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The Impact of Fuel Ownership on Intrastate Violence

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Abstract

The impact of natural resources on intrastate violence has been increasingly analyzed in the peace and conflict literature. Surprisingly, little quantitative evidence has been gathered on the effects of the resource-ownership structure on internal violence. This paper uses a novel dataset on oil and natural gas property rights covering 40 countries during the period 1989–2010. The results of regression analyses employing logit models reveal that the curvilinear effect between hydrocarbon production and civil conflict onset – often found in previous studies – only applies to countries in which oil and gas production is mainly state controlled. The findings suggest that only state-owned hydrocarbons may entail peace-buying mechanisms such as specific clientelistic practices, patronage networks, welfare policies, and/or coercion. At the same time, it seems that greed and grievance are more pronounced whenever resources lie in the hands of the state. Exploring the within-country variation, further analyses reveal that divergent welfare spending patterns are likely to be one causal channel driving the relationship between resource ownership and internal violence.

Keywords: Natural resources, intrastate conflict, minor civil war, oil, gas, ownership structure, national oil companies.

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Article Outline

1 Introduction

In recent years, the peace and conflict literature has increasingly concentrated on natural resources as a potential source for intrastate conflict.[1] The juxtaposition of "greed" and "grievance" in Collier and Hoeffler's (2004) seminal work, for example, suggests that a resource-related opportunity structure and group-related grievances may explain the onset of internal violence. Territorial, separatist civil wars in Indonesia, Nigeria, and Sudan as well as governmental conflicts in Angola, Republic of Congo, and Sierra Leone seem to confirm the de-

1 I would like to thank Matthias Basedau for his insightful comments on earlier drafts of this manuscript as well as Constantin Ruhe, Laura Albarracin and Maik Maerten for their excellent research assistance.

stabilizing effect of specific natural resources. Oil, gas, and diamonds, in particular, have been found to promote intrastate conflict in various analyses (see Fearon and Laitin 2003; Hegre and Sambanis 2006; Ross 2006; Dixon 2009; Lujala 2010).

While several resource-rich countries have indeed experienced deadly conflicts, the role of commodities as a promoter of violence is still contested. Le Billon (2010), for example, finds that oil-producing states in Africa have not been more susceptible to civil wars than non-oil-producing states. Some studies maintain that previous findings linking resources to domestic conflict may be a product of spurious correlation. Brunnschweiler and Bulte (2008) and Thies (2010), for example, find no direct link between these two variables. Other authors claim that oil may even be associated with domestic stability and lower levels of violence (Smith 2004; Basedau and Lay 2009; Brunnschweiler and Bulte 2009).

As evidenced, the relationship between certain natural resources and conflict is still ambiguous and ill understood. Given the range of alternative of findings, studies have started to focus more intensely on the specific risks leading to violence within a resource-rich environment (e.g. Le Billon 2010; Basedau and Richter 2011). One important explanatory variable, however, has been largely ignored by the present quantitative literature: resource ownership. Although many of the explanations for the resource-conflict nexus rely on ownership patterns, distributional conflicts, and/or rentier-state mechanisms, empirical analyses have drawn exclusively on rough measures of resource abundance or resource dependence without actually accounting for ownership.

Utilizing a novel dataset on oil and gas ownership, this paper argues that information on who owns the commodities within a country may advance our understanding on the resource-violence link. It seems plausible to assume that only state-owned hydrocarbons may entail peace-buying mechanisms by filling governments' coffers, giving way to clientelistic practices, granting more fiscal autonomy, and reducing the legitimation pressure faced by the state. Through public oil companies, governments may also spend more on coercion or large-scale redistribution policies. At the same time, public oil money may exacerbate political competition for access to the key bodies responsible for managing resource-revenue distribution. By offering selective incentives in the form of future material rewards, it may facilitate the mobilization of insurgents and promote violence.

