

The Effect of Crude Oil Price Changes on Civil Conflict Intensity in Rentier States

Chase Englund*
Taylor Vincent†
Connor Kopchick‡

April 2023§

Abstract

Existing literature has focused on the relationship between oil and conflict. Yet, many of these studies have failed to study a critical variable mediating the effect that the fluctuating market price for oil has on conflict, particularly conflict intensity. We theorize that the military capacity of the state is a key mediating mechanism for understanding the relationship between shifting oil market prices and conflict intensity. We argue that states which rely upon oil sales to fund a large portion of government spending will have a more difficult time maintaining conflict-reducing state capacity during times in which oil prices are below previously prevailing averages for extended lengths of time. Using country-year data in 67 conflict states from 1989-2019, we find that low average oil prices are associated with lower military spending which in turn is associated with higher rates of battle fatalities in existing civil conflicts.

Keywords: Price shocks, Commodities, Military spending, State capacity

*Ph.D. Candidate, Department of Government and Politics, University of Maryland, College Park MD. Email: cenglund@umd.edu.

†Ph.D. Candidate, Department of Government and Politics, University of Maryland, College Park MD. Email: tvincent@umd.edu.

‡Ph.D. Candidate, Department of Government and Politics, University of Maryland, College Park MD. Email: ckopchic@umd.edu.

§The order of author names does not necessarily indicate level of contribution. Please do not distribute this draft without explicit permission. The authors report there are no competing interests to declare. Replication data is available upon request. The authors would like to thank Paul Huth and all others who graciously provided feedback for this paper.

1 Introduction

The relationship between oil and conflict is one which has given rise to broad scholarly interest. One identified component of this relationship is an increased risk of intrastate conflict in oil rich nations, a “curse” which can lead to instability in regions important to the global energy market.¹ Research on the impact of oil on intrastate conflict however tend to treat oil as a constant, contrasting with a reality in which oil prices are constantly in flux. Indeed, there has been significant variation in crude oil prices since 1980, with prices often settling at multi-year averages that are significantly higher or lower than previous averages. This leads to a lingering question in the literature, what impact does variation in the price of oil have on intrastate conflicts?

This paper addresses this gap in the literature, theorizing that fluctuating oil prices effect the intensity of civil conflict through an intervening variable: military expenditures. We argue that drops in oil prices reduce revenue for oil-dependent states, thus reducing the state’s military expenditures. As military expenditures determine overall military capacity, greater military expenditures should correlate with an increased capacity to implement security measures and put down rebellions, resulting in a decrease in battle deaths. This should be particularly pronounced in states more heavily reliant on oil to fund government expenditures.

While we theorize that the impact of higher oil prices is higher military expenditures and lower combat fatalities, we also recognize that the link between higher military expenditures and civil conflict intensity may be non-linear. In states experiencing higher intensity civil conflict marked by higher combat fatalities, an increase in military expenditures could actually lead to greater battle deaths as crackdowns and clashes with rebels intensify. However, in low-intensity conflicts, the most common conflict we observe, the opportunity costs for rebels may increase as security measures are put in place, resulting in fewer battle deaths. While the incentives to rebels to gain the financial benefits of oil via conflict should remain constant through price fluctuations, higher prices should increase opportunity costs for rebels engaged in low intensity rebellions due to the resulting increased resilience and coercive capacity of the state.

Drawing on crude oil prices, military expenditures, and conflict severity data we examine 67 conflict states from the period of 1989-2019, demonstrating that low average oil prices are correlated with higher battle fatalities in existing civil conflicts. We also demonstrate the role of our proposed causal mechanism, showing that low average oil prices are associated with lower military expenditures, which are in turn associated with higher battle fatalities in low-intensity conflict states. We contribute to the literature by adding an important dimension, backed by empirical results, to our existing understanding of the so-called “oil curse,” and reiterate the important role global markets play in the development of intrastate conflicts.

The remainder of this paper is comprised of five sections. Section two reviews relevant literature on oil prices, conflict, and state capacity to provide context for our analyses. Section three follows this by defining our theoretical approach and establishing the primary hypotheses. Section four and five lay out the data used to test the hypotheses and present the results of the empirical evaluation. Lastly, section six provides a key case study meant to help further illustrate the theoretical mechanisms we describe.

¹Ross (2012).

2 Literature on Oil Prices and Civil Conflict

Many examinations of oil and civil conflict focus on rebel incentives. The notion that natural resources would provide a valuable “prize”² or an opportunity to make conflict more viable by offsetting the costs of rebellion³ is well founded in the literature. Scholars have likewise examined the potential linkage between other lootable natural resources and conflict onset, with mixed results.⁴ For instance, work has found that loss of income (in their case from labour-intensive agriculture) can serve as a catalyst for conflict when it impacts a politically marginalized ethnic group.⁵ There has been a specific interest on the role that oil plays in conflict. The “oil curse” is a theory that has received considerable attention in the literature, focusing primarily on intrastate conflict onset.⁶ Some leading scholars such as Ross⁷ argue that the presence of on-shore oil production provides a financial incentive for would-be rebels and opposition forces to resort to armed conflict.

We hypothesize that the price of oil does not meaningfully affect the incentive of potential separatist rebels. Those with very poor economic opportunities - i.e. a lack of alternatives - will be similarly enticed by potential spoils from oil revenue regardless of prices.⁸ Rebels would still get a larger share of the revenue if they alone controlled the oil reserves instead of the existing central government. This mechanism occurs irrespective of prices.⁹ Thus we consider rebels to be insensitive to oil price shocks.

In contrast to the incentive approach described above, some find that oil revenue can increase a state’s ability to “pay off” opposition and thus lower the probability of civil conflict.¹⁰ This suggests there are multiple potential mechanisms to understand oil’s effect on conflict, particularly relating to the resources at the disposal of the state and how this impacts whether or not it can stave off rebellions.

Oil, like other commodities, varies in pricing which begs the question as to whether its value to rebels and states likewise varies. While other researchers have examined the linkages between oil prices and conflict, they have often exclusively focused on interstate conflicts.¹¹ Increases in the price of oil can in fact lead to an increase in state capacity, in the form of military capacity used in interstate conflict.¹² Positive resource shocks, however, could also allow the state to strengthen its security measures and control and suppress or buy off internal rebellion.¹³

There are indeed some studies that have examined commodity prices and civil conflict. Several analysts have focused on agricultural commodity prices and their relationship with conflict, with important trends emerging. However, these studies tend to focus on either the opportunity cost of insurrection or the state prize model.¹⁴ Under the opportunity cost model, falling agricultural yields make rebellion more appealing as an alternative to agricultural production.¹⁵ The state prize model assumes that rising

²Fearon (2005).

³Collier and Hoeffler (2004).

⁴Collier and Hoeffler (2004); Ross (2008); Ali and Abdellatif (2013); Le Billon (2012).

⁵Buhaug et al. (2021)

⁶Collier and Hoeffler (2004); Ross (2008); Watts (2008); Fjelde (2009); Gunter 2015)

⁷Ross (2012).

⁸Demuyne and Schollaert (2008).

⁹Ross (2012).

¹⁰Fjelde (2009).

¹¹Dunfield and Klare (2005); Hendrix (2017).

¹²Hendrix (2017).

¹³Snyder (2006); Ross (2012); Bazzi and Blattman (2014).

¹⁴Ray and Esteban 2017

¹⁵See Collier and Hoeffler (1998); Miguel, Satyanath, and Sergenti (2004); Dal B’o and Dal B’o (2011).

prices increase rebel incentives to capture lootable resources. Others argue that sub-Saharan African states, which rely on tropical agricultural commodities and mineral wealth, are less likely to see conflict when high agricultural prices provide laborers an alternative to mining and competition over its spoils.¹⁶ Low agricultural prices however, increase the attractiveness of the mineral sector and fuel conflict onset. A meta-analysis mirrors this line of reasoning, showing that increases in agricultural prices decreases conflict likelihood, while increases in oil prices increases conflict likelihood.¹⁷

However, other recent work has suggested that lootable, capital-intensive resources like oil are less likely to affect rebel conflict incentives than labor-intensive resources.¹⁸ Price shocks to labor-intensive resources are more likely to provoke conflict given the greater returns and employment opportunities, rather than capital intensive resources like oil and gas. Despite this, commodity price shocks (including oil price shocks) have been shown to effect on conflict intensity measured in battle deaths, conflict onset and duration, and coups. Notably, rising oil and mineral prices have been associated with shorter, less intense conflicts in recent studies, including in a key 2014 study by Bazzi & Blattman.¹⁹ While this study focused primarily on agricultural price shocks, and bundled oil and gas price shocks with mineral price shocks, it provides an important addition to the literature and some basis for our approach. Importantly, this study did not provide an empirical treatment of the mechanism, which was loosely explained as military spending and state capacity. However, the authors argue that “the evidence tips... toward a ‘state capacity’ effect”. Other approaches have reached competing conclusions such as income shocks, due to rising oil prices in the 1990s, increased violence in Colombia, a notoriously long-lasting civil conflict.²⁰

In sum, oil price fluctuations should have important implications for civil conflict. However, the literature does not clearly link oil price fluctuations with civil conflict in the way that we propose to do, which is through the transmission mechanism of state military capacity (although some studies suggest this). When oil prices are high and the state is able to both produce and generate revenues from oil, then conflicts will subside as the state is better able to fund counter-insurgency measures against rebels. The next two subsections briefly discuss the literature around both sides of this mechanism to provide a basis for our theoretical intuitions.

