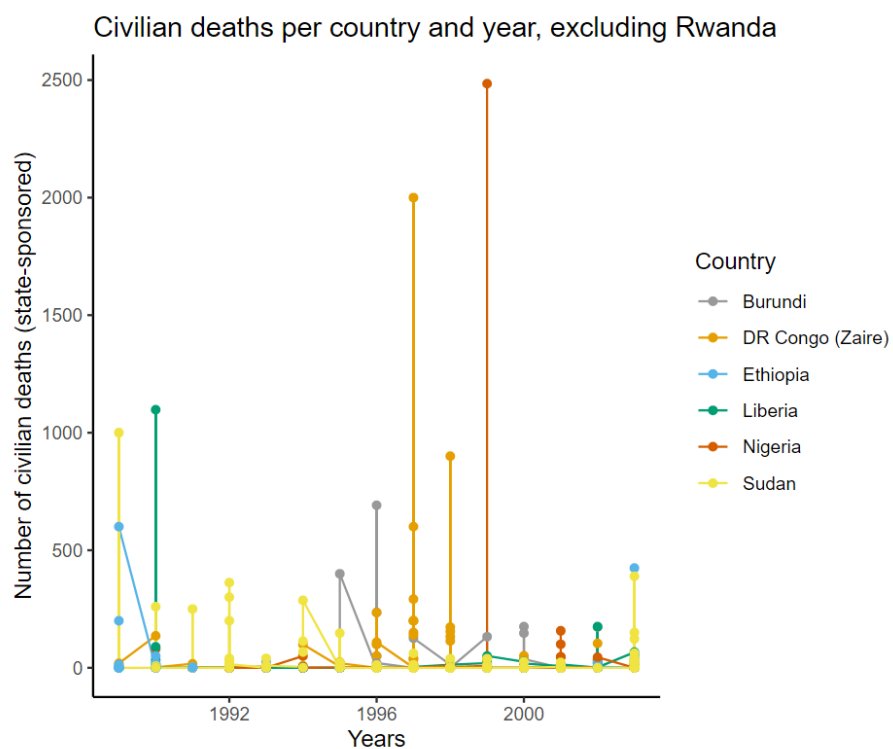
Finally, Figure 2 below shows the total number of civilian deaths for the period 1989-2003 in each country, excluding Rwanda.

Figure 2. Total number of state-sponsored civilian deaths per country for the period 1989-2003.
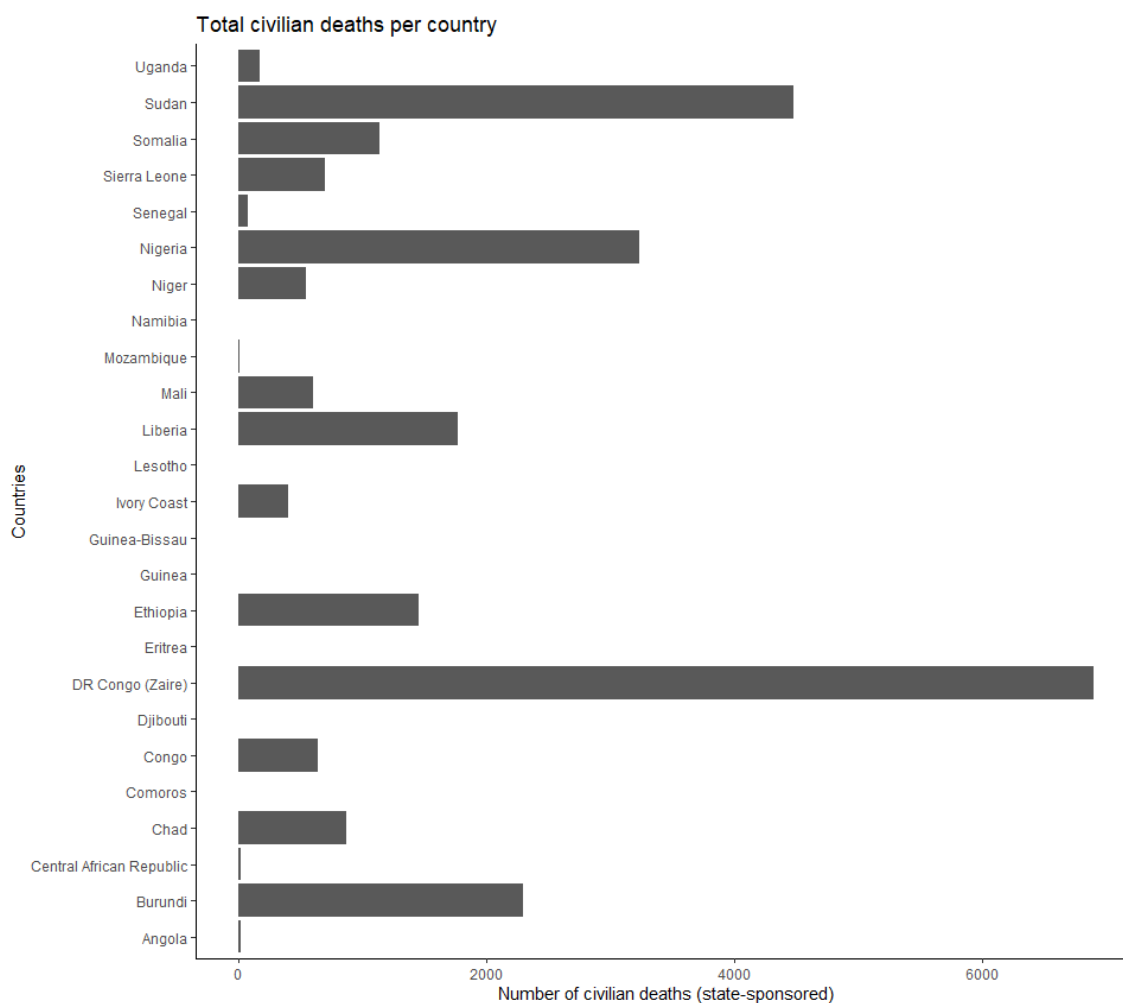
b) Method