This paper tests whether ownership patterns of hydrocarbons – namely, whether oil and gas are state or privately owned – affect the potential for conflict within countries by employing logit estimations on pooled time-series, cross-sectional data. The regression analyses reveal that the curvilinear effect between per capita hydrocarbon production and civil war onset – often found in previous studies – only applies to countries in which oil and gas production is mainly state controlled. A further statistical analysis finds that within-country differences in patterns of welfare spending may partly explain why only state-owned hydrocarbons are associated with an increased – or decreased – conflict potential.

The rest of this paper proceeds as follows: The next section reviews the existing literature on the impact of natural resources on domestic stability and internal violence. The paper's main argument is presented in the third section, shedding light on how the resource-ownership structure influences the risk of civil war onset. The quantitative research design employed for this study is described in the fourth section, which is followed by the paper's quantitative findings in the fifth section. The sixth and final section presents the conclusion and highlights areas that require further research.

2 Review of the Research on Natural Resources, Domestic Stability, and Civil Wars

Influenced by the research of Paul Collier and Anke Hoeffler, a growing body of literature has advanced our knowledge on the relationship between natural resource abundance and conflict propensity. According to many authors, primary commodities often increase the risk of civil war by providing insurgents with the opportunity to finance large-scale violence and making warfare militarily feasible (Le Billon 2001; Collier and Hoeffler 2004). Resources may also provide the motive to take up arms due to resource-related grievances such as forced migration, ecological distress, environmental damage, and the withholding of resource revenue. Costs and benefits related to resource extraction may be the driving forces of conflict (see e.g. de Soysa 2002; Ross 2003; Collier and Hoeffler 2004). In fact, Lujala (2010) shows that resources may provide an important incentive and opportunity structure for rebel groups.

Other authors claim that resources have a more indirect impact on conflict. First, resources may instigate predatory rent-seeking behavior, which simultaneously reduces the quality of institutions' and states' counterinsurgency capacities (see e.g. Fearon and Laitin 2003; Fearon 2005; Humphreys 2005). Second, resource production may create economic and social grievances resulting from resource-related–terms-of-trade shocks, currency appreciations, and increasing inequalities (Ross 2003, 2004, 2012).[2]

In recent years, the resource-conflict link has increasingly been questioned. Authors stress the need to examine the precise conditions under which primary commodities act as a catalyst for violence (e.g. Collier and Hoeffler 2005; Humphreys 2005; Basedau and Wegenast 2009). Contextual conditions identified in the literature include the characteristics of the available resource (Ross 2003; Dunning 2005; Snyder and Bhavnani 2005), the mode of extraction of the commodities in question (Lujala et al. 2005), and the point in time in which revenues arrive (Humphreys 2005). Le Billon (2001, 2008) stresses the lootability of resources, noting that the exploitation of "diffuse" and "distant" resources like alluvial diamonds, alluvial gold, or drugs cannot be controlled by central governments – thus, they are more lootable for rebels. Lujala (2010) finds that oil only increases the likelihood of conflict onset when it is produced in a more lootable manner – that is, onshore instead of offshore.

2 For an overview of the possible mechanisms driving the relationship between natural resources and civil war onset, see Humphreys (2005), Ross (2004, 2006), and Le Billon (2008).

Other authors point to the fact that a country's resource abundance and dependence are not identical and have different implications for the risk of civil war (Ross 2006; Basedau and Lay 2009). The sociopolitical environment within resource-abundant states might also pose specific risks. As shown by some authors, relations between identity groups (Sorens 2011; Wegenast and Basedau 2012) and the institutional framework – such as the electoral system (Wegenast 2013) – may interact with natural resources and influence the likelihood of conflict.

The rentier state theory (Luciani 1987) – often omitted in the debate over the resource-conflict link – provides an important theoretical framework to assess countries' potential for civil violence. Oil-rich countries are often perceived as distributive states, where governments are mainly concerned with the internal distribution of rents (see Karl 1997). High incomes from resources such as oil and gas may allow states to employ peace-buying mechanisms such as repression, redistribution policies, low taxation, social benefits, political corruption, and/or patronage.