2.1 State Capacity, Military Expenditures, and Conflict

The ability for the state to project power and engage with belligerents is a long-standing explanatory factor for conflict. States must be able to reach and control far and difficult to reach corners of its territory.²¹ Large militaries can help with favorable outcomes for the government (assuming that they can win quickly) and have been linked to primary commodity exports.²² Recent work has also linked military capacity to the prevention of civil conflict onset.²³ Others have reached similar findings about the effect of military capacity on conflict duration and intensity by examining *military expenditures*

¹⁶Demuyne and Schollaert (2008)

¹⁷Blair, Christensen, and Rudkin’s (2021)

¹⁸Blair et al. (2021).

¹⁹Bazzi and Blattman (2014).

²⁰Dube and Vargas (2013).

²¹Tilly (2017); Herbst (2000); Buhaug et al. (2009); Roessler (2016).

²²DeRouen and Sobek (2004).

²³Crepon et al. (2021).

specifically as a measure of military capacity.²⁴

The literature's debate on state capacity measures and its relationship to conflict onset is long standing. Relative to conflict onset, there is a smaller literature on how military state capacity affects conflict *severity*.²⁵ Most literature focuses on the relationship between state capacity and conflict onset using static measures such as the size of the army or gross domestic product. These studies do not provide much information about how state capacity affects ongoing conflict. Moreover, the determinants of conflict onset differ from severity.²⁶ Recent work has shown how various state level factors can explain conflict intensity and duration such as state economic conditions²⁷ and regime and cultural characteristics.²⁸ Military capacity is likely to affect the severity of conflict as the government works to defeat insurgents. National militaries with combined arms capabilities, or mechanized infantry, armor, and air units working in tandem, are correlated with shorter civil conflict duration.²⁹ Such capabilities, not only in the form of equipment, but in training in order to operate in tandem, require significant investments. Building on existing work,³⁰ we focus here on military state capacity and factors related to conflict intensity, conceptualized as conflict-related battle deaths. We depart from this work by arguing that impacts to state capacity overwhelm impacts to rebel capabilities or incentives, as oil rents enable more military spending and leave governments better equipped to fight rebels.

In sum, there is reason to suspect that military capacity is an important variable in determining the intensity of ongoing civil conflict, and that military expenditures is a reasonable means by which to estimate this capacity. We aim to add to this literature with the results here.

2.2 Oil and Military Expenditures

As discussed, military strength and the state's capacity for coercion is an important variable for examining conflict intensity. However, how fluctuating oil prices impact oil-dependent states' coercive capacity is still an open question. Revenue reflects the ability of the state to fund operations, namely operations relevant to the conflict, that are important to the course of conflict. Scholarship on the link between decreasing oil prices and shrinking military expenditures has been mixed, but generally favors a positive correlation. Military expenditures were found to be inelastic relative to variations in oil revenues in one study of five major oil producing states between 1997-2007³¹. Likewise, a similar analysis of Gulf Cooperation Council (GCC) states found a negative correlation between oil rents and military expenditures.³² However, this effect was reversed in non-GCC Middle East and North African (MENA) states in the same study. The study argued that corruption plays a mediating role between oil rents and military spending, with oil having a larger, more positive impact on military spending in polities which are more corrupt. This finding is also reinforced by work linking higher oil rents with

²⁴Hendrix (2010)

²⁵In general, the literature focuses on the determinants of conflict onset compared to how wars are fought. See Lu and Thies (2011); Balcells and Kalyvas (2014)

²⁶Lacina (2006).

²⁷Lu and Thies (2011); Chaudoin et al. (2017)

²⁸Lacina 2006

²⁹Caverley and Sechser (2017).

³⁰Lacina (2006), Hendrix (2010) and Balcells and Kalyvas (2014).

³¹Chun (2010)

³²Erdoğan, Çevik, Gedikli (2020).

greater military expenditures in MENA states by Ali & Abdellatif³³ and others.³⁴ Other studies posit a positive relationship between oil rents and military spending in GCC states as well.³⁵

These findings of a positive relationship have been substantiated by a number of studies. Scholars have identified a similar positive relationship between oil rents/revenues and military spending in Chad³⁶, Algeria³⁷, and Iran.³⁸ Scholars have generally supported a positive correlation between oil wealth and military spending in non-democratic countries.³⁹ Various causal mechanisms linking oil revenue to military spending have been proposed in prior literature such as corruption⁴⁰, buying the loyalty of the military⁴¹, or a combination of these variables.⁴²

In sum, it seems clear that positive resource shocks, such as those created in oil-reliant states by a significant and lasting increase in the price of oil, should often result in greater military expenditures. However, the literature contains gaps in our understanding of oil resources and conflict intensity, as well as unclear mechanisms surrounding how price fluctuations may impact this relationship. With this study, we seek to clarify one mechanism by which this relationship is governed. Specifically, we suspect that oil revenues support military spending, and that greater military spending increases state capacity to suppress rebellion. Next, we present a theory, focused on state military capacity, that seeks to address these concepts directly.

3 A Theory of Oil Price Shocks and Conflict in Rentier States

In conflict states in which the central government budget is heavily reliant on revenues generated from the sale of oil, we predict that significant negative changes in price will impact the ability of the government to finance security measures in areas vulnerable to rebellion. States are best suited to prevail in intrastate, and particularly counter-insurgency, conflicts when their forces are well equipped and properly trained, both resource-intensive endeavors. Positive resource shocks allow the state to strengthen its security measures and control and suppress or buy off rebellion.⁴³ Rising oil and mineral prices are therefore associated with shorter, less intense conflicts.⁴⁴

If our core hypothesis proves correct, then we will have shown that an increase in oil prices leads to more effective security and less battlefield fatalities. We would then expect that greater oil prices correlate to lower battlefield fatalities in oil reliant states.

H1: An increase in oil prices will be correlated with a decrease in combat fatalities, i.e. “battle deaths,” in conflict states reliant on oil, relative to those not reliant on oil, all else equal.

In states dependant on the sale of oil, higher prices lead to more revenue. These higher revenues lead

³³Ali & Abdellatif (2015)

³⁴Dizaji (2019)

³⁵Al-Mawali (2015)

³⁶Frank and Guesnet (2009).

³⁷Perlo-Freeman and Brauner (2012).

³⁸Farzanegan (2011).

³⁹Cotet and Tsui (2013).

⁴⁰Farzanagen (2018).

⁴¹Bellin (2004).

⁴²Fjelde (2009).

⁴³Snyder (2006); Ross (2012); Bazzi and Blattman (2014).

⁴⁴Bazzi and Blattman 2014

to more military and security spending, allowing states to fund additional soldiers, police, and other security personnel. This increase in security capacity leads to a reduction in rebels’ ability to operate, and thus, in the medium term, this should reduce the number of battle deaths as rebels scale back operations or lay down their arms.

To test the mediating variable in this hypotheses, we also examine whether oil prices impact oil-dependent states’ military expenditures. In line with the conclusions of previous scholars⁴⁵ who demonstrated a correlation between oil rents/revenue and military spending, we theorize a correlation between oil prices and military expenditures among states more reliant on oil rents. As the price of oil rises, rentier states highly dependent on oil will see a growth in revenue. As their revenue increases, these states will be inclined to dedicate more resources to the military. In contrast, when oil prices drop along with rents, states will respond with cuts to military spending.

H2: When oil prices are at high average levels, oil dependent states will have higher levels of military expenditures relative to periods of low oil prices, all else equal.

States can derive oil rents from a variety of sources, such as through taxation or the capture of profits through state-owned enterprises. Depending on the time of year and how the state budgeting process works, the impacts from a positive or negative shock to revenue could happen in the same year, or the following year. We examine both scenarios by testing lag variables for both H1 and H2. This is discussed in more detail in the proceeding sections.

Lastly, we propose to link this measure of state capacity; military expenditures, with the primary dependent variable from H1; battle deaths. When state military expenditures are higher, this should reduce the number of battle deaths from civil conflict as the security environment improves. However, the relationship between these variable is complex and may be nonlinear. For example, increases in military capacity may lead to “crackdowns” that temporarily lead to *higher* battle deaths. However, for most states in civil conflict, we predict that this relationship will be negative.

H3: When oil dependent conflict states have higher military expenditures, this will be correlated with a decrease in combat fatalities, i.e. “battle deaths”, relative to when military expenditures are lower, all else equal.

One way we choose to examine this possibility of a nonlinear effect is by splitting the sample along the lines of conflict intensity. This is discussed in greater detail in the proceeding sections. We also explore a key case study which helps illustrate the dynamics we propose around military expenditures and civil conflict.