To test the three hypotheses, two regressions are performed. First, to examine the impact of petroleum and diamonds on the *intensity* of SSMK, it runs a negative binomial regression with year and country fixed-effects and with robust standard errors clustered at the grid-cell level. The country fixed-effects aim to account for in-between countries unobserved heterogeneity that is correlated with the other covariates, and the year fixed-effects control for unobserved changes over the years (Vargas, 2009, p.17). Moreover, the standard errors clustered at the grid-cell level account for heterogeneity between grid-cells, and for the fact that such heterogeneity is correlated within a given grid-cell overtime (Abadie et al., 2017, p.1). The use of fixed-effects and clustered errors reduce the problems of omitted variables bias and serial correlation (Vargas, 2009, p.18). The negative binomial is the method most suited to the data. It is particularly designed for count variables, it is adapted for rare events panel data with over-dispersion (a majority of zero values alongside extremely high numbers) as is the case for the count

dependent variable (deaths_by_governm), and it accounts for contagion between neighboring grid-cells (Fjelde & Hultman, 2014, p.1243). This method has also been adopted by most authors performing comparable analyses with similar datasets (e.g. Clayton & Thomson, 2016; Fjelde & Hultman, 2014; Hinkkainen & Kreutz, 2019; Schutte, 2017; Wimmer & Minner, 2020). Second, a logit regression is performed to examine how petroleum and diamonds influence the *likelihood* of SSMK (as a dummy variable). This regression is given similar specifications: country and year fixed-effects, and robust errors clustered at the grid-cell level.

c) Results

The results in tables 4 and 5 support H1 and H2. Table 4 presents the negative binomial regression. The coefficient for petroleum is positive and significant at least at the 0.05 level across all models. As hypothesized in both H1 and H2, the presence of petroleum in a grid-cell increases the number of civilians killed by government. Interestingly, the coefficient for battle events is negative and significant at the 0.001 level. This indicates that state actors are less deadly for civilians during battle events, underlining that SSMK follows its own logic during armed conflicts, rather than solely being a byproduct of violent confrontations. This observation echoes findings by Raleigh (2012, p.477). However, the coefficient for battle events in the previous year is positive and significant (except in model 5). This finding is in line with Fjelde and Hultman (2014) who find higher levels of violence after battle events (p.1249). This observation provides support for the strategic logic articulated in H1: the presence of petroleum and of contestation the previous year increases the number of state-sponsored civilian deaths in a given cell.

Table 4 also provides support for the opportunistic logic conveyed in H2. When adding the variable controlling for the presence of excluded ethnic groups in model 5, the battle variable loses significance. In contrast, both the presence of one and of two or more excluded groups in a cell present positive and significant coefficients. Importantly, petroleum not only remains significant, its coefficient becomes larger and significant at the 0.001 level. In line with the opportunistic logic underlined in H2, the presence of petroleum increases the number of civilian deaths, even if the area is not a zone of violent contestation by the warring parties. This effect is stronger when excluded ethnic groups occupy the territory.

Table 4. Negative binomial regression for the count dependent variable: deaths by government.

Negative Binomial regression for Dependent variable: Civilian deaths by government					
	Model 1	Model 2	Model 3	Model 4	Model 5
Diamonds	0.154	0.165	0.334	0.441	0.279
	(0.585)	(0.586)	(0.478)	(0.473)	(0.561)
Petroleum	1.425**	1.379**	1.276**	1.135*	2.133***
	(0.468)	(0.465)	(0.448)	(0.534)	(0.542)
Gold		0.441	1.101	1.283	0.690
		(1.168)	(1.235)	(1.364)	(0.989)
Battle			-1.251***	-1.219***	-1.470***
			(0.246)	(0.248)	(0.286)
Battle (t-1)			0.789**	0.829**	0.443
			(0.289)	(0.292)	(0.271)
Deaths by government (t-1)			0.823**	0.826**	0.806**
			(0.277)	(0.288)	(0.306)
Population density (log)				0.139	0.175+
				(0.095)	(0.097)
Light density at night				-0.330	-5.084
				(5.263)	(3.497)
Distance to border (log)				0.015	-0.182
				(0.123)	(0.141)
Distance to capital (log)					-0.453**
					(0.155)
excluded1					1.049***
					(0.276)
excluded2+					1.160**
					(0.395)
Num.Obs.	2744	2744	2744	2744	2325
R2 Pseudo	0.105	0.105	0.110	0.110	0.120
AIC	6131.3	6133.2	6105.2	6109.1	5589.0
BIC	6338.4	6346.2	6336.0	6357.7	5842.0
Log.Lik.	-3030.658	-3030.578	-3013.600	-3012.574	-2750.489
Std.Errors	by: gid	by: gid	by: gid	by: gid	by: gid
FE: country	X	X	X	X	X
FE: year	X	X	X	X	X

$+ p < 0.1$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$

Note: Robust standard errors in brackets

The results in table 4 do not support H3. While the coefficient for diamonds is positive as expected, it is not significant. The presence of diamonds does have less influence than petroleum as predicted in H3, but it also does not have any significant effect on the intensity of SSMK. Regarding the other control variables, the lagged deaths by government variable has a positive and significant coefficient. More civilians killed on the cell the previous year leads to more civilian deaths the following year, suggesting that SSMKs are recurrent in the same areas. Finally, logged distance to capital has a negative and significant coefficient, implying that cells situated closer to the capital experience more intense state-sponsored violence. This finding echoes results by Fjelde and Hultman (2014) but contrasts with Schutte (2017)'s claim that states are more indiscriminate further from the capital. Nevertheless, Schutte considers violence on the form of collateral damage. The contrasting results, therefore, reflect that various types of violence follow distinct dynamics.