Political corruption can foster domestic peace within oil-wealthy countries, where private privilege is offered in exchange for political loyalty and to accommodate the opposition (Fjelde 2009). Arezki and Brückner (2009) argue that in countries with a high share of state participation in oil production, oil rents have a significant effect on corruption, and there is no threat to state stability. In addition to the possibility of buying the consent of key segments of society, large oil rents are often used to increase states' military and counterinsurgency capacities. These rents may provide a readily available pool of funding for military equipment and personnel (Karl 2004).

Governments of resource-abundant countries are also not heavily dependent on taxes as a source of state income, meaning citizens may face a lower tax burden (Humphreys 2005). Morrison (2008) finds that nontax revenue such as oil is associated with lower taxation of the elite in democracies, higher social spending in dictatorships, and more regime stability overall (see also de Mesquita and Smith 2010). Furthermore, resource rents may be employed to finance social programs and projects, assuring regime legitimacy and citizens' support. Often, resource income is used to distribute material benefits throughout society (see, e.g., Heydemann 2004). According to Herb (2005: 297), rich rentier states often use oil rents to create a larger middle class or pay for schoolteachers. Gary and Karl (2003) emphasize that under fair, accountable, and transparent conditions, oil revenues become a blessing that facilitates socioeconomic development rather than a curse.

Some authors have emphasized that the impact of resources on intrastate conflict onset may be contingent on the degree of resource dependence or abundance. Collier and Hoeffler (1998), for example, find that resource dependence (as measured by the ratio of primary exports to GDP) has a curvilinear effect on the onset of civil war. This finding has been corroborated by Basedau and Lay (2009),[3] who also show that high levels of oil abundance (as

3 This finding is contested by Brunnschweiler and Bulte (2009: 655), who find that resource dependence is "an endogenous variable in conflict regressions, and that properly accounting for this endogeneity removes the

measured by total per capita oil production) reduce the risk of internal violence (see also Brunnschweiler and Bulte 2009). The authors rely on the concept of the rentier state to explain their findings.

Drawing on the studies cited above, this paper shows that the effect of oil abundance/dependence on civil war onset is largely dependent on oil ownership patterns. For several reasons, which are outlined in the next section, the curvilinear effects found in previous research only apply to countries in which hydrocarbon production lies mainly in the hands of the state. By shedding light on the conditions under which resources may promote or prevent internal violence, this paper provides more clarity to an ill-understood research field characterized by contradictory findings.

3 Bringing Ownership into the Debate

As is evident from the literature review above, authors frequently refer to state-owned resources when trying to assess a country's risk of facing internal instability. Various explanations of the resource-conflict nexus – such as the deterioration of political institutions and state capacity, the ability to repress, the provision of social benefits and redistributive policies, the motive mechanism, and the enforcement of clientelist rule – assume that large oil reserves serve to fill state coffers.

In spite of the apparent pivotal role of resource ownership for internal violence onset, it is rather surprising that – most likely due to the lack of appropriate data – studies have failed to include ownership patterns when operationalizing and testing their advocated mechanisms. Authors have largely relied on rough measures of abundance such as per capita resource production or rents[4] and resource dependence (e.g., the share of natural resources in total exports).

However, countries vary in terms of the ownership patterns of their main resources (see e.g, Luong and Weinthal 2006; 2010). Although states such as Angola, Bahrain, China, Canada, Iran, Mexico, Nigeria, Saudi Arabia, Australia, and Russia all exhibit a high level of hydrocarbon production, government ownership rights over these resources differ greatly between these countries.[5] The empirical reality shows that ownership structures vary greatly both within and across mineral-rich states over time (see Luong and Weinthal 2010). It seems reasonable to assume that the conflict-enhancing or stabilizing effects of natural resources partly depend on the extent to which governments effectively own the extracted commodities.

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positive statistical association between dependence and conflict onset." The authors stress that conflict increases dependence on resource extraction.

4 Resource rents are commonly measured by the price minus average extraction costs times the amount of resources extracted (see e.g. De Soysa and Neumayer 2007).