4 Data

We consider 67 conflict states with varying degrees of oil dependence from 1989-2019. Since government budgets do not fluctuate by the day like oil prices, an average over a longer term is the most appropriate measure, thus our unit of analysis is measured at the country-year. In order to estimate the effect of the primary independent variable, *oil prices*, we employ several methods. Government spending decisions are typically made in advance, so a lagged measure which captures the dynamic shifts in oil

⁴⁵Frank and Guesnet (2009); Perlo-Freeman and Brauner (2012); Al-Mawali (2015); Dizaji (2019).

prices from year to year is prudent. We tested a one-year average of crude oil prices for our primary measures. This data was obtained from the Federal Reserve Bank of St. Louis FRED dataset, a widely accepted benchmark for crude oil prices.⁴⁶ We opted to use the West Texas Intermediary (WTI) price of oil instead of Brent. These two measures are highly correlated, and the results using Brent were substantively indistinguishable from using WTI.

Secondly, we expect the effect of oil prices to appear primarily in states that are heavily dependent on oil for government revenue. Therefore, we employ a measurement of relative oil rents. Oil rents are continuous variable which indicates the percentage of total GDP which was derived from the sale of oil in a given year. This data can be obtained from the World Bank Open Data online database.⁴⁷ Ross (2013) uses oil income per capita as his primary measure of a petro-state. However, there are some concerns with this measure. The measure does not estimate the relative importance of oil to the overall economy, the degree to which the government derives state revenue from it, or independent effects from changes to GDP, leading researchers to consider other measures in more recent work.⁴⁸ For this reason, we opt to use oil rents as a percentage of GDP, which provides a better estimate of how important oil is to the overall economy.

Oil reliant states should have greater capacity to deal with rebels when oil prices are high. In order to test this hypothesis, we examine the impact of oil prices in military expenditures, and the impact of military expenditures on conflict intensity. When military spending is high, governments should have additional military resources to devote to suppressing armed rebellions and providing security. When these resources are scarcer, governments may need to scale back military and security operations, potentially allowing groups more opportunity to sustain and intensify an armed rebellion. Nigerian military spending was, for example, at an all-time high in 2011, coinciding with a peak in the two-year average price of oil during the same year. Oil prices hit a two-year low in 2014, and Nigerian military expenditure that year was less than half the value it was in 2011.⁴⁹ Our data on military expenditures was obtained from a dataset on military expenditures developed by the Stockholm International Peace Research Institute, which is integrated into the World Bank Open Data online database. We use military expenditure in constant USD as our primary measure. Rebel-incentive-based theories are limited to describing the behavior of rebels located in regions with on-shore oil reserves and little economic opportunity cost for rebellion.⁵⁰ However, our theoretical mechanism should work in any conflict-prone oil state, regardless of the type of rebel (secessionist or non-secessionist) or location of reserves. However, key conflict-related independent variables identified in such prior studies, such as overall GDP, still need to be included.

We expect that states with higher military expenditures have less intense civil conflicts. There are multiple series that allow for the creation of a variable measuring conflict intensity. We opt to use battle-related deaths. Another possible measure is found by aggregating battle-related deaths and deaths from one-sided violence (i.e. civilian deaths), but we view these measures of violence and conflict intensity as separate, with the former not capturing conflict between government forces and rebels, but rather crimes against civilians, which is a theoretically distinct phenomena. We therefore use battle-related deaths as our measure of conflict intensity and obtain this measure from the UCDP Battle-Related Deaths

⁴⁶U.S. Energy Information Administration (2020).

⁴⁷World Bank (2020).

⁴⁸Wright et al. (2015).

⁴⁹Stockholm International Peace Research Institute Data, 2018

⁵⁰Ross (2012).

Dataset.

The Uppsala Conflict Data Program (UCDP) defines an armed conflict as a contested incompatibility that concerns government and/or territory over which the use of armed force between two parties, of which at least one is the government of a state, has resulted in at least 25 battle-related deaths in one calendar year. Battle-related deaths refer to those deaths caused by the warring parties that can be directly related to combat.

Our dataset includes roughly 1200 country-year cases of states in which civil conflict was occurring and for which we have both a measurement of battle related deaths and a measurement of the share of the state's GDP accounted for by the sale of oil. Among the universe of civil conflict states in the dataset, that average level of military spending was 7.1 billion USD. The average level of oil rents as a share of GDP was 4.75%. The mean level of yearly battle deaths was 703, ranging from 25 to as high as 30,000. However, the majority of state cases in which there was a civil conflict occurring saw fewer than 500 fatalities per year. The mean level of military expenditure as a percentage of GDP and as a percentage of total government spending was 3.2% and 11.9%, respectively.

The conflict models we use incorporates a number of controls for confounding variables. The first of these is population size. Larger population size should be predictive of a higher number battle deaths in a civil conflict.⁵¹ Among other control measures used were a security effectiveness score taken from the Center for Systemic Peace (which also produces the well-known Polity series). A higher score on this index indicates a less secure state, making it a good indicator of state capacity. Lastly, GDP was also introduced as a control variable, another measure of relative state capacity and size.⁵² The models also include fixed effects which are described in detail in the results section.

The model examining military expenditures and conflict carries some concern about endogenous variables. States in more severe conflicts will tend to spend more on the military. The presence of this effect serves to work against our hypothesis, and we control for it by incorporating previous period conflict intensity as a control, as well as fixed effects.⁵³

The spending models include controls for GDP, total currency reserves (excluding gold), and government debt, all taken from the World Bank data. Each of these measures should be expected to positively relate to military spending, as they are measures of government resources and state capacity.⁵⁴ The spending models also include controls for fixed effects.

A initial examination of this aggregated data indicates support for H1. A full move across the range of observed price values for WTI Crude Oil in the dataset (from the lowest observed price to the highest) is predictive of over 50 fewer monthly deaths in ongoing civil conflicts on average among the most oil-reliant conflict states observed (where oil rents were greater than 20 percent of GDP). A figure illustrating this association can be found in the appendix. In the next section we rigorously examine the data to determine the strength and characteristics of this relationship.

⁵¹See Bruckner 2010

⁵²See d'Agostino et al 2019

⁵³ibid

⁵⁴See Ali and Bhuiyan 2022

5 Results

In order to examine our hypotheses using this data, we first subdivided the full set of conflict states into a smaller subset of “oil states”. States that saw the sale of oil comprise a mean value of 10% or more of GDP over the observation period were designated as an “oil states”. These oil states should be most sensitive to the impact of oil price fluctuations on state capacity. We also designated a smaller subset of “extreme oil states”, states in which the sale of oil was over 20% of GDP. Among the sample, there were 8 “oil states” and 5 “extreme oil states”, comprising about 197 and 104 total cases respectively.

The first set of models were designed to test the impact of oil price changes on battle deaths in these oil reliant states. We employed four measures for oil prices. The first measure was a simple measure of the mean price for WTI in the current year. The second measure was a measure of the prior year’s mean price. The reason for testing a lagged variable here was because increases or decreases in the price of oil may not impact state revenues until a later period in states where budgets are set the year prior. The second two measures measure the change in WTI prices in percentage terms from the prior year’s mean. We include a measure of the change relative to the prior period mean (i.e. the change for the current year), and a measure of the change between the prior period and the period preceding that (i.e. the change for the prior year). These measures provide a variety of ways to measure the degree to which oil prices changes may impact conflict-reducing state capacity.

Our standard specification approach for the first set of models was to use ordinary-least-squares (OLS) regression models with fixed effects for state errors. State fixed effects are particularly important as states have wide endogenous variation in the number of battle deaths.⁵⁵ In this first test of Hypothesis 1, we specify the following four basic models of yearly conflict battle deaths:

$$Battle\ Deaths_{it} = B_0 + B_1 WTI\ Price_{it} + B_2 \log(population)_{it} + B_3 SecScore_{it} + B_4 \log(GDP)_{it} + C_i + e$$

$$Battle\ Deaths_{it} = B_0 + B_1 WTI\ Price_{i(t-1)} + B_2 \log(population)_{it} + B_3 SecScore_{it} + B_4 \log(GDP)_{it} + C_i + e$$

$$Battle\ Deaths_{it} = B_0 + B_1 WTI\ Price\ Change_{it} + B_2 \log(population)_{it} + B_3 SecScore_{it} + B_4 \log(GDP)_{it} + C_i + e$$

$$Battle\ Deaths_{it} = B_0 + B_1 WTI\ Price\ Change_{i(t-1)} + B_2 \log(population)_{it} + B_3 SecScore_{it} + B_4 \log(GDP)_{it} + C_i + e$$

As the table illustrates, we find that three out of four measures of oil prices levels were significantly and negatively associated with the number of battle deaths in the state. An increase in the price of oil by 50 USD was associated with roughly 15 fewer battle deaths per year. While this figure appears rather small at first, it is more significant when we consider that roughly half of the conflicts in the dataset saw 100 or fewer battle deaths per year. We also tested measures of the percentage change in oil prices. Positive changes in both the current and prior period were associated with fewer battle deaths. A 10% increase in price in the current or prior period was associated with a decrease in yearly battle deaths of over 100.