Table 5 below presents the results of the logistic regression. The coefficient for petroleum is positive and significant across all models. As hypothesized in the first parts of H1 and H2, the presence of petroleum leads to a higher likelihood of SSMK occurring in a given cell. Moreover, SSMKs are significantly less likely during battle events. The coefficient for battle events in the previous year is also positive but is only significant at the 0.1 level in model 3 and 4, and loses all significance in model 5. Accordingly, this regression provides a weaker support for the strategic logic in H1. The presence of petroleum increases the likelihood of SSMK, but previous zones of contestation fall short of accepted significance. The models also only partly support the opportunistic logic laid down in H2. The presence of one and of two or more excluded ethnic groups have the expected positive sign but are not significant. Petroleum increases the likelihood of SSMK in a cell, but the presence of contestation the previous year and of excluded groups do not. Finally, the results do not provide support for H3. The coefficient for diamonds remains positive but insignificant. It cannot be claimed that SSMK is more likely in diamonds-rich areas than in resources-poor cells. Regarding the other control variables, mass-killing occurring the previous year significantly increases the likelihood of SSMK in a given cell. Additionally, in line with Wegenast and Schneider (2017)'s findings on repression, state-sponsored violence is more likely in more populated cells. As for the negative binomial, distance from the capital is negatively associated with the likelihood of SSMK.

Table 5. Logistic regression for the dummy dependent variable: SSMK by government.

Logistic regression for Dependent variable: one-sided violence by government

	Model 1	Model 2	Model 3	Model 4	Model 5
Diamonds	0.249	0.280	0.347	0.379	0.057
	(0.269)	(0.272)	(0.272)	(0.273)	(0.342)
Petroleum	1.009***	0.980***	0.872***	0.741**	0.650*
	(0.244)	(0.238)	(0.246)	(0.272)	(0.315)
Gold		0.890+	0.824	0.858	0.819
		(0.510)	(0.553)	(0.550)	(0.586)
Battle			-1.427***	-1.400***	-1.469***
			(0.162)	(0.160)	(0.165)
Battle (t-1)			0.232+	0.266+	0.162
			(0.140)	(0.142)	(0.152)
Osv by government (t-1)			1.083***	1.048***	1.041***
			(0.189)	(0.190)	(0.194)
Population density (log)				0.171**	0.169*
				(0.061)	(0.074)
Light density at night				0.354	0.245
				(1.033)	(1.068)
Distance to border (log)				0.060	0.018
				(0.070)	(0.075)
Distance to capital (log)					-0.226*
					(0.090)
excluded1					0.293
					(0.185)
excluded2+					0.338
					(0.226)
Num.Obs.	2758	2758	2758	2758	2337
R2 Pseudo	0.166	0.167	0.227	0.231	0.231
AIC	2323.6	2321.6	2167.5	2161.6	1933.8
BIC	2536.8	2540.7	2404.4	2416.2	2192.9
Log.Lik.	-1125.777	-1123.800	-1043.748	-1037.776	-921.907
Std.Errors	by: gid	by: gid	by: gid	by: gid	by: gid
FE: country	X	X	X	X	X
FE: year	X	X	X	X	X

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Robust standard errors in brackets

To conclude, the results provide support for both H1 and H2, but not for H3. As hypothesized in the first parts of H1 and H2, state-sponsored violence is both more *intense* and more *likely* in petroleum-rich areas. Nevertheless, the analysis suggests that the onset of SSMK and its intensity follow different logics. The strategic and opportunity logics hypothesized seem better suited to explain the intensity of state-sponsored violence than its onset. Following the strategic logic articulated in H1, SSMK is more intense in petroleum-rich areas and when these were zones of violent contestation the previous year. In line with the opportunistic logic in H2, SSMK is also more intense in petroleum-rich areas, even when these areas are not zones of contestation, and even more when these are occupied by one or more excluded ethnic groups. However, the onset of SSMK is more likely on petroleum-rich territories, but not significantly more in previous zones of contestation or on territories occupied by excluded groups. In contradiction to H3, SSMK is neither more intense nor more likely in diamonds-rich areas.

Finally, while this dissertation focuses on state-sponsored violence, it still attempted to provide a short overview of the distinct patterns linking state and rebel-sponsored violence to natural resources during conflicts. Consequently, it replicated the two regressions with civilian deaths and mass-killing events by non-state perpetrators as dependent variables. The results can be found in tables 1 and 2 in the Annex. Interestingly, VAC by rebels is more intense in both petroleum and diamond-rich areas. Additionally, it is more likely in diamond-rich areas (significant in models 4 and 5) but not in petroleum-rich cells. Rebel violence is also neither more likely nor more intense in cells where battle events occurred the previous year nor in territories occupied by excluded groups. These results underline the importance of researching state and non-state VAC as distinct phenomena, as they are influenced differently by the presence of diamonds and petroleum, and follow distinctive logics. It is crucial to disaggregate violence per actor and per resources. This observation might partly explain why this dissertation's findings contrast with results found by Wimmer and Miner (2020) who have not disaggregated violence per actor and only focus on ethnic settlement territories.

d) *Robustness-checks*

To ensure the validity of the findings, a number of robustness-checks have been conducted. All regression tables (3-9) can be found in the Annex. First, the Variance Inflation Factor of the models was measured to control for problems of multicollinearity between the variables. No score was higher than five, suggesting that none of the variables were subject to problems of multicollinearity. Second, it replicated the negative binomial and logistic regressions by using errors clustered at the country level. Petroleum remained significant across all models (only at the 0.1 level in model 4 for the negative binomial and model 5 in the logistic). Third, it repeated the logistic regression with robust errors, and country and year dummies to ensure that the use of a fixed-effect package did not distort the logistic regression. Petroleum remained significant across all models. Fourth, it ran an Ordinary Least Squared (OLS) regression with country and year fixed-effects and errors clustered at the grid-cell level. This

robustness check is suggested by Timoneda (2021) who claims that the OLS regression can better deal with fixed-effects panel data with a rare event dummy dependent variable than the logistic. It yields the same result as the logistic regression, except for model 5 where petroleum is only significant at the 0.1 level. Fifth, the negative binomial regression was run using high estimates provided by the UCDP-GED, rather than the best estimates. This check aimed to ensure that there was no bias brought by the best estimates as, in some cases, the best estimate was zero but there were civilian deaths in the high estimate. The results remain the same. As a final test, it ran both the negative binomial and the logistic regression excluding the deadliest oil-rich cell-year which is found in Nigeria. The results remained significant across all relevant models.

