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Does Oil Promote or Prevent Coups?

Frode Martin Nordvik

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Frode Martin Nordvik*

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Abstract

A large literature investigates the relation between oil and conflict, yet no empirical study has found any link between oil and coups d'état. Using a new data set on oil production separated into onshore and offshore production, and covering 172 countries from 1900 to 2012, onshore oil is seen to promote coup while offshore oil prevents them. A likely mechanism is that onshore oil motivates military build-ups, while offshore oil does not. From a political leader's point of view, a large military is a double-edged sword, because it may turn against him and stage a coup.

JEL codes: Q34, Q41, D74, H56, O17
Keywords:: political economy, natural resources, coups d'état, military spending

* *Corresponding author*: Frode Martin Nordvik, BI Norwegian Business School, Department of Economics. Email: frode.m.nordvik@bi.no. This paper is part of the research activities at the Centre for Applied Macro and Petroleum economics (CAMP) at the BI Norwegian Business School. I am very grateful for invaluable guidance and support from Hilde Bjørnland, Jørgen Juel Andersen, Ragnar Torvik, Steffen Grønneberg and all affiliated with CAMP, as well as participants at the EEA Annual Congress 2014, Computing in Economics and Finance (CEF) 2014, IAAE 2014 Annual Conference and NHH-UIO Macro workshop 2014 .

1 Introduction

A striking feature of cross-country coup data is that eight of the ten countries that have experienced the most coups since 1950 are oil producers, see Figure 1. Furthermore, the output of seven of these oil producing countries derives largely from onshore oil deposits. Yet existing studies of oil and political conflict are unable to identify whether oil rents promote coups. The most recent example is a panel data study by Cotet and Tsui (2013) who found no robust link between aggregate oil reserves and the occurrence of coups. In this paper, I analyze whether the *location* of oil deposits matter for the frequency of coups. The paper's key innovation is to employ new global oil data that disentangles oil production into onshore and offshore volumes. This allows me to study the association between coups and oil's location in a panel data set of about 130 countries in the period 1950-2008.

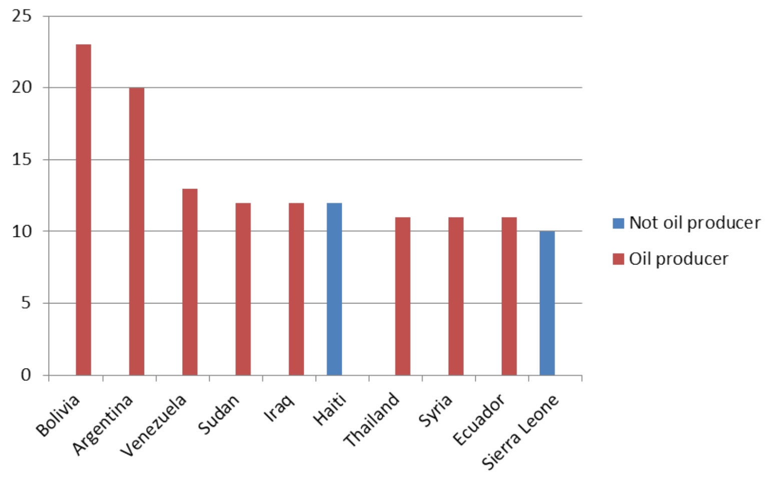
After disentangling oil production into onshore and offshore volumes, a main finding is that oil is indeed strongly associated with coups. On the one hand, a one standard deviation increased *onshore* oil production almost doubles the coup rate, from one coup every 20 years to one every eleven years on average. On the other hand, a one standard deviation increase in *offshore* oil production *reduces* the coup frequency to once every 23 years on average.

Common to onshore and offshore oil is that both provide rents to the government. A key difference, however, is that onshore oil facilities are difficult to defend, and hence creates an incentive to build a strong military. First, it is well known that *onshore* oil deposits are vulnerable to theft by insurgents (Le Billon, 2001). As a very recent example, consider the IS terrorist group in Iraq and Syria which exports sizeable volumes of oil from captured onshore oil fields to fund their operations.[1] *Offshore* oil fields, on the other hand, do not seem to offer funding opportunities to rebels, the reason being their location far from land, and the physical characteristics of the oil rigs. While onshore oil can be loaded on to trucks and transported to black-market customers,[2] this is not a feasible option for offshore oil. Second, onshore oil is also susceptible to pure sabotage. Numerous attacks against onshore oil installations are carried out each year without any clear motivation other than to voice opposition against the ruling regime. An illustration of the severity of these attacks is the recent decision by several foreign oil companies to divest from onshore oilfields in Nigeria, and focus on safer offshore oil assets. Oil theft and sabotage against the onshore sites was cited as the main reasons for reducing onshore presence.[3] Thus, land-based natural resources provide insurgents with an opportunity to directly voice their grievances through sabotage, or to capture oil revenue through the illegal appropriation of oil fields. Hence, onshore oil creates incentives to build a strong military, while offshore oil does not.

The existing theoretical literature on natural resources and conflict focuses largely on civil war (e.g., Aslaksen and Torvik, 2006; van der Ploeg and Rohner, 2012). However,

[1] Reuters, July 23 2014, "Oil smuggling finances Islamic State's new caliphate".
[2] Wall Street Journal, September 16 2014, "Islamic State Funds push Into Syria and Iraq With Labyrinthine Oil-Smuggling Operation".
[3] Financial Times, May 4 2014, "Theft and sabotage lead Nigeria into an oil crisis".

Figure 1: Top 10 coup countries in period 1950-2008



few contributors analyze coups. One exception is Acemoglu et al. (2010). In their model, a dictator needs to build a large military in order to stay in power and to avoid a costly transition to democracy. But a strong military is a double-edged sword; it can be effective in preventing transition to democracy, but it also creates, as Acemoglu et al. (2010) note (p. 2) "a *political moral hazard problem* because it can turn against the elite and take direct control of the government".

To support my argument, I explore the hypothesis that, because regimes in countries rich with onshore oil have an additional incentive to build a strong military branch, there is an increased risk the military may be tempted to stage a coup against the regime. Consistent with this hypothesis, the analysis confirms a link between onshore oil and an increase in defense spending. A one standard deviation increase in onshore oil production is associated with about 130 dollars more defense spending per capita. For offshore oil production, however, no significant effect on military spending is found. Moreover, I find that for the limited period for which military spending data are available, onshore oil is positively linked to coup likelihood, but only when accompanied by higher military spending [4]

A modest amount of empirical work has been carried out to explore the link between oil and coups. Svolik (2012) finds no effect of fuel exports as a share of GDP on the likelihood of coups. The only other rigorous contribution that I am aware of is Cotet and Tsui (2013), which is closely related to this study. In their work, too, no link is identified when looking at the effect of aggregate oil reserves on the frequency of coup attempts once they control for country fixed effects. One possible interpretation of the results in both Cotet and Tsui(2013) and Svolik (2012) is that the net effect of oil on coups could be nulled out in an analysis where offshore and onshore resources are lumped together into one single resource wealth measure, be it fuel exports or aggregate oil reserves. Indeed, using the new oil production data, and aggregating the onshore and offshore oil production variables that I use in this paper into one single variable, my analysis confirms the findings of Cotet and Tsui (2013) and Svolik (2012).

[4]See discussion in section 5.3.

While this paper is about coups, the study fits well with the branch of the resource curse literature that links oil to conflict (e.g. Collier and Hoeffler, 2000; Fearon and Laitin, 2003; Ross, 2004; Lujala, 2010). Common to virtually all previous contributions is their failure to take into account the location of natural resources − or any other sources of oil heterogeneity for that matter. Only Lujala (2010), studying the outbreak and persistence of civil wars, has explicitly accounted for the location of oil resources, finding that only onshore oil is positively linked to civil war. However, the difference between coups and civil conflict is that violence in civil wars is two-sided, between an insurgent and a government (Besley and Persson, 2011), and often takes place in remote corners of a country. In contrast to civil war, coups have their origin *within* a nation's state apparatus. Moreover, Lujala (2010) lacks data on onshore and offshore production and simply relies on a dummy for onshore oil. The current analysis, however, uses information on oil production volumes at the two different types of locations.