⁵⁵Fixed effects for time were not included in this model due to poor model fit. Fixed effects for time are used in the interactive effects regressions presented later in this section and tested for all subsequent regressions.

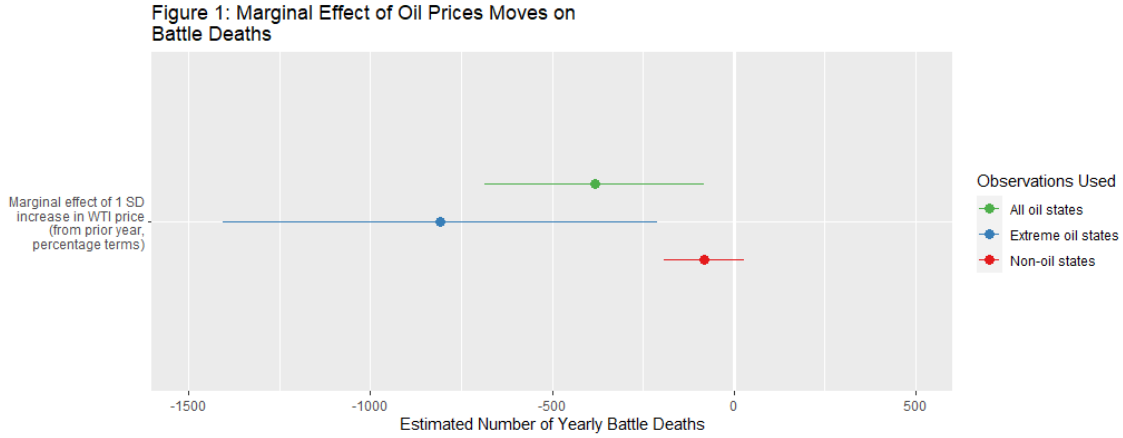
Table 1: Oil Prices and Conflict Intensity in Oil Reliant Conflict States

	<i>Dependent variable:</i>			
	Battle deaths (yearly)			
	(1)	(2)	(3)	(4)
WTI P(t)	-28.875*** (10.693)			
WTI P(t-1)		-2.888 (9.602)		
WTI % chng(t)			-1,190.311** (600.541)	
WTI % chng(t-1)				-1,617.526** (673.981)
log(Population)	2,244.934 (2,038.138)	4,279.730** (1,977.919)	4,161.462** (1,901.066)	3,452.998* (1,925.875)
Sec score	1,152.992** (510.982)	875.673* (526.654)	773.926 (504.849)	976.206* (503.646)
log(GDP)	841.387 (626.393)	-281.843 (580.287)	-403.644 (432.539)	-212.523 (436.278)
Observations	139	139	139	139
R ²	0.113	0.062	0.090	0.103
Adjusted R ²	0.036	-0.019	0.011	0.025
F Statistic (df = 4; 127)	4.034***	2.116*	3.138**	3.626***

Notes: Models are panel linear regressions with country fixed effects.
Price coefficients show the result of a 100 dollar increase in oil prices.
Robust standard errors in parentheses.*p<0.1; **p<0.05; ***p<0.01

Among the control variables, performance was largely in line with expectations based on similar models. Overall model fit was within an acceptable range. However, the number of observations was limited to fewer than 200, as most states in the dataset were not “oil states”. In response to this, in order to examine the robustness of these findings, and to determine the effect that oil dependency has on the size of the marginal effect, we tested two additional subsets of Model 4 in Table 1. The first additional subset was tested using only extreme oil states and the second was tested using all states in the set.

As the figure below illustrates, the effect of oil prices increases was most pronounced for the most oil-reliant states. By contrast, among non-oil states, there was no statistically significant effect. This all indicates that oil price increases have conflict-reducing impacts to state capacity in these oil-reliant states. However, in order to provide an additional examination of the robustness of this observation, we also examined the entire set of cases using an interactive term between oil price and the level of oil rents.



In order to operationalize a test using all of the data, we employed the variable measuring oil rents as a percentage of GDP directly into the model. The term was multiplied with the variable measuring the price of oil to form an interactive term. As before, our standard specification approach for all models was to use ordinary-least-squares (OLS) regression models with two-way fixed effects for time (by year) and state errors. The formal specifications for these models can be viewed in the appendix.

Observing the results of these four interactive models in Table 2 below, we see that both the current and prior year percentage change in oil price are negatively associated with the number of battle deaths in ongoing conflicts. In both cases, a 100% increase in the price of oil during the current or prior year is associated with roughly 60 fewer fatalities per year. Substantively speaking, the effect from oil shocks is modest. However, it represents the average across the entire dataset. The marginal effect increases significantly as the level of oil dependence increases. This is discussed more below.

Among the control variables, the prior year battle deaths variable was most statistically significant, as might be expected. The independent effect of oil prices was dropped in these models due to the inclusion of time fixed effects, meaning that price was invariant within states in many cases. This is also the reason that time fixed effects were not included in Table 1. When time fixed effects were dropped for these regressions, the independent effect of oil price was not statistically significant. This is expected,

as we should expect a significant effect from oil prices only when oil rents as a percentage of GDP are also high.

Table 2: Oil Prices and Conflict Intensity in all Conflict States

	<i>Dependent variable:</i>			
	Battle deaths (yearly)			
	(1)	(2)	(3)	(4)
WTI P(t)*Oilrents	-0.148 (0.231)			
WTI P(t-1)*Oilrents(t-1)		0.229 (0.201)		
WTI % chng(t)*Oilrents			-60.175** (25.878)	
WTI % chng(t-1)*Oilrents(t-1)				-62.031*** (25.889)
Oilrents	7.823 (20.850)	-26.362 (18.116)	17.942 (15.166)	10.998 (15.655)
Battle deaths(t-1)	0.347*** (0.029)	0.348*** (0.029)	0.342*** (0.029)	0.340*** (0.029)
log(Population)	558.401 (1,061.429)	545.259 (1,062.073)	405.422 (1,060.751)	446.246 (1,058.723)
log(GDP)	213.170 (242.903)	144.129 (240.011)	183.295 (232.703)	197.094 (232.683)
Observations	1,040	1,020	1,040	1,020
R ²	0.132	0.131	0.136	0.137
Adjusted R ²	0.053	0.053	0.058	0.060
F Statistic (df = 5; 953)	28.881***	28.833***	30.031***	30.375***

Notes: Models are panel linear regressions with country and time fixed effects.

Price coefficients show the result of a 100 dollar increase in oil prices.

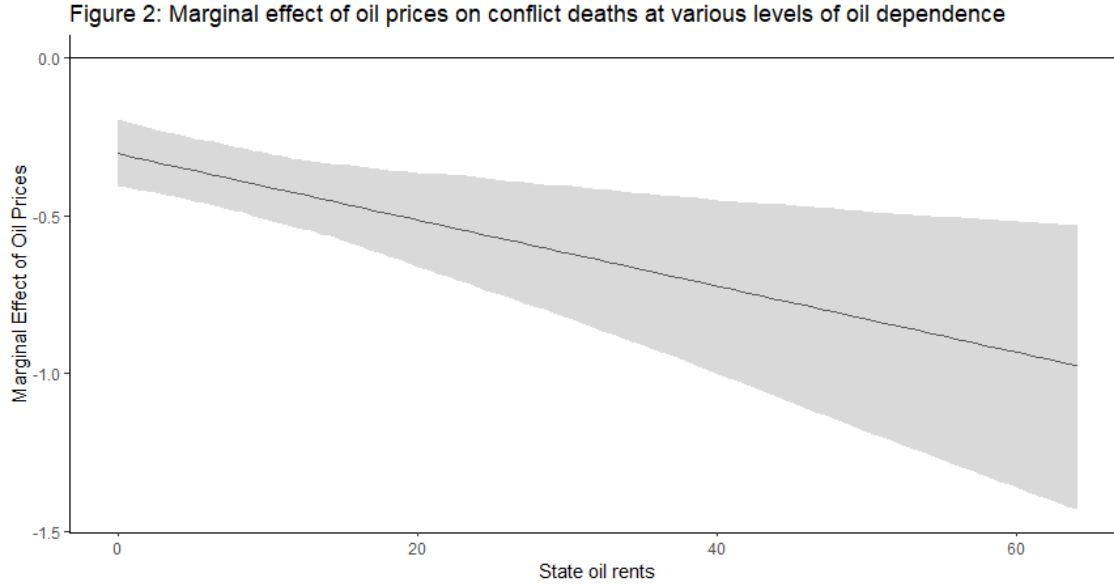
Oilrents variable in models 2 and 4 is lagged.