Finally, a last check controls for an alternative explanation. It replicates both regressions including a new model (see tables 10 and 11, Annex). Koren and Bagozzi (2017) have argued that, in regions ridden by armed conflicts, VAC is more likely in rural-agricultural areas. In contrast, Raleigh (2012) and Höglund et al. (2016) find that violence is more likely and intense in urban centres. Accordingly, model 6 includes two continuous variables taken from the PRIO-GRID to control for the urban/rural nature of cells: the travel time to the nearest urban center and the percentages of the cell covered in urban areas. Petroleum remains positive and significant in model 6, proving resistant to this alternative explanation. To conclude, the results are robust to various models and specificities.

7. CONCLUSION

This dissertation aimed to investigate how the sub-national location of onshore oil and alluvial diamonds influence the incidence of state-sponsored mass-killing during armed conflicts in Sub-Saharan Africa. It has argued that the presence of petroleum in an area increases state-sponsored violence against civilians through two rational logics. According to the strategic logic (H1), rebel contestation in oil-rich areas represents a vital threat to the government due to rebels' disruption of valuable oil-rents and the local support they can generate. SSMK is therefore used as an extreme strategy to eradicate the rebel threat to the government's oil revenues and the civilian population's will and capacity to challenge the oil exploitation. According to the opportunistic logic (H2), state elites make opportunistic use of the blurriness brought by armed conflict to militarize oil-rich territories, violently appropriate the land, and eliminate resisting local populations. This logic will be particularly violent when politically excluded ethnic groups occupy the oil-rich areas. This dissertation has argued that these two logics are reinforced by an opportunity mechanism. Large foreign-owned oil facilities provide the logistical capacity for governments to conduct SSMK in petroleum-rich areas. Finally, it has been claimed that the presence of alluvial diamonds increases state-sponsored violence through the strategic logic, but less than the presence of petroleum (H3). With the quantitative analysis, this dissertation finds support for both the strategic (H1) and opportunistic logics for petroleum (H2), but not for diamonds (H3). It also finds that the hypothesized logics explain the intensity better than the onset of SSMK. While the presence of

petroleum increases both the intensity and likelihood of SSMK, contestation the previous year and the presence of excluded ethnic groups on oil-rich territories increase the intensity, but not the onset of violence. In contrast, the presence of diamonds does not increase neither the likelihood nor intensity of SSMK.

Accordingly, this dissertation underlines the relevance of exploring the geography of state-sponsored violence, and points to oil-rich territories as areas that are particularly at risk of intense mass-killing during armed conflicts in Sub-Saharan Africa. As a result, these regions should be particularly monitored during conflicts and considered a priority for the deployment of international troops to protect civilians. Ongoing conflicts in oil-rich Western Cameroon and the Cabo Delgado province of Mozambique, for instance, should be particularly scrutinized. Nevertheless, this dissertation also possesses limitations. First, the analysis is limited to 2003 and ignores more recent developments in armed conflicts in Sub-Saharan Africa. Particularly, governments are increasingly delegating violence to pro-government militias, blurring the lines between state and non-state perpetrators (Stepanova, 2009, p.44). A relevant avenue for further research would be to examine how the presence of natural resources influence patterns of VAC by pro-government militias. Second, while this dissertation controls for the presence of excluded ethnic groups on a cell, it might fail to capture the full effect of ethnicity on the geography of SSMK. A major limitation is that it cannot completely rule out the possibility that the effect of petroleum on SSMK is driven by specific characteristics of ethnic groups present in the petroleum-rich cells. Further research could replicate this analysis by taking into account the characteristics of the ethnic groups present on the cells such as linguistic/cultural and religious polarization. Third, this dissertation does not consider counterfactuals, namely, petroleum-rich areas which did not experience SSMK during a conflict. Investigating counterfactuals in further research could allow to test and refine the argument.

Lastly, the results are limited to Sub-Saharan Africa. It is therefore crucial to ask whether the argument can travel to other world regions such as Latin America or Southeast Asia. In Latin America, the majority of oil facilities are ran by domestically-owned petroleum companies. Due to the less prominent presence of foreign companies, the "opportunity mechanism" of petroleum might not travel well to Latin American countries. Additionally, rebels might not be able to exploit local grievances, as domestically-owned companies produce significantly less grievances than foreign firms (Wegenast & Schneider, 2017), thereby undermining the applicability of the strategic logic. In contrast, the case of Aceh, Indonesia, suggests that the argument could travel better to Southeast Asia. The militarization of the region after the discovery of oil in 1971, the provision of military training and equipment to the Indonesian military by ExxonMobile, and the state-sponsored violent repression and large-scale abuses in oil-rich Aceh (Renner, 2002, p.155) reveal signs of the two logics and the opportunity mechanism at play. A promising avenue for further research, therefore, lies in applying the arguments developed in this dissertation to Southeast Asia.

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Figure 1. Number of state-sponsored civilian deaths in the six deadliest countries over time.