This paper is also related to the literature on the structural and long-term causes of coups. Tullock (1974) was the first economist to write about coups, stressing how a dictator can use rewards and punishments to deter coup plans. Poverty, inequality and political fractionalization are primary conditions that make societies more coup-prone (Acemoglu and Robinson, 2001; Belkin and Schofer, 2003; Huntington, 1995; Jackman, 1978; Londregan and Poole, 1990). Coups are particularly common in non-democratic regimes, but have also occurred in democracies, as well as in transitional regimes (Sutter, 2000; Hiroi and Omori, 2013). This paper contributes to this literature by adding the location of natural resources as a predictor of coup attempts.

Moreover, I also improve the methodological approach of previous work. In Cotet and Tsui (2013), fixed effects are included in the estimation but time fixed effects are not properly accounted for. Since annual coups in the world have trended downwards since the 1960s, this warrants the inclusion of a common time trend in the analysis. Additionally, OLS can be inappropriate for count data since it can predict negative counts and might yield inefficient estimators. Hence, this study uses a fixed effects negative binomial regression, which is better suited for discrete counts such as coups (King, 1988).

Lastly, the paper relates to the broader literature on the effect of political instability on economic performance. In this literature, Alesina et al. (1996) documents the adverse effects of political instability, of which coups is a main source of variation, on economic growth - a finding that has been confirmed also by others (e.g., Aisen and Veiga, 2013). I advance this literature by identifying how political instability can be traced back to the location of natural resources.

The paper proceeds as follows. Section 2 covers the data and coup definition as well as a describing the oil data set. Section 3 outlines the empirical estimation framework, while section 4 provides the main results from the estimations. Section 5 discusses possible mechanisms, including the hypothesis that onshore petroleum resources are associated with higher military spending. Section 5 also discusses and tests the hypothesis that offshore oil is associated with more intercepted coup plots and arrests of coup-makers than onshore oil. In addition, section 5 discusses potential concerns for this paper's main result. Section 6 concludes.

2 Data and definition

2.1 Coup data

The main dependent variable in this paper is the number of observed coup attempts, successful or not, in country i at time t.[5] Hence, the data covers both successful and failed coup attempts. Success is defined as coup events where coup-makers were able to hold on to power for at least seven days. The coup data were compiled by Powell and Thyne (2011), and covers the period 1950 to 2008 for a sample of 192 countries. Coup is defined as "Illegal and overt attempts by the military or other elites within the state apparatus to unseat the sitting executive". Essential to a coup attempt is the control of all or part of the armed forces or other military elements. Unlike a revolution, which is usually achieved by large numbers of people seeking basic political and economic change, a coup is a change in power from the top that results in the abrupt replacement of the ruling elite. As such, a coup rarely changes a nations fundamental social and economic policies (Encyclopedia Britannica, 2014). For my purposes, a coup attempt is an observable measure of political instability.

Coups are the most prevalent form of non-democratic regime change in the world, more common than regular elections in some nations (Sutter, 2000). The total number of coup attempts in the data set is 450, and the total number of observations is 8517, so the unconditional probability of experiencing a coup attempt is .053. Hence, on average, a coup occurs every 20 years. In this paper, this is referred to as the mean *coup rate*. The corresponding mean success rate is 48 percent during the entire time span. Geographically, almost three quarters of these coup attempts have been observed in Africa and Latin America, with 41 percent in Africa and 31 percent in Latin America. Historically, coups are about 4.5 times more likely to occur in any given year in a country below the mean democracy level than in a country that has above mean institutional quality.[6] Figure 2 shows that the number of annual coup events worldwide has declined since the 1960s, when coup attempts were particularly rife.

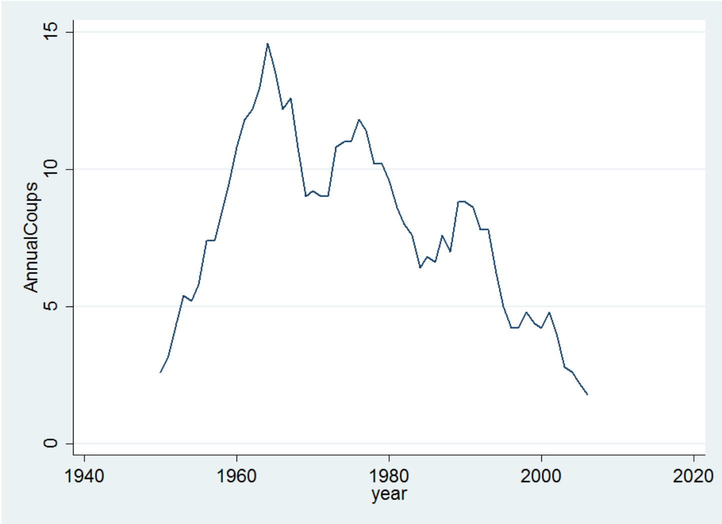
Other datasets on coups are available, most importantly Marshall and Marshall's (2007), who in addition to overt coup attempts also include 'unobserved' coup attempts, such as coup plots and alleged coup plots. Hence, this data set includes more coup observations, a total of 716 coup attempts. However, the measurement error associated with coup plots and alleged coup plots is likely to be substantial, and governments often have an incentive to fabricate coup plots and rumors to justify repression (Powell and Thyne, 2011). Nevertheless, I run separate regressions also for this data set. In addition, I construct a new variable where only the plots and alleged plots are counted. This generates a variable with 337 observed coup plots and alleged coup plots that can be analyzed separately.[7]

[5] Throughout, coup d'etat will be referred to simply as "coup".

[6] The total number of country-years where at least one coup occurred in the non-democratic sample throughout the period is 305, while 80 country-years experienced at least one coup in the above-average democratic countries in this period.

[7] See section 5.2

Figure 2: Annual coups in the world, 1950-2008



2.2 Oil data

The global oil production series decomposed into onshore and offshore sources is provided by Rystad Energy's UCube database (2013). Rystad is an independent oil and gas consulting services company headquartered in Oslo, Norway. They in turn have collected the production data from oil and gas companies' annual reports as well as authorities' historical production accounts. Based on this data, I construct the variables for yearly onshore and offshore production, measured in barrels per capita for each country-year.

Historically, the volume of onshore oil production is higher than offshore oil production, and today offshore volumes are about half the volume from onshore sources.[8] Also, the timing is different. The first oil well ever drilled was at an onshore oil field in Pennsylvania in 1859, while the first offshore oil well was drilled off the coast of California in 1896. It was not until the 1960s and 1970s that output from offshore oil fields reached significant levels, relative to the volumes from onshore sources. Perhaps surprisingly, countries below the mean democracy level have an eleven times higher average accumulated offshore oil production than their democratic counterparts, and similarly for onshore oil. These figures relate to a sample period from 1929 to 2008. This suggests that, with the aid of foreign oil majors, weakly institutionalized countries have been able to develop both offshore and onshore oil reserves. An illustration of this is Chevrons presence in Venezuela since the 1920s, or Royal Dutch Shell's operations in Nigeria since 1937. The variability of the two production series is similar, and the coefficient of within variation is 4.58 for offshore oil production per capita, and 4.33 for onshore oil production per capita.