5 While Canadian and Australian oil and gas production is nearly entirely privately owned, governments in Bahrain, Iran, Mexico, and Saudi Arabia retain 100 percent ownership over these resources. The ownership pattern in the four remaining countries is mixed.

This paper maintains that only oil and gas production lying in the hands of the state – as opposed to privatized hydrocarbon production – has a direct impact on a country's internal conflict potential. At least two fundamental differences exist between nationalized and privatized resource sectors that may explain a country's risk of experiencing the onset of civil war: the quantity of steady, nontax government revenue provided by state-owned companies and the varying degree of transparency and accountability that exist between public and private hydrocarbon sectors.

Compared to private oil and gas firms, national companies may provide a higher amount of nontax income to governments. For example, Guriev et al. (2011) show that nationalizations of the hydrocarbon sector occur primarily when oil and gas prices are high, since governments expect higher state revenues (see also Friedman 2006). Mahdavy (2011: 5) also argues that governments in oil-producing countries may "seek access to more petroleum revenues and nationalization is perceived as a great step forward from having to tax foreign oil companies." However, unlike Guriev et al. (2011), Mahdavy (2011) demonstrates that nationalizations are rather a cause and not a consequence of price spikes. This finding is confirmed by Ludwig (2012: 1), who shows that "the shift from private towards state-owned oil dominance in the 1970s gave rise to a delayed increasing oil price path."

According to Kennedy and Tiede (2011), many oil nationalizations were justified by what countries believed were unstable or low oil prices. The authors argue that strategic control over oil and linkage to the domestic economy is more important in explaining nationalization. Mexico, for example, blamed the international oil companies (IOCs) for low oil prices before nationalizing its oil industry (Yergin 2008: 255). Andersen and Ross (2012) note that most oil-producing autocracies nationalized in the 1970s and started to collect the rents that previously went to the IOCs.[6] As a consequence, the size of government revenues grew considerably (see also Ross 2012). According to Mommer (2002), nationalizations raised governments' shares of oil profits from 50 percent in the early 1960s to 98 percent by 1974.

Besides possibly generating more direct income for the state, national oil companies (NOCs) are believed to be less transparent and accountable than private oil firms. Quinn (2008:84), for example, finds that "majority state ownership of the most important economic sectors of a country results in higher levels of corruption." This finding is corroborated by Arezki and Quintyn (2009), who show that oil rents have a positive effect on corruption only in countries with a high share of state participation in oil production. Stevens (2008) reports on the lack of transparency that characterizes most of the NOCs. Al-Mazeedi (1992: 988) notes that in the Middle Eastern NOCs, recruitment policies are influenced ''to a great extent by tribal and religious considerations rather than qualifications, performance or personal attributes."

NOCs are often used to accommodate the political opposition (e.g., through job patronage) and buy political legitimacy. This lack of transparency allows rulers to use oil rents as a

6 Levy (1982) shows that, prior to this nationalization wave, the IOCs controlled almost all of the world's petroleum and used favourable contracts and transfer pricing to retain the biggest share of the rents for themselves.

tool for gaining greater control over the distribution of patronage (Ross 2012). State leaders have direct access to the revenues generated by the NOCs and may conceal the actual figures on oil revenue and spending from the public – for example, the budget of the Iraq National Oil Company was confidential. In countries such as Azerbaijan and Iraq, more than half of the governments' budgets were funneled through their respective NOCs. Under private ownership arrangements, non–state actors are the direct claimants of the revenues generated from hydrocarbon productions. The primary interest of private actors is to maximize the profits on their investments in the oil sector. Generally speaking, private oil firms are more likely to be characterized by well-defined managerial structures, objective criteria to measure company performance, and more transparency (Luong and Weinthal 2010: 56).