Civilian deaths per country and year
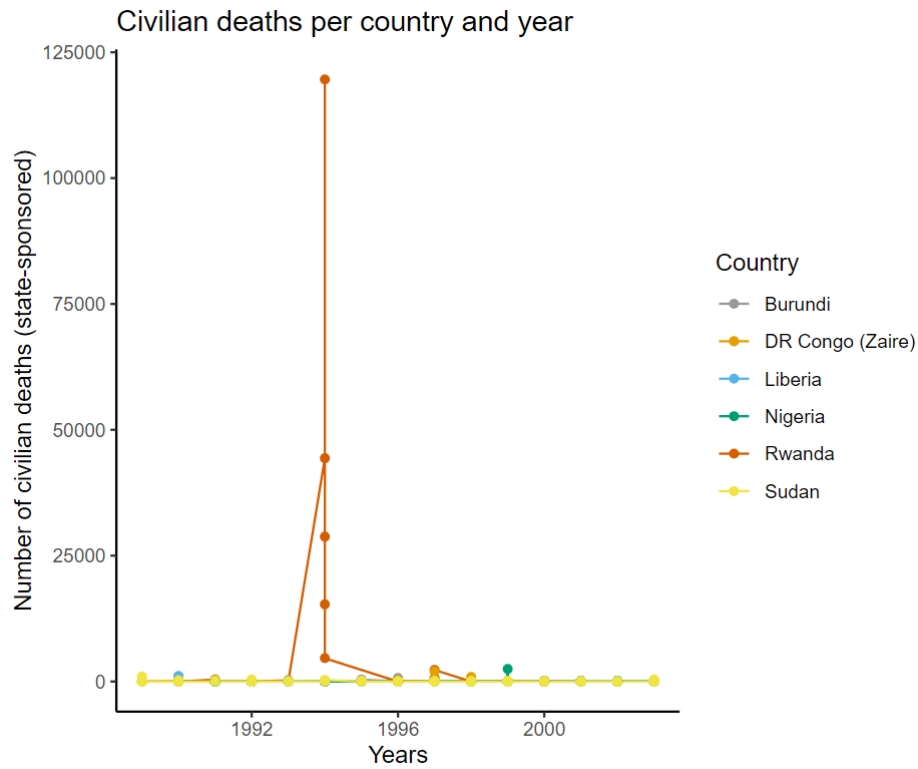
Table 1. Negative binomial regression for dependent variable: civilian deaths by rebels.

Negative Binomial regression for Dependent variable: Civilian deaths by rebels

	Model 1	Model 2	Model 3	Model 4	Model 5
Diamonds	0.589*	0.584*	0.589*	0.719**	0.556*
	(0.232)	(0.234)	(0.261)	(0.255)	(0.265)
Petroleum	1.274*	1.274*	1.637**	1.530*	2.016***
	(0.611)	(0.612)	(0.594)	(0.620)	(0.608)
Gold		-0.228	-0.162	-0.175	-0.370
		(0.418)	(0.450)	(0.455)	(0.488)
Battle			-1.363***	-1.365***	-0.812***
			(0.197)	(0.201)	(0.184)
Battle (t-1)			-0.021	0.038	0.106
			(0.162)	(0.166)	(0.165)
Deaths by rebels (t-1)			0.597***	0.572***	0.515**
			(0.168)	(0.171)	(0.182)
Population density (log)				0.124+	0.169*
				(0.069)	(0.084)
Light density at night				-2.254	-3.044
				(2.373)	(2.251)
Distance to border (log)				0.258**	0.304**
				(0.089)	(0.095)
Distance to capital (log)					0.387*
					(0.162)
excluded1					-0.177
					(0.281)
excluded2+					-0.316
					(0.361)
Num.Obs.	2723	2723	2723	2723	2309
R2 Pseudo	0.054	0.054	0.061	0.062	0.076
AIC	9765.3	9767.2	9705.1	9698.6	8532.8
BIC	9972.1	9980.0	9935.5	9946.8	8785.6
Log.Lik.	-4847.658	-4847.609	-4813.534	-4807.322	-4222.407
Std.Errors	by: gid	by: gid	by: gid	by: gid	by: gid
FE: country	X	X	X	X	X
FE: year	X	X	X	X	X

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2. Logistic regression for dependent variable: one-sided violence by rebels.

Logistic regression for Dependent variable: one-sided violence by rebels

	Model 1	Model 2	Model 3	Model 4	Model 5
Diamonds	0.368	0.362	0.340+	0.390*	0.504*
	(0.237)	(0.238)	(0.197)	(0.198)	(0.197)
Petroleum	0.324	0.353	0.251	0.327	0.407
	(0.303)	(0.282)	(0.252)	(0.259)	(0.291)
Gold		-0.318	-0.321	-0.206	-0.285
		(0.515)	(0.526)	(0.529)	(0.524)
Battle			-1.526***	-1.519***	-1.526***
			(0.158)	(0.159)	(0.167)
Battle (t-1)			0.230	0.202	0.160
			(0.140)	(0.139)	(0.146)
Osv by rebels (t-1)			0.862***	0.866***	0.874***
			(0.143)	(0.143)	(0.148)
Population density (log)				-0.019	-0.026
				(0.049)	(0.054)
Light density at night				-1.694	-1.973
				(3.122)	(3.143)
Distance to border (log)				0.153**	0.130*
Distance to capital (log)					0.034
					(0.086)
excluded1					0.078
					(0.164)
excluded2+					0.187
					(0.217)
Num.Obs.	2723	2723	2723	2723	2309
R2 Pseudo	0.249	0.249	0.311	0.314	0.302
AIC	2624.0	2625.4	2420.4	2418.7	2144.4
BIC	2830.8	2838.1	2650.9	2666.9	2397.2
Log.Lik.	-1276.980	-1276.691	-1171.218	-1167.344	-1028.209
Std.Errors	by: gid	by: gid	by: gid	by: gid	by: gid
FE: country	X	X	X	X	X
FE: year	X	X	X	X	X

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3. Negative binomial for dependent variable: civilian deaths by government (country clustered).