Many empirical studies of the economic and political impact of oil uses oil reserves rather than production volumes as their principal source of resource variation, yet there are at least three advantages to focusing on production volumes rather than reserves in the current setting. First, the production figures vary more over time than estimates

[8] See Figure A4 in the appendix for a graphical display of historical onshore and offshore oil production measured in thousand barrels per day.

of reserves, so there is more within-country variation to exploit in the data. Second, production data are largely reported by international oil companies in their annual reports to investors, and are therefore more accurate than reserve data. A country's reserve figures are often reported by the governmental bodies in each country, and these bodies have sometimes other reasons for reporting a certain reserve figure. It is believed that OPEC countries overstate reserves in order to be able to produce more crude oil than their quota allows (Lux research, 2012). Since OPEC regulations only enable member countries to produce a certain fraction of total reserves, each member can boost its production quota by overstating the reserves. Reserves can also be overstated for other reasons, political or to attract investment. Third, estimated oil reserve figures are, even in the most developed oil-rich countries, associated with significant geological uncertainty, and should always be interpreted with caution. Moreover, according to Torvik (2013), using oil reserves as a measure of resource abundance is likely to introduce biases that portray oil as having favorable effects on institutions since well-functioning countries that have discovered more of their petroleum reserves will be measured as resource abundant.

2.3 Other controls

In addition to the main variables reviewed above, I also add a range of control variables that are assumed to explain variation in coup events. The following determinants of coups are used: log of GDP; economic growth; log of population; Polity IV democracy index from the Center for Systemic Peace; crude oil price in constant 1990 dollars; oil discoveries measured in million barrels per 1000 persons from the Association for the Study of Peak Oil and Gas (ASPO);[9] and a dummy for ongoing civil war from Gleditsch Correlates of War, version 1.52. In the fixed effects specifications, only relevant time-varying variables are included. The military spending variable that I use to explore the potential link between onshore oil, the military and coups is from the Stockholm International Peace Research Institute (SIPRI), and covers the years 1989-2003 and 156 countries. The variable measures military spending as percentage of GDP. For our purposes, this variable is transformed into military expenditure in constant US dollars per capita. Average spending on military per capita is 184 US dollars. Unfortunately, extensive military spending data are not available before 1989. However, as a robustness check, military spending will be included in the coup estimation.[10] See the appendix for summary statistics of all relevant variables.

3 Empirical strategy

3.1 Main analysis of oil and coups

The coup variable analyzed is a standard count variable, representing the number of coup attempts for country i at time t. A useful approximation to the underlying data

[9]The ASPO data and most of the controls are from Cotet and Tsui (2013).
[10]See table A5 in the appendix and comments in section 5.3.

generating process for an event count is usually taken to be a Poisson distribution, a distribution that is discrete and is restricted to positive values. King (1988) lists several problems associated with using OLS models on event count data. First, OLS assumes a linear relationship. Imposing a linear relation often results in predicting event counts that are less than zero and therefore meaningless. Second, OLS introduces inefficiencies in the estimates because it does not take into account the underlying Poisson distribution of the disturbances. According to King, the result can be that OLS estimators get both the sign and size wrong.

To avoid this source of impreciseness in the estimates, I use a negative binomial regression with fixed effects, as proposed by Cameron and Trivedi (1998).[11] Because of overdispersion in the distribution of coups, the negative binomial regression model fits better than the pure Poisson specification. The negative binomial distribution can be regarded as a generalization of the Poisson distribution with an additional parameter allowing the variance to exceed the mean. In our case the mean of the coup variable is 0.053 and the variance is 0.261. The empirical model to be estimated then reads:[12]

$$Coups_{i,t} = \exp(\beta X_{i,t} + \gamma_t + \delta_i + \varepsilon_{i,t}), \tag{1}$$

where the vector $\beta X_{i,t}$ is a battery of time-varying control variables that are assumed to be related to the occurrence of coups, γ_t is the time-fixed effects, δ_i is the country-fixed effects and $\varepsilon_{i,t}$ is an error term which is clustered at the country level. $Coups_{i,t}$ is the predicted number of coups, restricted to be a positive integer. Adding country fixed effects allows the model to control for any time-invariant unobserved cross-country heterogeneity. The omitted variable bias arising from the exclusion of any stable confounding factors on the country level, is thus removed completely from the estimation. In our setting, time-invariant country-characteristics that may be important to control for, are factors like political culture and norms as well as historically predetermined conditions such as, e.g., colonial past, geographic traits and social structures that have been relatively stable over the time span. The time fixed effects are mainly included to control for a common time trend in the evolution of coups. From Figure 2, showing the annual number of coups globally since 1950, it is clearly necessary to control for time trends, since the number of coups seem to have declined more or less steadily since the early 1960s.

3.2 Military spending analysis

Military spending is a persistent time-series for most countries (Goldsmith, 2003). That being the case, it is natural to consider a dynamic model specification. The estimation of military spending is therefore based on a fixed effects OLS and a dynamic GMM model. OLS regressions with lagged levels of military spending would yield an estimator upwards

[11] An early application of count regression in a panel data setting is found in Hausman et al. (1984), in a study of patents.

[12] With a slight abuse of notation.

biased and inconsistent, since the lagged level of military spending is correlated with the error term. The fixed effects within-transformation do not solve the problem because of the possible Nickel bias (Nickel, 1981).

As a baseline estimation, I estimate an OLS regression without including the lagged level of military spending included as a covariate. In this first regression, I use the within estimator to control for country fixed effects, and in addition add year dummies to control for any common time trend.

I then compare the results of the OLS model with a GMM model. As shown by Blundell and Bond (1997), when the coefficient on the lagged dependent variable approaches unity, so that the dependent variable is close to a random walk, the differenced GMM (Arellano and Bond, 1991) has poor finite sample properties, and will be downward biased. Therefore, the System GMM estimator is more suitable, as proposed by Blundell and Bond (1997). In dynamic panel settings, the system GMM approach is found to perform better than the difference GMM model when series are persistent (coefficient on lagged dependent variable is close to unity), and there is a reduction in the finite sample bias due to the exploitation of additional moment conditions (Blundell et al. 2000).

In our case, the coefficient on lagged military spending is 0.96, suggesting that the system GMM model performs better than a difference GMM model. The GMM approach is the most suitable for situations where one has a small T, large N. In our case T is 15 and N is 121. To avoid the issue of too many instruments, I restrict the number of lags to three.

4 Results

4.1 Main results

The baseline results in the following section refer to the estimation of model 1, where the dependent variable is the number of coups; the results are displayed in table 1. Column 1 shows the estimation where aggregate oil production in barrels per capita is the main covariate of interest. Country and year fixed effects are included in all the estimations. The *total oil production* coefficient is insignificant as an explanatory variable for coup attempts, confirming Cotet and Tsui (2013) who find no effect of aggregate oil reserves in thousand barrels per capita on the number of coup attempts. As expected, democratic level, income and economic growth are negatively associated with coups. This confirms earlier studies of the structural causes of coups. [13]

In column 2, the only change from column 1 is that the aggregate oil production is disentangled into onshore and offshore production volumes. Importantly, this yields highly significant coefficients, but with opposite signs. Onshore oil shows a strong positive link with the rate of coups. For the offshore oil coefficient, the reverse is true: there is a strong negative association with the rate of coups. In a negative binomial regression, the interpretation of the coefficients requires that one takes the exponential of each coefficient. Doing so yields the following results: A one standard deviation increase in onshore

[13] See literature discussion in the introduction.

oil production per capita is associated with an average increase in the coup rate that corresponds to moving from one coup attempt every 20 years to one every 11 years. For offshore oil, a one standard deviation increase in offshore oil production per capita is associated with an average decrease in the coup rate that corresponds to moving from one coup attempt every 20 years to one every 23 years.