These two divergent characteristics (i.e., the size of government revenues and the degree of transparency and accountability) have implications for the peace-buying and conflict-enhancing mechanisms inherent to resource production. Large nontax revenues over which governments have direct access as well as its nontransparent management may further the competition for control over the key bodies responsible for managing hydrocarbon revenues among state actors, thus increasing the risk for conflict.[7] The prospect of capturing future oil or gas income may thereby act as a selective incentive that motivates individuals to participate in political or armed conflict.[8] The nontransparent management of revenues by NOCs may further motivate violence. As shown by Ross (2008), rebel groups often make exaggerated claims about the amount of state-owned oil rents. According to the author, more transparency could "reduce these misperceptions and undercut support for rebellion" (ibid: 206).[9] Hydrocarbon production lying in the hands of private firms may certainly also bring about greedy intentions among different state actors. However, the prospect of amassing individual benefits through corruption or patronage is smaller. Also, if private actors dominate the oil and gas sector, communities are likely to be better informed about the real costs and benefits of mineral projects. Finally, the option of expropriating private hydrocarbon corporations usually comes at a high cost and entails risks (Guriev et al. 2011), while some countries may simply lack the know-how to exploit hydrocarbons.

While the direct control over resource revenue and the lack of transparency associated with state ownership may further intrastate conflict, it may at the same time promote internal stability. Large off-budget petroleum revenues in the hands of the state are often em-

7 Competition over state oil wealth has for example fueled violence between various ethnic groups in Nigeria. According to Obi (2001: 173), the Nigerian state is "a site of constant struggles for access to power and resources, in which those in power defend themselves at any cost, and those outside seek entry at any cost and through any means." Lewis (1994) goes as far as to characterize Nigerian politics simply as a process of competition for access to oil revenue.

8 Ross (2004) highlights the role of so-called booty futures in order to finance rebellion in countries such as Liberia, Sierra Leone, and the Republic of Congo.

9 Initiatives such as the Extractive Industries Transparency Initiative may be a helpful instrument to achieve more fiscal and budgetary transparency (see Ross 2008).

ployed to increase both patronage and pork-barrel spending (e.g. Mahdavy1970; Luciani 1987). According to Andersen and Ross (2012: 12), many rulers "used their national oil companies to gain greater control over the distribution of patronage, and to cloak these transactions in secrecy." Fjelde (2009) convincingly demonstrates that rulers of oil-abundant states use corruption in order to offer private privilege in exchange for political loyalty and to accommodate the opposition, thereby ensuring domestic peace. Rents from oil or gas may also be employed to lower taxes and win "popular acquiescence through distribution" (Andersen 1987: 10).[10]

Finally, the unlimited and direct control over the resource sector may allow governments to invest in a large repressive apparatus and/or welfare policies. Indeed, some authors show that natural resources such as oil may increase social spending and internal stability (Morrison 2009).[11] Welfare spending is found to reduce the probability of civil war onset (Taydas and Peksen 2012), and NOCs, in particular, are believed to support the building of strong welfare states (Marcel and Mitchell 2006). Furthermore, hydrocarbons are often employed when building up a large military apparatus and deploying coercion (Karl 2004: 668; Basedau and Lay 2009).[12] Andersen and Ross (2012) demonstrate that the peace-buying mechanisms reported above are more likely to produce regime stability when a country's petroleum sector is state owned. The authors show that oil rents only foster autocratic stability when large waves of nationalization are taken into account in quantitative analyses.

As outlined above, the prevalence and applicability of the conflict-promoting or peace-buying mechanisms inherent to rentier states may depend largely on the resource-ownership structure. In accordance with some of the reviewed studies (Collier and Hoeffler 1998; Basedau and Lay 2009; Brunnschweiler and Bulte 2009), this paper assumes that the quantity of resource revenue determines which of the two mechanisms will prevail. Intermediate levels of state-owned oil and gas production are expected to increase the risk of civil war onset, while the impact of privately owned hydrocarbons on internal conflict is expected to be only marginal or nonexistent. High levels of state-owned hydrocarbons, in contrast, are expected to reduce a country's internal violence potential, whereas this conflict-reducing effect is not expected where oil and gas are privately owned. By employing a novel and unique dataset on hydrocarbon ownership, the next section empirically tests these two hypotheses.

10 This is expressed in the phrase "no representation without taxation" commonly found in the rentier state literature (e.g. Herb 2005).