Robust standard errors in parentheses.*p<0.1; **p<0.05; ***p<0.01

Figure 2 provides an illustration of the effect modeled in Model 1 of Table 2 (using monthly data in place of yearly).⁵⁶ As shown in Figure 2, the marginal effect of the oil price coefficient increases as the level of rentierism increases. Across the range of the sample, the marginal effect increases by nearly 3 times. This indicates that, on average, states without dependence on oil revenue experience a substantively insignificant effect on the level of conflict intensity even during large shocks. However,

⁵⁶This is done for illustrative purposes to provide more observations. We chose models using yearly oil price data in the tables because our conflict and spending data is yearly. The model using monthly data used for this illustration can be found in the appendix.

for states in which oil represents over 20 percent of gross domestic product, the negative marginal effect of price increases on conflict intensity are more significant. Around the median point, where oil rents represent approximately 30 percent of GDP, a one dollar increase in oil prices is expected to result in approximately 0.6 fewer monthly battle deaths. This is equivalent to roughly 72 fewer battle deaths on average in a year where prices increased by USD 10. This illustration mirrors the results from the three non-interactive models illustrated in Figure 1, where the effect was observed most strongly for the most oil reliant states.



It is possible that the effects shown in Tables 1 and 2 are weakened in part because the effect of military spending on battle deaths may in some cases work in the opposite direction that we hypothesize. For example, if increased military spending/greater military capacity leads to military “crackdowns” on rebels, we may expect a short-term uptick in battle deaths as a result of increased military activity. This is examined in greater detail below.

For all the models using an interactive term between oil rents and oil price, it is also important to note a feature of the interactive model which likely causes an underestimation of the true effect. As oil prices decline, the proportion of a states GDP that is normally generated by the sale of oil declines, causing the state to appear as less of an “oil state”. However, it is in precisely these states that we are trying to observe an effect. This causes an underestimation of the effect that makes the results more conservative.

As previously theorized, the reason for these observed effects is the impact that declines in oil prices have on government revenue in rentier states. When oil dependent states face large declines in oil prices, they have a few limited options to make up the shortfall. Borrowing on capital markets is an option, but for most of these states, creditworthiness is inherently tied to the value of oil exports, so this option becomes constrained as well. Some states have “rainy day funds” in the form of sovereign wealth funds, and others may receive foreign military aid. However, these alternatives are present for only a select number of states. For most states, significant declines in real government revenue means significant

declines in actual government spending, which includes the military.

In order to test Hypothesis 2, we specify four models. The first two models estimate the effect of the measures of oil price in the current and prior period on military expenditures in oil reliant states only (using the same set of cases used for the models in Table 1). The second two models use all states, and employ the interactive effect between oil rents and oil prices (similar to the method used for the models in Table 2). Once again, the models are OLS linear regressions with fixed effects included. The formal model specifications can be viewed in the appendix.

Table 2 demonstrates the effect of oil price shocks on gross military expenditures in constant 2017 USD. For the linear models using oil reliant states only (the first two models), a USD 100 increase in the price of oil in the prior period was associated with an increase in military expenditures of USD 36 million.

In the first interactive model (the third model), the marginal effect of an increase in the price of oil during the current year, when multiplied by an increase in oil rents, is associated with a more positive marginal effect on military expenditures by the magnitude of roughly USD 14 million. For the price of oil during the prior year, this figure was a USD 5 million increase in the marginal effect on military expenditures. For context, the standard deviation for military expenditure in the data was roughly USD 12 billion. Using the figure in model 3, an increase in oil rents by five percent is associated with an increase in the positive marginal effect of oil prices by USD 700 million dollars, and a USD 10 increase in the price of oil at this level would entail a USD 7 billion dollar increase in spending.

States that use the revenue from oil sales to fund government expenditures often have alternative sources of funding such as sovereign wealth funds or access to international credit markets. Thus, control variables for these features were added to the models here and in the appendix. The appendix models also provide alternative specifications using a logged dependent variable and additional fixed effects. The results of these models were similar to those shown here. While the second two models in the table used the full dataset of 1200 cases, the number of observations was more severely limited by the inclusion of the control variables for which there were fewer observations. Models without control variables saw similar performance of the primary independent variables of oil price and oil rents, but these models without controls had much weaker fit.

Based on these results, it seems plausible to suspect that significant prices shocks can be expected to have an impact on both the intensity of civil conflict (H1), as well as the level of military spending, which mediates this outcome (H2).

Table 3: Oil Prices and Military Spending in Conflict States

	<i>Dependent variable:</i>			
	Military Expenditure (2017 USD)			
	(Oil Reliant States)	(Oil Reliant States)	(All States)	(All States)
WTI P(t)*Oilrents			14,087,750*** (3,689,224)	
WTI P(t-1)*Oil rents(t-1)				3,216,664*** (1,905,151)
WTI P(t)	5,314,081 (9,607,049)		-28,047,722** (13,037,850)	
WTI P(t-1)		36,188,156*** (8,552,945)		-18,518,084 (12,181,288)
Oilrents			-264,725,160 (261,892,763)	28,324,143 (228,550,421)
log(GDP)	966,952,011*** (322,459,424)	287,898,859 (308,713,578)	-159,851,212 (624,665,693)	-45,925,586 (617,583,728)
Total reserves	369,389,520*** (130,978,480)	283,032,140** (122,189,741)	11,039,391*** (364,678)	11,038,959*** (368,679)
Central government debt			-3,802,557 (10,384,174)	2,979,000 (10,232,084)
Observations	154	154	384	373
R ²	0.431	0.494	0.863	0.860
Adjusted R ²	0.392	0.458	0.852	0.849
F Statistic	36.171*** (df = 3; 143)	46.465*** (df = 3; 143)	371.400*** (df = 6; 354)	363.277*** (df = 6; 354)

Notes: Models are panel linear regressions with country fixed effects.

Total reserves are logged for models using only oil reliant states. Oil rents variable is lagged for Model 4.

Robust standard errors in parentheses.*p<0.1; **p<0.05; ***p<0.01

The final hypothesis (H3) examines the relationship between military spending and the number of battle deaths in oil reliant conflict states. Analysis here is made more challenging by the fact that, without control variables, military spending can be expected to have a strong positive association with conflict intensity, since states experiencing more conflict will tend to spend more on the military. The inclusion of a measure for the number of battle deaths in the previous period helps to mitigate this effect and improve model fit, as do fixed effects.

As previously discussed, we can expect the effect of military spending on the number of battle deaths in a conflict to be nonlinear. States in the midst of higher intensity conflicts may see the number of associated battle deaths rise with increased military spending, as additional military spending is used to crack down on rebels. However, in states where ongoing conflict is less intense, we can expect that opportunity-minded or less-numerous rebels may have less appetite for conflict as the security environment improves. For this reason, we should primarily observe additional military spending to reduce the number of battle deaths in states where conflict is already more mild and rebels can more easily disengage.

Based on these intuitions, we split the sample of oil reliant conflict states into high intensity conflict states (those where yearly battle deaths exceeded 500), and low intensity conflict states (where battle deaths were less than 500). The formal specifications for these models can be found in the appendix. The table below illustrates the results of these tests. The first model illustrates the effect using all oil reliant states. The second model includes the low intensity conflict states, and the third model uses the high intensity conflict states. As before, we employed OLS panel regressions with fixed effects for time and country.

As the table shows, the logged value of military expenditures was negatively associated with the number of battle deaths in oil reliant states in which low-level conflict was occurring. A 25 percent increase in military expenditures was associated with roughly 25 fewer yearly battle deaths. This result supports the general hypothesis that military expenditures reduce conflict by increasing state capacity and dissuading rebel attacks. It also helps to explain why higher oil prices are negatively associated with the number of battle deaths in oil reliant states that are in conflict, because it links the results from H2 relating to military expenditures and oil prices with an estimation of how military expenditures in turn impact battle deaths.

Table 4: Military Spending and Conflict Intensity in Oil Reliant Conflict States

	<i>Dependent variable:</i>		
	Battle deaths (yearly)		
	(All Oil States)	(Low Intensity Conflict)	(High Intensity Conflict)
log(milex)	552.724 (430.128)	-106.947* (56.211)	1,584.703 (1,522.129)
Battle deaths(t-1)	0.472*** (0.092)	0.049 (0.030)	0.046 (0.246)
log(Population)	6,438.542* (3,508.574)	91.047 (363.617)	73,134.420 (48,482.200)
Sec score	144.797 (529.507)	-54.749 (62.593)	-8,809.556** (3,302.620)
log(GDP)	-307.582 (743.779)	-112.682 (96.471)	-8,491.844** (3,180.431)
Observations	128	83	45
R ²	0.381	0.171	0.620
Adjusted R ²	0.146	-0.446	-0.518
F Statistic	11.348*** (df = 5; 92)	1.938 (df = 5; 47)	3.597** (df = 5; 11)

Notes: Models are panel linear regressions with time and country fixed effects.

Robust standard errors in parentheses.*p<0.1; **p<0.05; ***p<0.01

In order to illustrate the relationship between these variables in a practical way, as well as to illuminate the varied effect that military spending has on the number of battle deaths depending on the severity of conflict, we employ a key case study designed to explore these variables in more detail.

6 Case Study

In order to trace the causal mechanisms of our study, we decided to use Nigeria as a case study. Nigeria is a useful case as it is a state that has a history of violent conflict with oil revenues playing a major role in mitigating the violence. We focus on recent conflict in the Niger Delta region from 2004-2017, a useful context to study the effect of oil prices on an enduring conflict through which we can more clearly see the theory we have outlined here.