In column 3, other relevant controls are added. An ongoing civil war could likely lead to instability also at the political level, resulting in coup attempts. Therefore, a dummy for years during which a country had an ongoing civil war is added. Also, expectations of future oil revenues could spur coup plotters to attempt a coup. Oil discoveries are therefore added as a control, a variable that measures the size of oil discoveries per country per year. Lastly, a lagged coup variable is added, in order to check for any persistence in the rate of coup attempts. The dummy for ongoing civil war is positively and significantly linked to a higher coup rate. Coups are more rife in the turmoil of a civil war than in peacetime. Oil discovery does not seem to affect the coup rate. The lagged level of coup attempts is significant and positive. This indicates that there is some 'coup persistence', or that one coup attempt increases the likelihood of another at a later date. Importantly, however, the estimates on onshore and offshore production remain statistically significant and stable in size throughout.

As mentioned, coups are more than four times as likely to occur in a given year in a non-democratic country than in a democratic country. This warrants a separate estimation on the non-democratic sample. The results from a regression on the sample of countries that are below the mean level of democracy is shown in column 4. The coefficient on offshore oil actually gains in magnitude from 0.008 to 0.01 and the onshore coefficient becomes slightly smaller. However, both the onshore and offshore oil production coefficients are still significant at the 1 percent level and 0.1 percent level, respectively.

Table 1: Fixed effects negative binomial regression

	(1)	(2)	(3)	(4)
Dependent var: No of coup attempts				
Total Oil production per. capita	**0.0015**			
	(1.03)			
Onshore oil production per. capita		**0.008*****	**0.007*****	**0.007*****
		(6.96)	(5.5)	(4.77)
Offshore oil production per. capita		**-0.009****	**-0.009*****	**-0.012****
		(-3.17)	(-2.95)	(-3.06)
log of GDP	-101.01**	-110.96**	-88.10**	-68.56*
	(-3.16)	(-3.42)	(-2.91)	(-2.09)
Economic growth	-3.47**	-3.42**	-2.58**	-2.13*
	(-3.24)	(-3.31)	(-2.76)	(-2.02)
log of population	-132.39	-170.14*	-185.33*	-308.65**
	(-1.55)	(-2.66)	(-2.04)	(-2.58)
Democracy index	-85.60*	-90.18**	-98.22**	138.34*
	(-2.56)	(-2.66)	(-3.09)	(2.19)
Crude oil price			.061	.12*
			(1.17)	(2.08)
Ongoing civil war			.857**	0.72*
			(2.86)	(2.10)
Oil discovery			-.303	-1.25
			(-.73)	(-1.88)
Lag of No of Coup attempts			.275**	.21
			(3.30)	(1.80)
Constant	14.71	18.73*	-1.689	5.68
	(1.77)	(2.28)	(-.28)	(.78)
N	6080	6080	4209	2390
$Countries$	128	128	99	74
FE	C/Y	C/Y	C/Y	C/Y

t statistics in parentheses

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

4.2 Robustness

In order to make the results from the first regressions more robust, I estimate several alternative models. First, one robustness exercise is to check if the main results hold for a different set of coup data, namely Marshall and Marshall's (2011). The results from this estimation are found in table A6 in the appendix. Column 1 substantiates the main finding from Cotet and Tsui (2013). Aggregate oil production is insignificant as a covariate for coup attempts. Column 2 confirms that decomposing the total oil production into onshore and offshore volumes, yields significant results. Onshore oil is positively associated with coups, but this time, the offshore oil coefficient is statistically insignificant at the conventional levels. However, when additional controls are included, in column 3, the results from table 1 are reconfirmed. The coefficients are remarkably similar to the ones estimated in table 1, and onshore oil production per capita is significant at the 0.1 percent level and offshore oil production per. capita at the 5 percent level. In the last column, the regression is estimated only on the non-democratic sub-sample of countries. For this sample, the onshore oil coefficient remains stable and has an even higher t-value than in the full sample regression. The offshore oil coefficient is still significant at the 5 percent level.

Second, since the production time series are non-stationary for most countries, an alternative model specification is to estimate all variables in first-differences with Ordinary Least Squares. This addresses potential spurious regression problems, while at the same time taking into account any country fixed effects. In addition, it checks if results are confirmed also when using a linear model such as Ordinary Least Squares. However, since it is estimated by Ordinary Least Squares and not a negative binomial regression, I expect the coefficients to be less efficiently estimated.[14] The results are found in table A7, where the regressions from table 1 are repeated, this time on the Powell and Thyne (2011) coup data. Column 1 shows the regression with the aggregate oil production per capita, which is still statistically insignificant. Column 2 shows the decomposed oil production coefficients, and again onshore and offshore oil have opposite signs and are significant, now at the 5 and 0.1 percent level, respectively. Adding more controls in column 3 does not change the results.

Third, I check whether the main results hold across different model specifications. Table A8 shows the results of a fixed effects logistic regression. First, both the available coup variables are transformed into two different dummy variables, equal to one if there were one or more coup attempts in a year, and zero if not. The results are confirmed also in this framework. The results for the Powell and Thyne (2011) data set are summarized in column 1 and 2, while column 3 reiterates the estimation for the Marshall and Marshall (2011) data set. Lastly, column 4 restricts the sample to non-democratic countries.

Fourth, table A9 shows the the baseline results from table 1 using a negative binomial fixed effects regression, but only regressing on the sample of countries that have experienced at least one coup attempt since 1950. The results are robust also for this coup-sample of countries.

[14]See discussion on count models in section 3.

Fifth, an implicit assumption so far is that a production increase one year leads immediately to a higher coup rate. But coup attempts presumably require some planning, and can not always be initiated immediately. Therefore, all explanatory variables are transformed into five-year changes and lagged one period so that they describe the past five years change in, e.g., onshore and offshore oil production before a coup attempt occurs. Table A10 shows the results, where the coefficient on onshore oil production per capita stays stable. This suggests a build-up period in onshore oil production before the military attempts a coup. The negative link between offshore oil and coup, however, disappears if I use a five year change in offshore oil production as a covariate, something which suggests that the link between offshore oil and less coups is more short-term in terms of timing. A dictator may be able to respond more quickly to possible coup threats and intercept them, even when offshore oil extraction has not been in place for a long period.

Lastly, another robustness check is to remove extreme cases. Therefore, a regression without the identified countries that have experienced the highest number of coups in a single year are excluded from the estimation. The results from this exercise are shown in table A11, and once again the coefficients remain stable.

5 Discussion of mechanisms

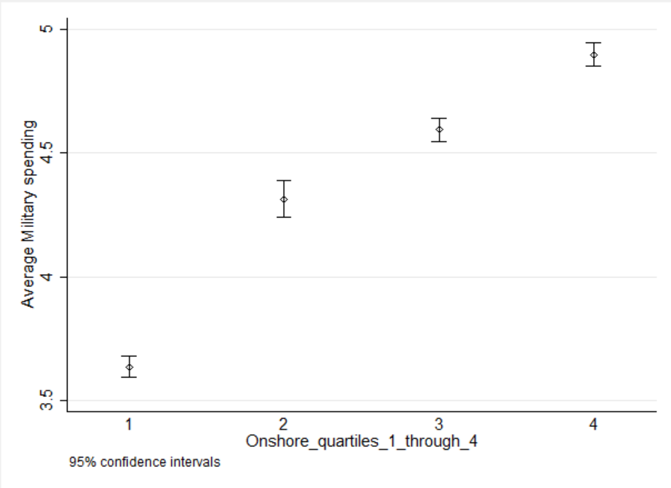
5.1 Onshore oil and military spending

Why do offshore and onshore oil have opposite signs in the regressions predicting coup attempts? Roughly 3 out of 4 coups originate in the military (Oberg et al., 2011). Hence, any mechanism that aims to explain variation in coup attempts should include the military. To reiterate my hypothesis, if a dictator wants to secure the rents from onshore oil, he needs to build a strong army to protect oil fields from rebels and insurgents. However, based on the model in Acemoglu et al. (2010), a strong military may turn against the dictator and stage a coup. Another model proposing this mechanism is Besley and Robinson (2010), whose theory of military coups emphasizes a dictator's need to control the military. In their model, only a large military poses a coup threat, contrary to a "tin pot" military which is too weak to stage a coup. For the data to support this proposed mechanism, onshore oil must be associated with higher average levels of military spending. Moreover, onshore and offshore oil must have different impacts on defense spending.