11 Several studies find that oil rents are associated with regime stability of autocracies (e.g. Smith 2004; Ulfelder 2007; Andersen and Aslaksen 2013).

12 Fjelde and De Soysa (2009) find that high levels of government spending are more significant predictors of civil peace than are states' coercive capacities.

4 Empirical Analysis

This empirical analysis employs time-series, cross-sectional data in order to find quantitative evidence for the two hypotheses presented above. The dependent variable is minor civil war onset as defined by the UCDP/PRIO Armed Conflict Dataset (Version 4–2012) (see Gleditsch et al. 2002). The variable civil war onset takes the value of "1" if the threshold of 25 battle-related deaths has been crossed for the first time and "0" if no internal civil war has started in the year under consideration. In order to measure the key independent variable, this paper relies on our new Oil and Gas Ownership Structure (OGOS) dataset (see Wegenast et al. 2013). Until recently, the only existing cross-national dataset on states' property rights over hydrocarbon production was that developed by Luong and Weinthal (2010). Their work has considerably advanced our understanding of the importance of ownership patterns within the resource-curse debate. They coded the ownership structure of 50 oil-abundant developing countries based on these countries' "constitutions, official laws and regulations governing the mineral sector, and (where available) mineral contracts" (ibid: 311). Four discrete categories were drawn up: state ownership with control, state ownership without control, private domestic ownership, and private foreign ownership.

Our assessment of countries' ownership structures differs from the one developed by Luong and Weinthal (2010) in several ways. Our data includes a wider range of countries from the developed and the developing world, focusing both on hydrocarbon abundance and dependence. In addition, our dataset also covers oil and gas production, instead of considering only petroleum. The most important difference, however, is that we draw on actual hydrocarbon output figures to measure states' ownership structures, whereas Luong and Weinthal (2010) rely exclusively on countries' legislation. Our focus on output figures allows for a more precise and valid operationalization of ownership within the hydrocarbon sector. Coding that relies exclusively on country legislation is more likely to measure the adoption of a certain ownership structure as opposed to its actual implementation. As suggested by Luong and Weinthal (2010: 9) themselves, a change in legislation signals the intent to alter the ownership structure but says little about whether such a change was successfully implemented. A final, and rather obvious, advantage of our data is that it provides numerical instead of categorical variables. Compared to Luong and Weinthal's rather static dummy variables, our data is capable of identifying smaller changes within countries' ownership structures over time.

In order to select our sample, we first included all countries that, taken together, accounted for 99 percent of the world's total oil and gas production during the period 1989–2010.[13] In a second step, we selected those countries whose oil and gas exports made up at least 10 percent of their total exports on average for the given period. This procedure provided us with

13 Data on oil and gas production comes from Evaluate Energy, online: <www.evaluateenergy.com/>.

40 hydrocarbon-abundant and/or hydrocarbon-dependent states.[14] Subsequently, we gathered information on the total production output of all oil and gas production firms within each country for the period under analysis. The main source for this information was Evaluate Energy, a service that provides information on the reported production volume for the majority of publicly quoted oil and gas companies within each state. While this database contains precise output figures for all-important privately owned firms, it lacks information on NOCs' hydrocarbon production within some countries for certain time periods.[15] Thus, we further drew on the information provided by the country reports of the US Geological Survey (USGS) to assess the importance of NOCs – vis-à-vis privately owned firms – within each country and year.[16] As USGS reports contain estimates over the total market share of many NOCs, we were able to obtain the majority of missing values.[17] In isolated cases, such as Russia, we further relied on country-specific studies.

Remaining deviations between a country's total reported output and the sum of the production of its individual oil and gas firms has three main causes: nonreporting or underreporting by NOCs, a lack of information on some very small privately owned firms, and the lack of exact participation shares of NOCs within joint ventures or production sharing agreements.[18] Although these differences are marginal for most of the countries covered by our dataset, eight states lack reliable information on the companies operating within the hydrocarbon sectors for several years: Azerbaijan, Bolivia, Equatorial Guinea, Indonesia, Kazakhstan, Libya, Syria, and Vietnam.[19] For these countries, missing observations for various consecutive years could not be replaced by the information from the USGS.