Negative Binomial regression for Dependent variable: Civilian deaths by government

	Model 1	Model 2	Model 3	Model 4	Model 5
Diamonds	0.154	0.165	0.334	0.441	0.279
	(0.411)	(0.435)	(0.330)	(0.287)	(0.443)
Petroleum	1.425**	1.379***	1.276***	1.135+	2.133**
	(0.440)	(0.329)	(0.193)	(0.613)	(0.740)
Gold		0.441	1.101	1.283	0.690
		(1.502)	(1.612)	(1.661)	(1.117)
Battle			-1.251*	-1.219+	-1.470*
			(0.621)	(0.624)	(0.621)
Battle (t-1)			0.789	0.829	0.443
			(0.609)	(0.603)	(0.632)
Deaths by government (t-1)			0.823*	0.826+	0.806+
			(0.409)	(0.492)	(0.443)
Population density (log)				0.139	0.175
				(0.176)	(0.164)
Light density at night				-0.330	-5.084
				(5.520)	(3.482)
Distance to border (log)				0.015	-0.182
				(0.222)	(0.220)
Distance to capital (log)					-0.453***
					(0.116)
excluded1					1.049+
					(0.585)
excluded2+					1.160*
					(0.501)
Num.Obs.	2744	2744	2744	2744	2325
R2 Pseudo	0.105	0.105	0.110	0.110	0.120
AIC	6131.3	6133.2	6105.2	6109.1	5589.0
BIC	6338.4	6346.2	6336.0	6357.7	5842.0
Log.Lik.	-3030.658	-3030.578	-3013.600	-3012.574	-2750.489
Std.Errors	by: country	by: country	by: country	by: country	by: country
FE: country	X	X	X	X	X
FE: year	X	X	X	X	X

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 4. Logistic regression for dependent variable: one-sided violence by government (country clustered).

Logistic regression for Dependent variable: One-Sided Violence (OSV) by government

	Model 1	Model 2	Model 3	Model 4	Model 5
Diamonds	0.249	0.280+	0.347*	0.379*	0.057
	(0.155)	(0.166)	(0.170)	(0.179)	(0.462)
Petroleum	1.009**	0.980**	0.872**	0.741*	0.650+
	(0.317)	(0.317)	(0.292)	(0.294)	(0.351)
Gold		0.890+	0.824	0.858	0.819
		(0.502)	(0.550)	(0.528)	(0.553)
Battle			-1.427***	-1.400***	-1.469***
			(0.352)	(0.339)	(0.335)
Battle (t-1)			0.232	0.266+	0.162
			(0.162)	(0.151)	(0.149)
Osv by government (t-1)			1.083***	1.048***	1.041***
			(0.197)	(0.191)	(0.184)
Population density (log)				0.171*	0.169
				(0.083)	(0.110)
Light density at night				0.354	0.245
				(1.073)	(1.121)
Distance to border (log)				0.060	0.018
				(0.124)	(0.122)
Distance to capital (log)					-0.226*
					(0.095)
excluded1					0.293
					(0.275)
excluded2+					0.338
					(0.275)
Num.Obs.	2758	2758	2758	2758	2337
R2 Pseudo	0.166	0.167	0.227	0.231	0.231
AIC	2323.6	2321.6	2167.5	2161.6	1933.8
BIC	2536.8	2540.7	2404.4	2416.2	2192.9
Log.Lik.	-1125.777	-1123.800	-1043.748	-1037.776	-921.907
Std.Errors	by: country	by: country	by: country	by: country	by: country
FE: country	X	X	X	X	X
FE: year	X	X	X	X	X

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5. Logistic regression with robust errors and dummy variables: country and year.

	Logistic regression				
	Dependent variable:				
	osv_gov				
	(1)	(2)	(3)	(4)	(5)
diam_sec1	0.2	0.2	0.3	0.3	0.01
	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
petroleum1	1.0***	1.0***	0.9***	0.7***	0.7**
	(0.2)	(0.2)	(0.2)	(0.3)	(0.3)
gold1		0.9*	0.8*	0.8*	0.8
		(0.5)	(0.5)	(0.5)	(0.5)
battle1			-1.4***	-1.4***	-1.4***
			(0.1)	(0.1)	(0.1)
previous_battle			0.2	0.2	0.1
			(0.1)	(0.1)	(0.2)
previous_osv_gov			1.1***	1.0***	1.0***
			(0.2)	(0.2)	(0.2)
logpop_density				0.2***	0.2***
				(0.1)	(0.1)
night_lights				0.6	0.3
				(1.1)	(1.2)
logborder_distance				0.04	-0.01
				(0.1)	(0.1)
logcapital_distance					-0.2***
					(0.1)
excluded1					0.3**
					(0.2)
excluded2+					0.4*
					(0.2)
Constant	132.0***	133.0***	150.0***	153.0***	135.0***
	(29.6)	(29.7)	(31.1)	(30.8)	(31.2)
McFadden Adj. R Sq.	0.14	0.14	0.2	0.2	0.2
Observations	2,816	2,816	2,816	2,813	2,390
Log Likelihood	-1,142.0	-1,139.0	-1,060.0	-1,055.0	-936.0
Akaike Inf. Crit.	2,341.0	2,339.0	2,187.0	2,180.0	1,947.0

Note: *p<0.1; **p<0.05; ***p<0.01

Included controls not shown are: country and year

Table 6. OLS regression for dependent variable: one-sided violence by government.