Perlo-Freeman et al. (2012) describe several ways in which natural resources can lead to a build-up in military expenditure. First, since oil rents are a source of income independent of taxation of citizens, such revenues are often more easily used for arms purchases than money from ordinary taxpayers. Second, defense spending can be increased in order to protect oil infrastructure from attacks. Third, a regime whose hold on power depends critically on resource revenue, may spend more on the military as a guarantor of regime survival.

Existing empirical evidence suggests that authoritarian regimes spend more on defense than democratic regimes (Hewitt, 1992; Goldsmith, 2003). Furthermore, Cotet and Tsui

Figure 3: More onshore production, heavier defense burden



Note: The figure is a margins plot with 95 percent CI. The vertical axis measures the log of mean military spending in USD per capita while the horizontal axis shows the sample divided into quartiles from 1-4 according to their onshore production level.

(2013) find that in non-democratic countries, oil discoveries are associated with increased military spending. Ali et al. (2013), studying military spending patterns in the Middle East and North Africa, find that abundance of oil leads to increased military spending. Could the link between oil and defense spending be attributable to onshore oil? Broad patterns in the raw data do indeed seem to suggest a closer link between onshore oil and military spending. The unconditional correlation between onshore production per capita and military spending level per capita is .52, while it is .21 for offshore oil. Figure 3 tells a similar story. The countries in higher quartiles of onshore oil production also has higher average military spending level.

Table 2 shows the regression results for military spending. Column 1 shows the OLS fixed effects baseline regression. The coefficient on onshore oil production per capita is positive and significant at the 1 percent level. One standard deviation increase in onshore oil production per capita is associated with an 800 dollars increase in military spending per capita. As expected, there is no significant effect on military spending from offshore oil production.

However, as the military spending time series shows strong persistence, this calls for the inclusion of lagged military spending in the regression. Column 2 reports the results from the dynamic panel system GMM approach. The lagged level of military spending is strongly significant. The coefficient on onshore oil is positive and significant at the 5 percent level, but has diminished in magnitude. Now, taking into account the persistence of military spending, a one standard deviation increase in onshore oil production is associated with 133 dollars more in defense spending per capita. The coefficient on offshore oil production per capita is still insignificant.

Column 3 shows the results from the estimation on the sample of countries below the mean level of institutional quality. As one would expect, the coefficient on onshore oil production per capita is larger in magnitude when estimation is restricted to non-democratic countries, and it is still significant at the 5 percent level. The results confirm the findings on military spending in Cotet and Tsui (2013). However, my results indicate that the relation between oil and defense spending is driven solely by onshore oil. A one standard deviation increase in onshore oil production increases military spending by 257 dollars per capita. The coefficient on offshore oil production is still statistically insignificant.

The last column is again a regression on the whole sample of countries, but with added controls for the price of crude oil and for ongoing civil conflict, both of which show no significant link to military spending. Rather, the coefficient on onshore oil becomes even more significant, now at the 0.1 percent level. Moreover, the coefficient returns to the level from the second estimation. A one standard deviation onshore oil production is associated with 72 dollars more military spending per capita on average. Also GDP per capita is strongly significant in this estimation.

The standard post-estimation routine after system GMM regressions is to perform a Arellano-Bond test for serial correlation in the first-differenced errors. Because the first difference of independently and identically distributed idiosyncratic errors will be serially correlated, rejecting the null hypothesis of no serial correlation in the first-differenced errors at order one does not imply that the model is misspecified. Rejecting the null at higher orders implies that the moment conditions are not valid. For our case, the test is reassuring, and we can reject the null of no serial correlation of order one in the first-differenced errors at the 5 percent level. For second order serial correlation, we can not reject the null hypothesis. Therefore, it seems that the moment conditions are valid in our case.

A note of caution with regard to these results: the sample period for military spending data from Stockholm International Peace Research Institute (SIPRI) starts in 1989, when coup activity already had decreased substantially.[15] However, one feasible robustness exercise is to check whether the risk of coup from having onshore oil depends on military spending for this sample period. Table A5, column 1, shows the results of a regression where onshore oil production is interacted with military spending. The coefficient of the interacted variable is positive and significant at the 5 percent level, while the original onshore oil coefficient is insignificant. The results suggest that in this period, an increase in onshore oil production is positively linked to coup, but only when accompanied by more military spending.

[15] A fifth of the total number of coups in the data occurred after 1989.

Table 2: Fixed effects OLS and System GMM estimation

	(1)	(2)	(3)	(4)
Dependent var: Military spending per capita				
Onshore oil production per capita	**4.05****	**0.670***	**1.314***	**0.67*****
	(3.16)	(2.38)	(2.49)	(7.09)
Offshore oil production per capita	**0.59**	**0.0017**	**-0.322**	**0.005**
	(0.82)	(0.00)	(-0.90)	(0.03)
log of GDP	4637.47*	5599.8	1087.5	5589.4***
	(1.96)	(1.20)	(0.19)	(8.23)
log of population	-7225.24	744.3	-2980.1	714.3
	(-0.85)	(0.21)	(-0.67)	(0.62)
Democracy index	-103.12	1120.4	1702.3	1165.3
	(-0.05)	(1.05)	(0.12)	(1.63)
Lag of military spending		0.832***	0.775***	0.832***
		(23.25)	(13.74)	(58.05)
Ongoing civil war				1.733
				(0.46)
Crude oil price				0.005
				(0.13)
Constant	313.55	-514.4**	207.7	-511.0***
	(0.45)	(-2.87)	(0.30)	(-3.59)
N	1660	1524	551	1524
$Countries$	121	120	66	120
FE	C/Y	GMM	GMM	GMM

t statistics in parentheses

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

[16]

[16] A strong outlier in the military spending sample is Kuwait. Since 1989, the unconditional correlation between onshore oil production and military spending in Kuwait is -.91, and getting interpretable results from the estimations requires the removal of Kuwait as an identified outlier. Since the military spending variable time period starts in 1989, and Saddam Husseins Iraq invaded Kuwait in 1990, oil production and military spending in Kuwait follows a special pattern. In 1990, due to the land invasion by Iraqi forces, production from Kuwait's onshore wells that year dropped to historically unprecedented levels. The same year, Kuwaiti defense spending rose to equally unprecedented levels, and more than quadrupled. For these reasons, Kuwait is removed from the estimations.

5.2 Offshore oil and coup prevention

The previous section showed that the available data for military spending strongly indicate a positive relation between onshore oil and military spending. But why is *offshore* oil negatively associated with coups? In order to address this, I explore the coup dataset compiled by Marshall and Marshall (2011). It is as extensive as the one used in the main analysis, namely Powell and Thyne's (2011), but the two differ on one important point. Powell and Thyne's data contain a total of 450 *observed* coup attempts, successful and failed. Marshall and Marshall's (2011) contains 716 observations of coup attempts. The main reason for this difference is that the latter in addition to observed coup attempts count *coup plots* and *alleged coup plots*. Reports of coup plots and alleged coup plots are found in various news sources, and are of course of questionable quality compared to the observed coup attempts. These events are mainly news stories of arrested 'coup-plotters' and stopped coup plans. Common to all these events is that the alleged coups were stopped before they could be carried out.