As a final step, we integrated information about each firm's property-rights structure, which was taken from Energy Intelligence's *Petroleum Intelligence Weekly* (PIW).[20] PIW publishes a compilation of the top one hundred hydrocarbon production firms (top fifty for the period 1989–1993) in an annual supplement to its publication. These one hundred firms make up the bulk of the world's oil and gas supply and had a market share of about 75 percent during the sample period. The dataset provides information on the exact share of state

14 A list of all countries as well as the respective mean values of their ownership variables is presented in Table A1 in the Appendix.

15 This is mostly owed to the fact that some NOCs do not publicly disclose their exact production figures.

16 See online: <www.usgs.gov/>.

17 As an example, approximately 60 percent of Nigeria's total oil and gas output was of unknown provenance prior to 2004. (Up to 2003, Evaluate Energy only provides production figures of privately owned companies operating within this country.) According to the single reports of the US Geological Survey, the market share of Nigeria's NOCs was around 60 percent during the given period. Thus, we could attribute the missing production to the state.

18 NOCs participation shares within certain joint ventures or production sharing agreements in Sudan, Azerbaijan, Kazakhstan, and Vietnam were not clearly identifiable.

19 While missing observations are limited to single years in Azerbaijan, Equatorial Guinea, and Libya, the remaining five mentioned countries are marked by missing information for longer time periods.

20 See online: <www.energyintel.com/Pages/EIG_GroupHome.aspx>.

ownership for each listed firm as well as the respective country of origin. We then matched this information on firms' ownership structures, and respective country of origin, with the previously gathered data on firms' output. As PIW includes only the top one hundred companies for each year in its publications, we coded the remaining noncovered companies by accessing their respective websites. This allowed us to gather four variables that measure the total amount of hydrocarbons produced by:

1) state-owned,
2) privately owned,
3) foreign, and
4) domestic companies.

Our final dataset covers 40 countries throughout the period 1989–2010. Overall, the data is in line with Luong and Weinthal's dataset. However, important differences are observable in deviant cases like Algeria, Angola, and Brunei. During the period 2005–2010, Luong and Weinthal classify Algeria's oil industry as "private foreign ownership." Our real production figures, however, reveal that nearly 90 percent of total hydrocarbons are produced by state companies. Angola and Brunei are characterized by a public-private ownership structure. Our data indicates that between 1999 and 2010, private firms were responsible for a higher production share than public companies in both countries. However, Luong and Weinthal classify their oil sectors as "state ownership without control" throughout this period. Similar differences can be found for other countries.

In order to test both hypotheses outlined in the previous section, the regression analysis relies on the total amount of hydrocarbons (in thousand barrels of oil equivalent per day)[21] produced by state-owned (*state hydrocarbons*) or privately owned firms (*private hydrocarbons*) both in per capita terms and as a share of country GDP. The control variables were chosen in accordance with a sensitivity analysis done by Hegre and Sambanis (2006), who performed specification tests to check the robustness of 88 variables frequently used in the literature to explain civil war. However, a "kitchen sink" model that considers any control variable that is expected to have an impact on the dependent variable should be avoided. As outlined by Ray (2003) or Aachen (2005), a control variable should be included in the analysis only if it is likely to influence the relationship between the key explanatory variables and the dependent variable. According to the authors, control variables showing an impact on the dependent variable that is complementary to that of the key explanatory factor should not be considered by the analysis. Therefore, the following control variables have been included in the regression models: log of population size, per capita GDP, economic growth, recent political instability, inconsistent democratic institutions, and ethnic fractionalization.[22] All independent variables were lagged by one year in order to counter possible reverse causality.

21 When calculating the unit "barrels of oil equivalent" (boe), the output of natural gas is standardized according to the energy content of one oil barrel.

22 See Table A2 in the Appendix for further information on the definitions and sources for all the variables employed. Table A3 provides a summary of the variables' descriptive statistics.