As this case will demonstrate, states can ward off rebel activity through increased military spending, although the impact to battle deaths is nonlinear. The case also involves important instances of social spending. Social spending can be seen as a way to appease and co-opt civilian support. Public expenditures by the state suggests the government is willing and able to invest in public goods and services, therefore raising the opportunity cost to rebel against the state. Recent scholarship has found that increased investments by the government on social welfare spending is correlated with a decreased likelihood of conflict onset.⁵⁷

Nigeria is one of the world's largest oil producers and a large portion of its revenue comes from oil production and exportation since its discovery in the 1950s. Oil and gas accounts for about 10 percent of GDP; petrol exports account for 86 percent of the country's total export revenue.⁵⁸ However, in recent years, oil prices have vacillated. As Hendrix (2017) states, over the period from 2004 to 2012 government revenues fluctuated wildly: they increased from USD 14.2 billion to USD 17.5 billion from 2007 to 2008 (23% growth) before falling by USD 2.4 billion the following year. These changes in revenue correlate closely with real oil prices. Moreover, following a steep reduction in violence during the high-price 2008-2015 period (partly due to a military crackdown and government payments to rebels), violence re-emerged in the Niger Delta concurrently with a sharp decline in government oil revenue in 2015.

6.1 Rebellion in the Niger Delta

The Niger Delta region is of incredible importance to both the livelihood of the people of the region, the central government and the global economy. Sixty percent of the people in the region rely on the environment for their livelihood, making the people of this region incredibly vulnerable to environmental damage.⁵⁹ This region has been subject to civil conflict due to environmental degradation affecting civilian incomes. The Delta has been described as 'one of the world's most severely petroleum-impacted ecosystems and one of the 5 most petroleum-polluted environments in the world'.⁶⁰

In recent decades, resistance movements have formed in opposition to this damage and the central government's inability to equitably distribute oil revenues to the civilian population.⁶¹ An umbrella

⁵⁷Azam (2001); Taydas and Peken (2012); Singh et al. (n.p.).

⁵⁸OPEC (2019).

⁵⁹Francis et al. (2011).

⁶⁰Obi (2010), pp. 221

⁶¹Aghedo (2012).

group of militants operating under the platform established by groups such as the Movement of the Emancipation of Niger Delta People (MEND), the Movement for the Survival of the Ogoni People, and others instigated attacks against the country's oil and gas infrastructure in the region from 2006-2009.⁶² These groups have formed a loose coalition of ethnic militants seeking to engage in "local resistance". MEND, formed in 2005-2006, has been known to abduct oil workers and attack oil pipelines.⁶³ The attacks represented a serious threat to the production of oil during this period.⁶⁴ Conflict was rampant in Nigeria during this time.

In response to this unrest, the government continued to increase its military presence in the region.⁶⁵ According to one account "...Since 2003 about 15,000 troops serve in the Niger Delta at any given time as part of the Joint Task Force (JTF), "Operation Restore Hope," comprised of the Army, Navy, and Air Force,"⁶⁶. The government viewed violence in the region as a law and order crisis and national security concern.⁶⁷ An extensive operation by the JTF was funded to fight against MEND and other groups, this operation included helicopter gun ships, gun boats, and between 3-7,000 ground troops for water, land and air operations in 2009. Debate can be had around the conduct of these operations, but it is clear that these operations were funded at least in part by the influx of oil revenue during the same period. Crude oil prices hit an all-time high in July 2008, and the Nigerian military launched the described large-scale offensive in August 2008. The Nigerian government continued to increase its military budget over the course of 2009 to 2014 by about USD 5-6 billion.⁶⁸

The impact of these military offensives in terms of battle deaths helps illustrate the complexity of the measure. The civil conflict in Nigeria was relatively high-intensity, with over 500 fatalities during every year of the conflict. During the period of the offensives, this figure climbed to over 1000. This helps illustrate why increased military spending may correlate in a nonlinear fashion with battle deaths. In lower intensity situations, increased security is more likely to result in the end of rebel activity, whereas "crackdowns" in higher intensity conflicts may see spikes in violence as the state removes rebels.

In combination with these military actions, President Umaru Musa Yar'Adua spearheaded a sweeping 2009 amnesty program instituted by the government to offer monthly payments to rebel groups to encourage disarmament, demobilization and reintegration led to a reduction in conflict.⁶⁹ The amnesty program, widely applauded by international audiences and militant leaders, did have some effective strategies at reducing violence in the region. A committee in charge of the amnesty program found that nearly 300,000 pieces of various guns and ammunition were purchased in a gun- buyback program in 2010.⁷⁰ Similarly to the military measures, these social measures were funded in large part by budget increases allowed by the increase in state oil revenues. In combination with the military measures, these actions served to ultimately pacify large parts of the region. Following these initiatives, both military and social, the number of battle deaths from civil conflict in Nigeria fell.

Unfortunately these gains were short-lived. Beginning in 2014, oil prices began a steep and sustained

⁶²Francis et al. (2011); Newsom (2011); Aghedo (2012); Campbell (2020).

⁶³Obi (2010); Francis et al. (2011).

⁶⁴Obi (2010).

⁶⁵Okonofua (2016).

⁶⁶(Francis et al. (2011).

⁶⁷Ikelegbe (2010).

⁶⁸International Crisis Group 2016

⁶⁹Newsom (2011).

⁷⁰Watts and Ibada (2011).

decline, hitting ten-year lows by 2016. By 2015 the effect on state revenue in Nigeria was so severe that the government was forced to make cuts to military and social spending. Funding for the Niger Delta Conflict amnesty program was reduced in the national budget making it difficult to pay for the monthly stipends the program is meant to support.⁷¹

Violence has since increased in the region. The decline of the military offensives and amnesty program has also seen the rise of new militant organizations in region such as the Niger Delta Avengers, the Niger Delta Red Squad and others.⁷² In sum, oil revenue has played a key role in funding counterinsurgency efforts in Nigeria, both through military measures and social programs. When this funding was reduced, violence increased. However, this case is also suggestive that military expenditures are likely to be most effective at reducing conflict when paired social programs that seek to reduce rebel incentives to fight. Developing measures to estimate these non-military measures is an important next step for this area of research. Another point highlighted by this case is the increase in battle deaths as the state attempts to assert control. In other words, the effect of military expenditures on battle deaths was nonlinear. In our empirical study we use battle deaths as a measure of conflict in line with previous studies⁷³, but other measures (such as the security effectiveness index or a similar measure) may do a better job at measuring progress in state capacity in future research.

7 Discussion

This research helps define important aspects of the relationship between oil prices and civil conflict in oil-reliant states. When oil prices are high, rentier states can better fund conflict-reducing state capacity, such as expenditures on military force. Rebels seeking to capture oil-rich regions can be expected to contend with the capacity that the central government has to stop their rebellion. Additionally, this research helps to expand an already existing literature on the impact of oil prices and conflict, which thus far has mainly focused on rebel incentives, or on the propensity for interstate conflict. By understanding the associations between these variables more closely, both researchers and policy makers will have additional insight into what conditions can be expected to generate conflict in oil dependent states.

This study could be improved by developing and testing alternative measures of state capacity and conflict intensity. As we saw in the data analysis and with the examination of Nigeria, high state capacity may not always lead to less battle deaths, and likewise lower military expenditure may not always indicate a weaker security sector. Improved measures of these variables will allow analysts to develop more flexible models than the ones presented here. The newness of many state capacity measures limits their usage in quantitative studies, and addressing this limitation should be a priority for peace researchers.

Regardless of the true size of the effects estimated here, it seems clear that the changing energy economy will hold serious consequences for states that derive significant government revenue from the sale of oil. As oil demand continues to decline in the face of economic greening and technological improvement, states oriented around the sale of these commodities will be faced with fewer options. Although some may find alternative sources of revenue, it seems plausible to expect that this shift in

⁷¹Ebiede 2017

⁷²Ajodo-Adebanjoko 2017

⁷³e.g. Bazzi & Blattman 2014

the global economy could result in significant political instability in vulnerable states.

As we have attempted to demonstrate in this article, one of these effects is likely to be the reduced capacity for oil reliant states to prosecute ongoing civil conflicts. In most cases, we can expect this to lead to increased conflict intensity. Policy makers and political scientists should continue to examine these relationships, and if possible develop solutions to reduce these unintended consequences of oil price fluctuations, and of the ultimate move away from fossil fuels.