Thus, the coup plots and alleged coup plots can be viewed as a signal of a dictator's ability to curb coup plots before plans are set into motion. Offshore oil extraction creates a relatively weaker incentive for a dictator to build a large military in order to secure the rents, since protecting the offshore oil facilities is relatively less demanding than onshore oil fields. Consistent with this, no significant link between offshore oil and military spending was found. A smaller army potentially poses less of a coup threat than a large one. This is in line with the theoretical mechanisms in both Acemoglu et al. (2010) and Besley and Robinson (2010), all of whom emphasize that a weaker military poses less of a coup threat. If the hypothesis is to be backed by the data, it must produce a positive and significant sign on the offshore oil coefficient for coups that were 'prevented', and a weaker, or no, effect of having more onshore oil production.

The plots and alleged plots are identified by the following simple transformation:

$$PreventedCoups_{i,t} = TotalCoups_{i,t} - ObservedCoups_{i,t}, \tag{2}$$

where *TotalCoups* is the sum of observed coup attempts, coup plots and alleged coup plots, as defined by Marshall and Marshall (2011) and *ObservedCoups* are only the *observed* coup attempts as defined by Powell and Thyne (2011). The transformation produces a variable that counts only the coup plots and alleged coup plots. These events are referred to here as *prevented* coups. The next step is to regress the prevented coups on the same covariates as the observed coup attempts, and look for differences in the coefficients.

The results from the regressions are shown in table 3. The first column shows the estimation with aggregate oil production as the main coefficient of interest. As it is significant at the 5 percent level, prevented coups seem to be linked positively to total oil production.

However, once oil production is disaggregated into onshore and offshore oil production, in column 2, the heterogeneous effects of offshore and onshore oil reappear. A one standard deviation increase in offshore oil production per capita means that a coup plot is revealed every 20 years, compared to every 25 years which is the unconditional mean rate of prevented coups. Therefore, these results suggest that, while onshore oil is robustly linked to a higher number of *observed* coup attempts, offshore oil is strongly linked to *prevented coups*. Does more offshore oil and the absence of a large military make it easier for the dictator to halt coup attempts before they are carried out? These results suggests that it does.

Column 3 shows the estimation results when additional relevant controls are added: the offshore coefficient grows in magnitude and significance. Since coups are most prevalent in non-democratic regimes, the last estimation, displayed in column 4, restricts the sample to countries below average in institutional quality. The coefficient on offshore oil gains both in size and in significance for the sample of non-democratic countries.

Table 3: Fixed effects negative binomial regression

	(1)	(2)	(3)	(4)
Dependent var: Prevented coups				
Total oil production per capita	**0.0107***			
	(2.16)			
Onshore oil production per capita		**0.007**	**0.006**	**0.007**
		(0.91)	(0.74)	(0.83)
Offshore oil production per capita		**0.014****	**0.019*****	**0.02*****
		(2.88)	(4.55)	(3.98)
Log of GDP	-97.52***	-99.15***	-104.38***	-116.66**
	(-3.31)	(-3.38)	(-3.28)	(-2.82)
Economic growth	-1.304	-1.279	-0.91	-0.274
	(-1.11)	(-1.10)	(-0.85)	(-0.28)
Log of population	-90.12	-92.89	-126.28	-218.26
	(-1.51)	(-1.56)	(-1.99)	(-1.88)
Democracy index	-68.93	-67.56	-59.82	-55.22
	(-1.73)	(-1.67)	(-1.50)	(-0.55)
Ongoing civil war			0.36	-0.41
			(1.54)	(-1.46)
Crude oil price			0.28	0.31*
			(-)	(2.30)
Constant	-4.922	-4.835	-8.30	-0.86
	(-1.89)	(.)	(.)	(.)
N	6080	6080	5702	3135
$Countries$	128	128	128	94
FE	C/Y	C/Y	C/Y	C/Y

t statistics in parentheses

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

5.3 Possible concerns

A first potential concern would be that my results are due to omitted unobserved cross-country heterogeneity. For example, being a well-functioning or poorly-functioning country is a relatively stable feature of a country that could give rise to an omitted variable bias. The inclusion of country fixed effects confronts this issue head on, since it removes any bias that is due to omitted confounding factors at the country level. Also, the technique removes all stable country characteristics that may be correlated with onshore and offshore oil exploration and production, income, institutional level or any other variable that is included in the estimation.

A second potential concern is the joint evolution of institutions and education levels within countries over time, consistent with Seymor Martin Lipset's (1959) modernization theory, implying that countries evolving in such a way may experience less coups. First, this would be a within-country *long-term* trend, as institutions and education levels do not change over night. The same applies to the development of oil reserves, which can take several decades in the case of offshore reserves. The statistical inference in this paper is based on yearly frequency production data for onshore and offshore oil and coups. Thus, the long-term trend described above would have to influence very short-term fluctuations in oil production in order to affect results, which is unlikely. Second, the regressions explicitly include institutional quality, economic growth and income level as time-varying covariates. So, indeed, if a country's institutional quality improves, the mentioned covariates should make sure that the offshore or onshore oil production variables are not acting as a proxy for any of them.

To the extent that coups are linked to measures of institutional quality, one possible critique is that countries with relatively better institutional standards on the margin drill more exploratory wells than their neighbouring countries (Cust and Harding, 2014). A wide interpretation of this result would be that higher institutional quality, i.e. fewer coups, would lead to more oil production in the long-run. Again, such a long-term concern is unlikely to affect production cycles in the short-term. Nevertheless, assuming the caveat is relevant for the results, it would, if anything, introduce a downward bias on both onshore and offshore oil production coefficients. If this were the case, it would only add to the credibility of the positive sign of the onshore oil coefficient.

A fourth possible concern is the alternative mechanism that, in a coup-year, a dictator in control of onshore oil assets foresees a coup originating in the military, and boosts production levels in order to extract all he can from the rent before he is ousted. This could also give a short-term effect of onshore oil production on coups, but for different reasons than those outlined in this paper. Table A12 in the appendix directly confronts this alternative story, as it reiterates the estimation from table 1, but with lagged oil production. For this story to be valid, using lagged levels of the oil production variables to explain coup should produce an insignificant coefficient for onshore oil production, since dictators are unlikely to systematically foresee coups two years ahead. The coefficients, however, stay significant and robust also for this exercise. Table A10 also addresses this issue, because all variables are estimated in 5-year changes. The onshore oil coefficient is still significant, suggesting that this is not a relevant caveat for this papers results.[17]

Nevertheless, I estimate two additional regressions to address possible issues of reverse causality and/or omitted variable bias. First, in the first-differences estimation of the baseline regression, the last column adds country and year fixed effects. The purpose of adding country fixed effects to a first-differences estimation is to control for any possible *country-specific* long or short-term trends that may affect coup frequency, institutional level, exploration activity or other time-varying covariates. The coefficients on onshore and offshore oil production per capita remain statistically significant also in this setting. The purpose of adding year fixed effects is to control for any aggregate year shocks that may impact the *change* in coup frequency, income levels, institutional quality and oil exploration. The latter could be the introduction of a new exploration technology in a given year that shifts the level of drilling on a global scale. Both coefficients for onshore and offshore oil gain in magnitude when estimating this model.

The second strategy to confront the possible critique of omitted institutional variables is to add two interaction terms to the baseline regression, the democracy index variable interacted with both onshore and offshore oil production. The reason why this addresses the critique is that if results were driven solely by countries' institutional quality, the original offshore oil production coefficient should be rendered insignificant, while offshore oil production interacted with institutional quality should be negative and significant. This is not the case. Also, the interaction between onshore oil production and institutional quality is insignificant, while the original coefficient remains as before. The results are reported in table A5, column 2. Column 3 shows the same results, only restricted to non-democratic countries (with a democracy score below the mean score). The last column in table A5 adds further controls to robustify the coefficients of interest.

6 Concluding remarks

A striking pattern in the data is that out of the ten countries that have experienced the most coups in the world, as many as eight produced significant amounts of oil. Yet, the literature has never established any link between oil and coups.