OLS regression for Dependent variable: one-sided violence by government

	Model 1	Model 2	Model 3	Model 4	Model 5
Diamonds	0.027	0.030	0.030	0.038	0.007
	(0.029)	(0.030)	(0.027)	(0.027)	(0.033)
Petroleum	0.139***	0.133***	0.117***	0.087*	0.081+
	(0.035)	(0.035)	(0.032)	(0.036)	(0.043)
Gold		0.131	0.120	0.119	0.114
		(0.089)	(0.079)	(0.080)	(0.079)
Battle			-0.193***	-0.190***	-0.212***
			(0.021)	(0.021)	(0.023)
Battle (t-1)			0.019	0.023	0.015
			(0.015)	(0.015)	(0.016)
Osv by government (t-1)			0.205***	0.199***	0.194***
			(0.035)	(0.035)	(0.036)
Population density (log)				0.017*	0.017*
				(0.007)	(0.008)
Light density at night				0.241	0.194
				(0.203)	(0.212)
Distance to border (log)				0.008	0.004
				(0.009)	(0.010)
Distance to capital (log)					-0.028*
					(0.014)
excluded1					0.046*
					(0.022)
excluded2+					0.056
					(0.035)
Num.Obs.	2816	2816	2816	2813	2390
R2	0.156	0.157	0.216	0.219	0.224
R2 Adj.	0.144	0.144	0.203	0.206	0.207
R2 Within	0.007	0.009	0.078	0.082	0.093
AIC	2307.0	2305.2	2108.4	2100.8	1938.6
BIC	2556.6	2560.8	2381.8	2386.0	2227.5
Log.Lik.	-1111.494	-1109.615	-1008.206	-1002.384	-919.279
Std.Errors	by: gid	by: gid	by: gid	by: gid	by: gid
FE: country	X	X	X	X	X
FE: year	X	X	X	X	X

$+ p < 0.1$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$

Table 7. Negative binomial for dependent variable: deaths by government (high estimates).

Negative Binomial regression for Dependent variable: high estimate of civilian deaths by government

	Model 1	Model 2	Model 3	Model 4	Model 5
Diamonds	-0.273	-0.280	-0.241	0.003	0.371
	(0.540)	(0.540)	(0.482)	(0.454)	(0.439)
Petroleum	1.100**	1.126**	1.431**	1.232*	1.166*
	(0.411)	(0.418)	(0.452)	(0.517)	(0.501)
Gold		-0.437	-0.488	0.176	0.591
		(0.590)	(0.662)	(0.785)	(0.818)
Battle			-0.998***	-1.128***	-1.613***
			(0.233)	(0.248)	(0.259)
Battle (t-1)				0.762**	0.710*
				(0.268)	(0.279)
Deaths by government (t-1)				0.452	0.796*
				(0.295)	(0.334)
Population density (log)				0.101	0.009
				(0.092)	(0.099)
Light density at night				-0.838	-0.401
				(4.131)	(2.891)
Distance to border (log)				0.096	-0.103
				(0.100)	(0.114)
Distance to capital (log)					-1.110***
					(0.188)
excluded1					0.841**
					(0.264)
excluded2+					-0.351
					(0.383)
Num.Obs.	2758	2758	2758	2758	2337
R2 Pseudo	0.088	0.088	0.090	0.091	0.101
AIC	7437.9	7439.7	7427.1	7425.5	6705.2
BIC	7651.1	7658.8	7652.1	7680.1	6964.3
Log.Lik.	-3682.942	-3682.858	-3675.542	-3669.734	-3307.623
Std.Errors	by: gid	by: gid	by: gid	by: gid	by: gid
FE: country	X	X	X	X	X
FE: year	X	X	X	X	X

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8. Negative binomial for dependent variable: deaths by government (excluding deadliest oil-rich cell).

Negative Binomial regression for Dependent variable: Civilian deaths by government (excluding deadliest petroleum-rich cell)

	Model 1	Model 2	Model 3	Model 4	Model 5
Diamonds	0.046	0.061	0.262	0.383	0.151
	(0.580)	(0.583)	(0.484)	(0.473)	(0.548)
Petroleum	0.942*	0.874+	0.843+	0.885*	1.496***
	(0.456)	(0.453)	(0.439)	(0.443)	(0.426)
Gold		0.688	1.324	1.911	0.877
		(1.312)	(1.392)	(1.590)	(1.127)
Battle			-1.259***	-1.245***	-1.418***
			(0.241)	(0.242)	(0.270)
Battle (t-1)			0.837**	0.872**	0.422
			(0.292)	(0.291)	(0.264)
Deaths by government (t-1)			0.543*	0.500*	0.432+
			(0.253)	(0.249)	(0.262)
Population density (log)				0.189*	0.200*
				(0.094)	(0.094)
Light density at night				-3.968+	-5.706**
				(2.237)	(1.950)
Distance to border (log)				0.018	-0.191
				(0.121)	(0.136)
Distance to capital (log)					-0.491**
					(0.150)
excluded1					0.912***
					(0.272)
excluded2+					1.211**
					(0.386)
Num.Obs.	2742	2742	2742	2742	2323
R2 Pseudo	0.106	0.106	0.111	0.112	0.122
AIC	6089.6	6091.2	6064.2	6065.0	5543.9
BIC	6296.7	6304.2	6295.0	6313.5	5796.9
Log.Lik.	-3009.793	-3009.604	-2993.117	-2990.510	-2727.938
Std.Errors	by: gid	by: gid	by: gid	by: gid	by: gid
FE: country	X	X	X	X	X
FE: year	X	X	X	X	X

$+ p < 0.1$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$

Table 9. Logistic regression for dependent variable: one-sided violence by government (excluding deadliest oil-rich cell).