References

1. Aghedo, I., 2013. Winning the war, losing the peace: Amnesty and the challenges of post-conflict peace-building in the Niger Delta, Nigeria. *Journal of Asian and African Studies*, 48(3), pp.267-280
2. Ajodo-Adebanjoko, A., 2017. Towards ending conflict and insecurity in the Niger Delta region: A collective non-violent approach. *African Journal on Conflict Resolution*, 17(1), pp.9-27.
3. Bakirtas, T. and Akpolat, A.G., 2020. The relationship between crude oil exports, crude oil prices and military expenditures in some OPEC countries. *Resources Policy*, 101659, pp.67.
4. Ali, H.E. and Abdellatif, O.A., 2015. Military expenditures and natural resources: evidence from rentier states in the Middle East and North Africa. *Defence and Peace Economics*, 26(1), pp.5-13.
5. Ali, H. E., Bhuiyan, S. (2022). Governance, natural resources rent, and infrastructure development: Evidence from the Middle East and North Africa. *Politics & Policy*, 50(2), 408-440.
6. Al-Mawali, N., 2015. Do natural resources of rentier states promote military expenditures? evidence from GCC Countries. *Journal of Economic & Financial Studies*, 3(03), pp.49-53.
7. Balcells, L., Kalyvas, S. N. (2014). Does warfare matter? Severity, duration, and outcomes of civil wars. *Journal of Conflict Resolution*, 58(8), 1390-1418.
8. Bazzi, S. and Blattman, C., 2014. Economic shocks and conflict: Evidence from commodity prices. *American Economic Journal: Macroeconomics*, 6(4), pp.1-38.
9. Bellin, E., 2004. The robustness of authoritarianism in the Middle East: Exceptionalism in comparative perspective. *Comparative politics*, pp.139-157.
10. Blair, G., Christensen, D. and Rudkin, A., 2021. Do commodity price shocks cause armed conflict? A meta-analysis of natural experiments. *American Political Science Review*, 115(2), pp.709-716.
11. Brückner, M. (2010). Population size and civil conflict risk: is there a causal link?. *The Economic Journal*, 120(544), 535-550.
12. Buhaug, H., Croicu, M., Fjelde, H. and von Uexkull, N., 2021. A conditional model of local income shock and civil conflict. *The Journal of Politics*, 83(1), pp.354-366.
13. Campbell, J., 2020. *Nigeria and the Nation-State: Rethinking Diplomacy with the Postcolonial World*. Rowman Littlefield Publishers.
14. Caverley, J.D. and Sechser, T.S., 2017. Military technology and the duration of Civil Conflict. *International Studies Quarterly*, 61(3), pp.704-720.
15. Chun, C.K., 2010. *Do oil exports fuel defense spending?*. Strategic Studies Institute, US Army War College.
16. Collier, P. and Hoeffler, A., 2004. Greed and grievance in civil war. *Oxford economic papers*, 56(4), pp.563-595.

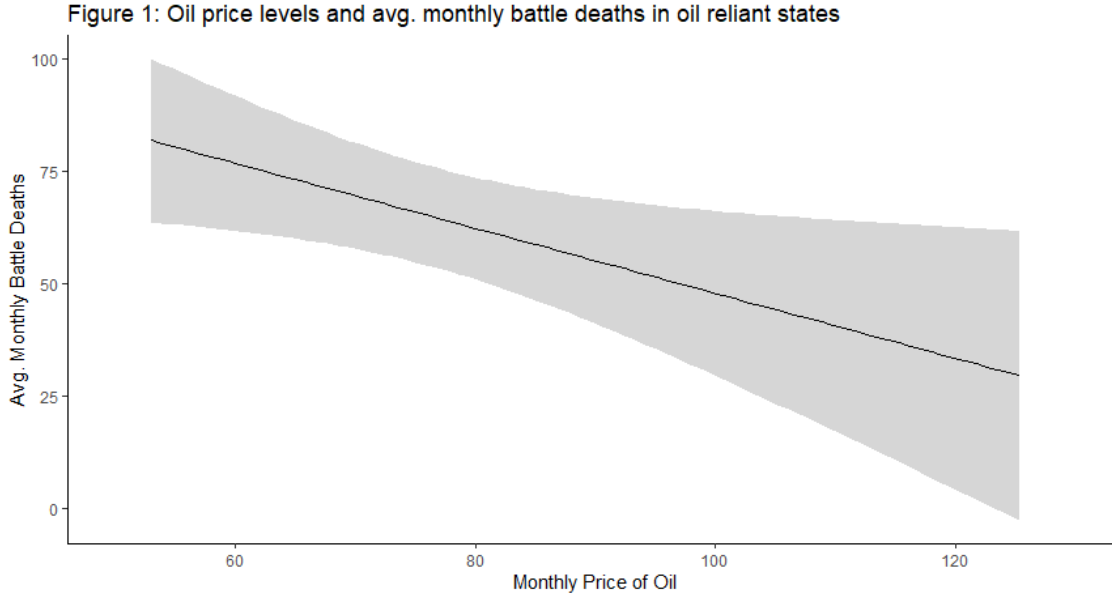
17. Cotet, A.M. and Tsui, K.K., 2013. Oil and conflict: What does the cross country evidence really show?. *American economic journal: Macroeconomics*, 5(1), pp.49-80.
18. Crepon, C., Hunziker, P., Cederman, L. E. (2021). Roads to rule, roads to rebel: relational state capacity and conflict in Africa. *Journal of Conflict Resolution*, 65(2-3), 563-590.
19. D'agostino, M., Tesse, N., Fripiat, J. P., Machouart, M., Debourgogne, A. (2019). Essential oils and their natural active compounds presenting antifungal properties. *Molecules*, 24(20), 3713.
20. Davies, Shawn, Therese Pettersson & Magnus Öberg (2022). Organized violence 1989-2021 and drone warfare. *Journal of Peace Research* 59(4).
21. Demuynek, T. and Schollaert, A., 2008. *International commodity prices and the persistence of civil conflict* (No. 08/518). Ghent University, Faculty of Economics and Business Administration..
22. De Rouen Jr, K.R. and Sobek, D., 2004. The dynamics of civil war duration and outcome. *Journal of Peace Research*, 41(3), pp.303-320..
23. Dizaji, S.F., 2019. *The potential impact of oil sanctions on military spending and democracy in the Middle East International Institute of Social Studies at Erasmus University Rotterdam* (No. 644).
24. Dizaji, S.F., 2022. The impact of negative oil shocks on military spending and democracy in the oil states of the greater Middle East: Implications for the oil sanctions. *Journal of Peace Research*, p.0022.
25. Dube, O., Vargas, J. F. (2013). Commodity price shocks and civil conflict: Evidence from Colombia. *The review of economic studies*, 80(4), 1384-1421.
26. Duffield, J., Klare, M. T. (2005). Blood and Oil: The Dangers and Consequences of America's Growing Dependency on Imported Petroleum. *Naval War College Review*, 58(2), 9.
27. Ebiede, T.M., 2017. Beyond rebellion: Uncaptured dimensions of violent conflicts and the implications for peacebuilding in Nigeria's Niger Delta. *African security*, 10(1), pp.25-46.
28. Erdoğan, S., Çevik, E.İ. and Gedikli, A., 2020. Relationship between oil price volatility and military expenditures in GCC countries. *Environmental Science and Pollution Research*, 27(14), pp.17072-17084.
29. Farzanegan, M.R., 2011. Oil revenue shocks and government spending behavior in Iran. *Energy Economics*, 33(6), pp.1055-1069.
30. Farzanegan, M.R., 2018. The impact of oil rents on military spending in the GCC region: does corruption matter?. *Journal of Arabian Studies*, 8(sup1), pp.87-109.
31. Fearon, J. D. (2005). Primary commodity exports and civil war. *Journal of conflict Resolution*, 49(4), 483-507.
32. Fjelde, H., 2009. Buying peace? Oil wealth, corruption and civil war, 1985—99. *Journal of peace research*, 46(2), pp.199-218.
33. Fjelde, H. and De Soysa, I., 2009. Coercion, co-optation, or cooperation? State capacity and the risk of civil war, 1961—2004. *Conflict management and peace science*, 26(1), pp.5-25.
34. Frank, Claudia, and Lena Guesnet. 2009. "We were promised development and all we got is misery" - The Influence of Petroleum on Conflict Dynamics in Chad." Brief 41. November. Bonn, Germany: Bonn International Center for Conversion (BICC). <https://www.bicc.de/uploads/txicctools/brief41.pdf> (February 3, 2022).
35. Gunter, F.R., 2015. ISIS and oil: Iraq's perfect storm. *Foreign Policy Research Institute*.
36. Henderson, E.A. and Singer, J.D., 2000. Civil war in the post-colonial world, 1946-92. *Journal of Peace research*, 37(3), pp.275-299.