This paper's main contribution is to show that aggregate data on oil production contain valuable information of relevance for the prevalence of coups. However, this information is not utilized unless oil production is disentangled according to the location of oil extraction. The reason is that onshore and offshore oil operations differ in ways that matter for political incentives.

The study shows a positive link between onshore oil and military spending, while no significant coefficient is found for offshore oil production per capita. The hypothesized mechanism is that frequent attacks against onshore oil facilities makes it necessary for dictators to build a large military, in order to protect oil fields from attacks. But a large military can also spin out of control, turn against the ruling elite, and stage a coup.

[17]Importantly, the statistical significance of the oil coefficients disappear after five years, indicating that results are not driven by long-term within-country trends.

An open question, then, is why there is a negative relation between offshore oil and coups. Exploring the details of the coup data, it turns out that offshore oil is positively related to revealed coup plots, i.e., coups that never materialized as observed coup attempts. The proposed mechanism is that since offshore oil is not linked to a build-up of the armed forces, the military poses less of a coup threat. However, the two potential mechanisms for the established heterogeneous correlations between offshore and onshore oil and coups that have been suggested and briefly explored, are by no means exhaustive. Future research should address such hypotheses in greater depth.

Most importantly, the results of this paper suggest that anyone studying the effect of oil on political conflict should take the location of oil depletion into account. Moreover, it is also possible that the spatial heterogeneity of oil extraction matters also for other types of institutional and economic outcomes. Further research should attempt to explore this.

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7 Appendix

Table A4: Summary statistics

Variable	Mean	Std. Dev.	N
Total oil production	21.06	122.378	8476
Onshore oil production	15.606	107.222	8616
Offshore oil production	4.943	33.17	8910
Coup(Powell and Thyne)	0.053	0.261	8517
Coup(Marshall and Marshall)	0.056	0.276	12855
Log of GDP	0.079	0.011	9488
Economic growth	0.019	0.064	9341
Log of population	0.088	0.016	10441
Democracy	0.005	0.004	8933
Crude oil price	43.237	33.369	17696
Oil discovery	0.142	3.395	7320
Ongoing civil war	0.041	0.198	15419
Military spending per capita	184.201	340.347	1990

Figure A4: Onshore and offshore production series 1929-2012
(in thousand barrels per day)

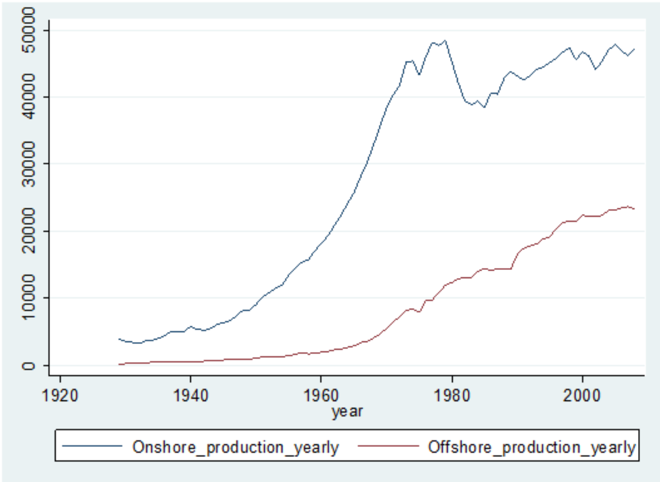

Table A5: Baseline regressions with robustness checks

	(1)	(2)	(3)	(4)
Dependent var: No of coup attempts				
Onshore oil production	-0.472	0.01**	0.008**	0.008*
	(-1.79)	(3.09)	(3.11)	(2.43)
Offshore oil production	-0.133	-0.013*	-0.01**	-0.01*
	(-0.39)	(-2.49)	(-2.76)	(-2.60)
Log of GDP	-205.9*	-110.61*	-73.75	-66.95*
	(-2.34)	(-3.47)	(-1.80)	(-2.49)
Economic growth	-9.778***	-3.36***	-3.19**	-2.68**
	(-4.54)	(-3.34)	(-2.93)	(-3.06)
Log of population	-381.7	-166.16	-313.65**	-97.43***
	(-0.73)	(-1.92)	(-2.99)	(-3.85)
Democracy index	-330.7***	-88.4*	165.42*	-95.75**
	(-3.94)	(-2.50)	(2.47)	(-2.78)
OnshoreXmilexpenditure	0.001*			
	(2.45)			
OnshoreoilXDemocracy		-1.60	-.67	-.67
		(-.66)	(-.28)	(-.27)
OffshoreoilXDemocracy		3.70	-7.75	3.65
		(1.02)	(1.96)	(1.02)
Crude oil price				0.000
				(.31)
Ongoing civil war				.79*
				(2.45)
Oil discovery				-.46
				(-1.33)
Constant	27.89	18.35*	29.19	-7.56**
	(0.67)	(2.17)	(3.02)**	(-3.35)
N	1668	6080	3259	4290
Countries	121	128	94	99
FE	C/Y	C/Y	C/Y	C/Y

t statistics in parentheses

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

Table A6: Estimation on Marshall and Marshall (2011) dataset

	(1)	(2)	(3)	(4)
Dependent var: No of coup attempts				
Total oil production	0.0016			
	(1.20)			
Onshore oil production		0.007**	0.008***	0.008***
		(3.11)	(3.19)	(4.58)
Offshore oil production		-0.006	-0.009*	-0.01*
		(-1.48)	(-2.27)	(-2.33)
Log of GDP	-80.73**	-85.01***	-106.37***	-104.15***
	(-4.02)	(-3.92)	(-3.96)	(-3.43)
Economic growth	-2.18**	-2.17*	-1.268	-0.541**
	(-2.31)	(-2.33)	(-1.38)	(-0.67)
Log of population	-78.69	-89.70	-154.54*	-229.34
	(-1.48)	(-1.64)	(-2.11)	(-1.85)
Democracy index	-76.13*	-78.98*	-87.96**	114.12
	(-2.34)	(-2.41)	(-2.58)	(1.70)
Crude oil price			0.08**	0.113
			(1.55)	(1.53)
Ongoing civil war			0.655*	0.54
			(2.56)	(1.86)
Oil discovery			-1.01	-1.69*
			(-1.44)	(-2.07)
Constant	9.65	4.109*	12.74*	2.86
	(1.81)	(2.04)	(2.41)	(0.38)
N	6265	6265	4436	2500
Countries	128	128	99	74
FE	C/Y	C/Y	C/Y	C/Y

t statistics in parentheses

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

Table A7: First-differences estimation

	(1)	(2)	(3)	(4)
Dependent var: d.No of coup attempts				
d.Total oil production per capita	0.0000255			
	(0.16)			
d.Onshore oil production per capita		0.0003*	0.0004*	0.0004*
		(1.98)	(2.01)	(2.38)
d.Offshore oil production per capita		-0.0009***	-0.001***	-0.0014***
		(-3.62)	(-5.17)	(-4.63)
d.Log of GDP	-7.701	-7.826	-12.14	-10.55
	(-0.77)	(-0.78)	(-0.91)	(-0.69)
d.Economic growth	-0.205*	-0.205*	-0.172	-0.185
	(-2.27)	(-2.28)	(-1.59)	(-1.57)
d.logpop_M	-24.28*	-25.47*	-40.21*	-54.15*
	(-2.19)	(-2.35)	(-2.59)	(-2.02)
d.Democracy index	-54.83***	-54.86***	-53.27***	-53.86***
	(-4.34)	(-4.34)	(-3.54)	(-3.48)
d.Crude oil price			0.0003	-0.004
			(0.88)	(-0.65)
d.Ongoing civil war			0.133	0.133
			(1.53)	(1.51)
d.Oil discovery			-0.005***	-0.005***
			(-26.39)	(-18.75)
Constant	0.007*	0.008*	0.011*	0.056
	(2.09)	(2.20)	(2.54)	(1.93)
N	5945	5945	4186	4186
Countries	128	128	99	99
FE	No	No	No	C/Y