Logistic regression for Dependent variable: one-sided violence by government
(excluding the deadliest petroleum-rich cell)

	Model 1	Model 2	Model 3	Model 4	Model 5
Diamonds	0.248	0.278	0.345	0.377	0.056
	(0.269)	(0.272)	(0.272)	(0.273)	(0.342)
Petroleum	0.983***	0.955***	0.849***	0.722**	0.626*
	(0.245)	(0.238)	(0.247)	(0.274)	(0.317)
Gold		0.894+	0.828	0.862	0.823
		(0.512)	(0.555)	(0.552)	(0.589)
Battle			-1.426***	-1.399***	-1.468***
			(0.162)	(0.160)	(0.165)
Battle (t-1)			0.233+	0.268+	0.163
			(0.140)	(0.142)	(0.152)
Osv by government (t-1)			1.078***	1.042***	1.034***
			(0.190)	(0.191)	(0.195)
Population density (log)				0.173**	0.172*
				(0.061)	(0.074)
Light density at night				0.283	0.193
				(1.007)	(1.044)
Distance to border (log)				0.059	0.017
				(0.070)	(0.075)
Distance to capital (log)					-0.227*
					(0.090)
excluded1					0.289
					(0.186)
excluded2+					0.330
					(0.226)
Num.Obs.	2756	2756	2756	2756	2335
R2 Pseudo	0.165	0.166	0.225	0.230	0.230
AIC	2320.9	2318.9	2165.5	2159.3	1931.6
BIC	2534.1	2538.0	2402.4	2413.9	2190.6
Log.Lik.	-1124.444	-1122.451	-1042.747	-1036.661	-920.789
Std.Errors	by: gid	by: gid	by: gid	by: gid	by: gid
FE: country	X	X	X	X	X
FE: year	X	X	X	X	X

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10. Negative binomial for depend variable: deaths by government (alternative explanation).

Negative Binomial regression for Dependent variable: Civilian deaths by government

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Diamonds	0.154	0.165	0.334	0.441	0.279	0.278
	(0.585)	(0.586)	(0.478)	(0.473)	(0.561)	(0.555)
Petroleum	1.425**	1.379**	1.276**	1.135*	2.133***	1.973***
	(0.468)	(0.465)	(0.448)	(0.534)	(0.542)	(0.546)
Gold		0.441	1.101	1.283	0.690	0.534
		(1.168)	(1.235)	(1.364)	(0.989)	(0.970)
Battle			-1.251***	-1.219***	-1.470***	-1.487***
			(0.246)	(0.248)	(0.286)	(0.287)
Battle (t-1)			0.789**	0.829**	0.443	0.435
			(0.289)	(0.292)	(0.271)	(0.267)
Deaths by government (t-1)			0.823**	0.826**	0.806**	0.774*
			(0.277)	(0.288)	(0.306)	(0.306)
Population density (log)				0.139	0.175+	0.176+
				(0.095)	(0.097)	(0.100)
Light density at night				-0.330	-5.084	-4.201
				(5.263)	(3.497)	(4.158)
Distance to border (log)				0.015	-0.182	-0.166
				(0.123)	(0.141)	(0.139)
Distance to capital (log)					-0.453**	-0.455**
					(0.155)	(0.162)
excluded1					1.049***	1.020***
					(0.276)	(0.278)
excluded2+					1.160**	1.211**
					(0.395)	(0.407)
Travel time to nearest urban center						0.000
						(0.000)
Coverage of urban areas						-0.074
						(0.104)
Num.Obs.	2744	2744	2744	2744	2325	2325
R2 Pseudo	0.105	0.105	0.110	0.110	0.120	0.120
AIC	6131.3	6133.2	6105.2	6109.1	5589.0	5591.6
BIC	6338.4	6346.2	6336.0	6357.7	5842.0	5856.2
Log.Lik.	-3030.658	-3030.578	-3013.600	-3012.574	-2750.489	-2749.804
Std.Errors	by: gid	by: gid	by: gid	by: gid	by: gid	by: gid
FE: country	X	X	X	X	X	X
FE: year	X	X	X	X	X	X

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 11. Logistic regression for dependent variable: one-sided violence by government (alternative explanation).

Logistic regression for Dependent variable: One-Sided Violence (OSV) by government

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Diamonds	0.249	0.280	0.347	0.379	0.057	0.043
	(0.269)	(0.272)	(0.272)	(0.273)	(0.342)	(0.344)
Petroleum	1.009***	0.980***	0.872***	0.741**	0.650*	0.813**
	(0.244)	(0.238)	(0.246)	(0.272)	(0.315)	(0.307)
Gold		0.890+	0.824	0.858	0.819	0.791
		(0.510)	(0.553)	(0.550)	(0.586)	(0.588)
Battle			-1.427***	-1.400***	-1.469***	-1.457***
			(0.162)	(0.160)	(0.165)	(0.167)
Battle (t-1)			0.232+	0.266+	0.162	0.151
			(0.140)	(0.142)	(0.152)	(0.152)
Osv by government (t-1)			1.083***	1.048***	1.041***	1.032***
			(0.189)	(0.190)	(0.194)	(0.193)
Population density (log)				0.171**	0.169*	0.107
				(0.061)	(0.074)	(0.068)
Light density at night				0.354	0.245	-0.417
				(1.033)	(1.068)	(0.997)
Distance to border (log)				0.060	0.018	0.026
				(0.070)	(0.075)	(0.076)
Distance to capital (log)					-0.226*	-0.149
					(0.090)	(0.105)
excluded1					0.293	0.345+
					(0.185)	(0.188)
excluded2+					0.338	0.421+
					(0.226)	(0.226)
Travel time to nearest urban center						0.000
						(0.000)
Coverage of urban areas						0.159+
						(0.092)
Num.Obs.	2758	2758	2758	2758	2337	2337
R2 Pseudo	0.166	0.167	0.227	0.231	0.231	0.235
AIC	2323.6	2321.6	2167.5	2161.6	1933.8	1928.0
BIC	2536.8	2540.7	2404.4	2416.2	2192.9	2198.6
Log.Lik.	-1125.777	-1123.800	-1043.748	-1037.776	-921.907	-917.016
Std.Errors	by: gid	by: gid	by: gid	by: gid	by: gid	by: gid
FE: country	X	X	X	X	X	X
FE: year	X	X	X	X	X	X

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$