37. Hendrix, C.S., 2010. Measuring state capacity: Theoretical and empirical implications for the study of civil conflict. *Journal of peace research*, 47(3), pp.273-285.
38. Hendrix, C.S., 2017. Oil prices and interstate conflict. *Conflict Management and Peace Science*, 34(6), pp.575-596.
39. Herbst, J. (2000). Economic incentives, natural resources and conflict in Africa. *Journal of African Economies*, 9(3), 270-294.
40. Ikelegbe, A., 2010. Oil, resource conflicts and the post conflict transition in the Niger Delta region: Beyond the amnesty.
41. Le Billon, P., 2012. *Wars of Plunder: Conflicts, Profits and the Politics of Resources*. Columbia University Press.
42. Lu, L., Thies, C. G. (2011). Economic grievance and the severity of civil war. *Civil Wars*, 13(3), 215-231.
43. Mason, T.D. and Krane, D.A., 1989. The political economy of death squads: Toward a theory of the impact of state-sanctioned terror. *International Studies Quarterly*, 33(2), pp.175-198.
44. Miguel, E., Satyanath, S., Sergenti, E. (2004). Economic shocks and civil conflict: An instrumental variables approach. *Journal of political Economy*, 112(4), 725-753.
45. Newsom, C. (2011). Conflict in the Niger Delta:. US Institute of Peace.
- 46.. Obi, C.I., 2010. Oil extraction, dispossession, resistance, and conflict in Nigeria's oil-rich Niger Delta. *Canadian Journal of Development Studies/Revue canadienne d'études du développement*, 30(1-2), pp.219-236.
47. Okonofua, B.A., 2016. The Niger Delta amnesty program: The challenges of transitioning from peace settlements to long-term peace. *SAGE Open*, 6(2), p.2158244016654522.
48. Okada, K. and Samreth, S., 2021. Oil bonanza and the composition of government expenditure. *Economics of Governance*, 22(1), pp.23-46.
49. Perlo-Freeman, S. and Brauner, J., 2012. Natural resources and military expenditure: The case of Algeria. *The Economics of Peace and Security Journal*, 7(1).
50. Ray, D., Esteban, J. (2017). Conflict and development. *Annual Review of Economics*, 9, 263-293.
52. Roessler, P. (2016). Ethnic politics and state power in Africa: The logic of the coup-civil war trap. Cambridge University Press.
52. Ross, M.L., 2008. Blood barrels-Why oil wealth fuels conflict. *Foreign Aff.*, 87, p.2.
53. Ross, M.L., 2012. The oil curse. In *The Oil Curse*. Princeton University Press.
54. Snyder, R., 2006. Does lootable wealth breed disorder? A political economy of extraction framework. *Comparative political studies*, 39(8), pp.943-968.
55. The World Bank, World Development Indicators (2020).
56. Tilly, C., 2017. War making and state making as organized crime. In *Collective violence, contentious politics, and social change* (pp. 121-139). Routledge.
57. U.S. Energy Information Administration, Crude Oil Prices: West Texas Intermediate (WTI) - Cushing, Oklahoma [DCOILWTICO], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/D> April 3, 2020.
58. Watts, M., 2007. Petro-insurgency or criminal syndicate? Conflict violence in the Niger Delta.
59. Watts, M., 2007. Petro-insurgency or criminal syndicate? Conflict & violence in the Niger Delta. *Review of African political economy*, 34(114), pp.637-660.

60. Watts, M.J. and Ibaba, I.S., 2011. Turbulent oil: Conflict and insecurity in the Niger Delta. *African Security*, 4(1), pp.1-19.
61. Wright, J., Frantz, E. and Geddes, B., 2015. Oil and autocratic regime survival. *British Journal of Political Science*, 45(2), pp.287-306.

Appendix

A visual model of our primary hypothesis yields a clear negative relationship between the prevailing market price for oil (measured in monthly mean intervals) and the average monthly battle deaths in ongoing conflicts, provided those conflicts are occurring in states heavily reliant upon the sale of crude oil for government revenue. Displayed in Figure 1, a full move across the range of observed price values for WTI Crude Oil in the dataset (from the lowest observed price to the highest) is predictive of over 50 fewer monthly deaths in ongoing civil conflicts on average among the states observed.



In order to re-test Hypothesis 1 with an interactive term, we specify the following four basic models of yearly conflict battle deaths to include oil rents as a share of the state's total GDP interacted with various measures of oil prices:

$$Battle\ Deaths_{it} = B_0 + B_1 WTI\ Price_{it} * Oil\ Rents_{it} + B_2 WTI\ Price_{it} + B_3 Oil\ Rents_{it} + B_4 \log(population)_{it} + B_5 \log(GDP)_{it} + B_6 BattleDeaths_{it-1} + C_i + e$$

$$Battle\ Deaths_{it} = B_0 + B_1 WTI\ Price_{i(t-1)} * Oil\ Rents_{it} + B_2 WTI\ Price_{i(t-1)} + B_3 Oil\ Rents_{it} + B_4 \log(population)_{it} + B_5 \log(GDP)_{it} + B_6 BattleDeaths_{it-1} + C_i + e$$

$$Battle\ Deaths_{it} = B_0 + B_1 WTI\ Price\ Change_{it} * Oil\ Rents_{it} + B_2 WTI\ Price\ Change_{it} + B_3 Oil\ Rents_{it} + B_4 \log(population)_{it} + B_5 \log(GDP)_{it} + B_6 BattleDeaths_{it-1} + C_i + e$$

$$Battle\ Deaths_{it} = B_0 + B_1 WTI\ Price\ Change_{i(t-1)} * Oil\ Rents_{it} + B_2 WTI\ Price\ Change_{i(t-1)} + B_3 Oil\ Rents_{it} + B_4 \log(population)_{it} + B_5 \log(GDP)_{it} + B_6 BattleDeaths_{it-1} + C_i + e$$

Below is a table presenting the results of the formal model used for the illustration in Figure 2, which uses monthly data instead of yearly data.

Oil Prices and Conflict Intensity in all Conflict States

	<i>Dependent variable:</i>	
	Battle deaths (monthly avg)	
	(1)	(2)
WTI P(t)*Oil rents	-1.1*** (0.004)	
WTI P(t-1)*Oil rents		-0.8** (0.004)
WTI P(t)	-0.302*** (0.055)	
WTI P(t-1)		-0.295*** (0.055)
Oil rents	-3.456*** (0.378)	-3.696*** (0.377)
log(Population)	122.718*** (9.557)	121.018*** (9.588)
Sec score	7.061* (3.770)	7.239* (3.772)
Observations	10,224	10,224
R ²	0.043	0.042
Adjusted R ²	0.037	0.036
F Statistic (df = 5; 10161)	91.804***	89.749***

Notes: Models are panel linear regressions with country fixed effects. Price coefficients show the result of a 100 dollar increase in oil prices. Robust standard errors in parentheses.*p<0.1; **p<0.05; ***p<0.01

Below are the formal model specifications used for H2. The models using only oil reliant states were not able to employ the debt variable due to the limited number of observations.

$$Military\ Expenditures_{it} = B_0 + B_1 WTI\ Price_{it} * Oil\ Rents_{it} + B_2 WTI\ Price_{it} + B_3 Oil\ Rents_{it} + B_4 \log(GDP)_{it} + B_5 FX\ Reserves_{it} + B_6 Gov\ Debt_{it} + C_i + e$$

$$Military\ Expenditures_{it} = B_0 + B_1 WTI\ Price_{i(t-1)} * Oil\ Rents_{it} + B_2 WTI\ Price_{i(t-1)} + B_3 Oil\ Rents_{it} + B_4 \log(GDP)_{it} + B_5 FX\ Reserves_{it} + B_6 Gov\ Debt_{it} + C_i + e$$

$$Military\ Expenditures_{it} = B_0 + B_1 WTI\ Price_{i(t)} + B_2 \log(GDP)_{it} + B_3 FX\ Reserves_{it} + C_i + e$$

$$Military\ Expenditures_{it} = B_0 + B_1 WTI\ Price_{i(t-1)} + B_2 \log(GDP)_{it} + B_3 FX\ Reserves_{it} + C_i + e$$

In order to test the robustness of these models, we employed additional specifications shown in the table below. The first two models add the use of fixed effects for time. The second two models include this and log the dependent variable. In each specification, the results remained consistent.

Robustness Checks for Spending Models

	<i>Dependent variable:</i>			
	milex (2017 constant USD)		log(milex (2017 constant USD))	
	(1)	(2)	(3)	(4)
Oilrents	-384,447,114 (246,662,205)	-160,865,293 (223,333,541)	-0.026 (0.024)	-0.021 (0.022)
log(GDP)	3,283,270,833*** (1,094,388,524)	3,666,134,906*** (1,088,693,981)	1.170*** (0.107)	1.184*** (0.105)
Total reserves	10,815,253*** (356,339)	10,759,540*** (357,815)	0.0001*** (0.00003)	0.0001*** (0.00003)
Central government debt	11,786,521 (10,796,978)	19,292,384* (10,398,843)	0.004*** (0.001)	0.004*** (0.001)
WTIprice(t)*Oilrents	11,922,098*** (3,576,031)		0.001* (0.0003)	
WTIprice(t-1)*Oilrents		5,342,796*** (2,010,420)		0.0004** (0.0002)
Observations	384	384	384	384
R ²	0.783	0.781	0.366	0.368
Adjusted R ²	0.748	0.745	0.261	0.264
F Statistic (df = 5; 329)	237.792***	234.174***	37.911***	38.277***

Note:

*p<0.1; **p<0.05; ***p<0.01

Below is the formal model specification used for H3.

$$Battle\ Deaths_{it} = B_0 + B_1 \log(milex)_{it} + B_2 \log(population)_{it} + B_3 SecScore_{it} + B_4 \log(GDP)_{it} +$$

$$B_4 \textit{Battleddeaths}_{it-1} + C_i + e$$