t statistics in parentheses

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

Table A8: Fixed effects logistic regressions

	(1)	(2)	(3)	(4)
Dependent var: No of coup attempts				
Total oil production	0.00184			
	(1.69)			
Onshore oil production		0.008***	0.009***	0.008***
		(4.31)	(3.76)	(3.34)
Offshore oil production		-0.012***	-0.012***	-0.017***
		(3.80)	(3.28)	(-3.78)
Log of GDP	-80.27**	-126.74**	-118.19**	-84.83*
	(-2.80)	(-3.23)	(-3.12)	(-1.96)
Economic growth	-4.346***	-4.009***	-3.20**	-3.08*
	(-3.84)	(-3.34)	(-2.82)	(-2.31)
Log of population	-102.6***	-249.52**	-288.92**	-503.62***
	(-4.67)	(-2.75)	(-2.56)	(-3.54)
democracy	-106.7**	-109.42**	-121.55**	200.81*
	(-3.06)	(-2.89)	(-3.25)	(2.32)
Crude oil price			0.165*	0.278**
			(2.22)	(3.29)
Ongoing civil war			0.776*	0.59
			(2.06)	(1.37)
Oil discovery			-0.814*	-1.33*
			(-2.30)	(-2.09)
Constant	12.81***	26.9**	23.819**	35.58**
	(5.21)	(5.31)	(2.81)	(3.56)
N	3569	3569	2566	1708
$Countries$	128	128	56	55
FE	C/Y	C/Y	C/Y	C/Y

t statistics in parentheses

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

Table A9: Negative binomial fixed effects on coup sample

	(1)	(2)	(3)	(4)
Dependent var: No of coup attempts				
Total oil production	0.00152			
	(1.03)			
Onshore oil production		0.008***	0.008***	0.007***
		(6.82)	(5.72)	(5.22)
Offshore oil production		-0.009**	-0.008**	-0.01**
		(-3.04)	(-3.01)	(-2.91)
Log of GDP	-99.87**	-109.8***	-88.78**	-76.23*
	(-3.15)	(-3.40)	(-2.90)	(-2.09)
Economic growth	-3.459**	-3.406**	-2.610**	-1.980
	(-3.18)	(-3.24)	(-2.71)	(-1.87)
Log of population	-132.2	-172.0	-177.3	-355.1*
	(-1.47)	(-1.92)	(-1.83)	(-2.52)
Democracy index	-89.57**	-94.28**	-105.8***	251.9**
	(-2.67)	(-2.78)	(-3.32)	(3.07)
Crude oil price			0.108	0.192*
			(1.78)	(2.51)
Ongoing civil war			0.844**	0.619
			(2.75)	(-2.78)
Oil discovery			-0.413	-1.278*
			(-1.35)	(-1.98)
Constant	14.59	18.80*	-2.67	7.14
	(1.68)	(2.17)	(-0.40)	(0.81)
N	3689	3689	2721	1741
Countries	101	101	80	64
FE	C/Y	C/Y	C/Y	C/Y

t statistics in parentheses

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

Table A10: Negative binomial, all variables in five-year changes

	(1)	(2)	(3)	(4)
Dependent var: No of coup attempts				
5 Y Total oil production	0.00692***			
	(3.53)			
5 Y onshore oil production		0.007*	0.007*	0.007*
		(2.41)	(2.41)	(2.42)
5 Y offshore oil production		0.004	0.004	0.005
		(1.38)	(1.38)	(1.12)
5 Y log GDP	-132.6***	-132.8***	-132.8***	-116.34**
	(-3.51)	(-3.51)	(-3.51)	(-3.00)
5 Y economic growth	-1.152	-1.153	-0.97	-1.153
	(-1.72)	(-1.72)	(-1.28)	(-1.72)
5 Y log population	547.8**	541.5**	500.03*	541.5**
	(3.08)	(3.01)	(3.01)	(2.50)
5 Y democracy index	18.13	17.93	-4.72	17.93
	(0.47)	(0.47)	(-0.11)	(0.47)
5 Y Crude oil price			0.005*	17.93
			(2.43)	(0.47)
5 Y Ongoing civil war			0.213	17.93
			(0.64)	(0.47)
5 Y Oil discovery			0.045	17.93
			(0.5)	(0.47)
Constant	-3.3***	-3.3***	-3.21***	-3.3***
	(-13.19)	(-13.09)	(-10.84)	(-13.09)
N	5505	5505	3960	5505
Countries	101	101	99	64

t statistics in parentheses

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

Table A11: Negative binomial regression, excluding all extreme countries

	(1)	(2)	(3)	(4)
Dependent var: No of coup attempts				
Total oil production	0.00126			
	(0.83)			
Onshore oil production		0.008***	0.008***	0.007***
		(7.76)	(7.76)	(5.65)
Offshore oil production		-0.01**	-0.087**	-0.01**
		(-3.03)	(-3.03)	(-2.85)
Log of GDP	-104.5**	-116.9***	-110.26***	-85.44*
	(-3.29)	(-3.64)	(-3.64)	(-2.48)
Economic growth	-3.112***	-3.028***	-2.44 **	-2.33*
	(-3.40)	(-3.45)	(-2.88)	(-2.32)
Log of population	-143.8	-179.5	-179.5	-360.91**
	(-1.52)	(-1.93)	(-1.93)	(-2.72)
Democracy index	-80.80*	-83.92*	-197.57	165*
	(-2.38)	(-2.47)	(-1.71)	(-2.47)
Crude oil price			0.705	-83.92*
			(.)	(-2.47)
Ongoing civil war			0.485	-83.92*
			(1.65)	(-2.47)
Oil discovery			-1.13	-83.92*
			(-1.73)	(-2.47)
Constant	-19.78***	-16.72**	-31.49***	-16.72**
	(-4.11)	(-2.88)	(-11.54)	(-2.82)
N	5763	5763	4038	2255
FE	C/Y	C/Y	C/Y	C/Y

t statistics in parentheses

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

Table A12: Estimation of model 1, but with lagged oil production

	(1)	(2)	(3)	(4)
Dependent var: No of coup attempts				
Lagged total oil production	0.00			
	(0.47)			
Lagged onshore oil production		0.007***	0.006**	0.0063**
		(4.11)	(3.39)	(2.93)
Lagged offshore oil production		-0.009**	-0.01**	-0.013***
		(-3.27)	(-3.14)	(-3.67)
log of GDP	-97.44**	-106.85**	-82.26**	-60.25
	(-3.01)	(-3.26)	(-2.69)	(-1.78)
Economic growth	-3.47**	-3.32**	-2.49**	-2.12*
	(-3.26)	(-3.11)	(-2.60)	(-1.96)
log of population	-150.12	-184.76*	-217.96*	-375.22**
	(-1.82)	(-2.29)	(-2.38)	(-3.06)
Democracy index	-86.43*	-90.64**	-100.74**	138.28*
	(-2.59)	(-2.68)	(-3.19)	(2.19)
Crude oil price			.074	.15*
			(1.41)	(2.45)
Ongoing civil war			.86**	0.73*
			(2.90)	(2.12)
Oil discovery			-.29	-1.12
			(-.88)	(-1.84)
Lag of No of Coup attempts			.28 **	.21
			(3.39)	(1.81)
Constant	16.07*	19.77*	-.058	8.44
	(1.98)	(2.47)	(-.01)	(1.10)
N	6079	6079	4209	2390
Countries	128	128	99	74
FE	C/Y	C/Y	C/Y	C/Y

t statistics in parentheses

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

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Centre for Applied Macro - Petroleum economics (CAMP)
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