The risk of internal conflict onset is estimated using logit models for 40 countries throughout the period 1989–2010.[23] Including only hydrocarbon-abundant (or hydrocarbon-dependent) states in the sample has the advantage of reducing the risk of structural instability and omitted variable bias.[24] To minimize the problems of temporal dependence on a history of conflict, a variable reflecting the duration of time since the last event/onset (peace) as well as three natural cubic splines were included in all models, following the recommendation made by Beck et al. (1998). Additionally, rare-event logit models, as suggested by King and Zeng (2001), were estimated. These authors demonstrate that when binary dependent variables measure the occurrence of rare events, standard logit or probit estimations may produce biased coefficients.

5 Empirical Findings

The first performed regression analysis tried to replicate the findings of Collier and Hoeffler (1998) and Basedau and Lay (2009) by using the outlined sample of 40 hydrocarbon-producing states.[25] It did not differentiate between ownership types, but rather assessed the impact of total oil and gas production (both in per capita terms and as a share of total exports) on civil war onset. To test for the possibility of a curvilinear effect, a squared term was introduced in the models.

Table 1 below shows that the results are largely in line with those reported in previous studies. Hydrocarbon dependence (measured by total oil and gas production divided by the GDP) increases the risk of violence onset at intermediate levels while reducing the risk after a certain production output has been reached (see Model 2). However as previously noted, these results might suffer from reversed causality bias (see Brunnschweiler and Bulte 2009) and should therefore be interpreted with care. Concerning the impact of hydrocarbon wealth (measured by total per capita oil and gas output) on civil war onset, the analysis also indicates an inverted U-shaped relationship – although high levels of hydrocarbon wealth (as captured by the squared term) are only statistically significant at the 11 percent level (see Model 1). All control variables exhibit the expected signs, with three of them reaching statistical significance at conventional levels: per capita GDP and growth reduce the likelihood of civil wars, while population size is associated with an increased risk of internal violence onset.

23 This period of analysis reflects the availability of the Evaluate Energy data on companies' oil and gas production.

24 Resource-wealthy countries share common characteristics that might be relevant for explaining internal violence onset but often remain unobserved, thus creating spurious relationships.

25 Only country-years in which the sum of state-owned and privately owned oil and gas figures made up more than 65 percent of the officially reported total hydrocarbon production were considered.

Table 1: Total Hydrocarbon Production and Civil War Onset

	(Model 1)	(Model 2)
	civil war onset	civil war onset
peace years	0.676	0.615
	(0.526)	(0.557)
pc_total_prod$_{(t-1)}$	58.62**	
	(25.87)	
pc_total_prod squared$_{(t-1)}$	-275.4	
	(184.0)	
gdp_total_prod$_{(t-1)}$		83.83***
		(28.49)
gdp_total_prod squared$_{(t-1)}$		-891.4**
		(427.2)
mixed regime$_{(t-1)}$	0.305	0.641
	(0.422)	(0.437)
instability$_{(t-1)}$	-0.432	-0.199
	(0.452)	(0.426)
gdppc$_{(t-1)}$	-0.000192**	-0.0000887*
	(0.0000826)	(0.0000485)
(log)population$_{(t-1)}$	0.445**	0.425***
	(0.186)	(0.143)
growth$_{(t-1)}$	-0.0762***	-0.0763***
	(0.0259)	(0.0272)
fractionalization$_{(t-1)}$	1.807	1.160
	(1.336)	(0.916)
constant	-9.253*****	-8.202*****
	(2.588)	(1.941)
N	589	589
Prob > Chi^2	0.0000	0.0000
pseudo R^2	0.287	0.246

NOTE: Logit models using robust standard errors (shown in parentheses) with onset of minor civil wars as dependent variable. We account for duration dependence using peace-years correction and three natural cubic splines calculated with the program BTSCS Data Analysis Utility Version 4.0.4.
* p<0.10, ** p<0.05, *** p<0.01, ***** p<0.001
Source: Author's own compilation.

After partially corroborating the findings of previous studies, the following regression analyses assessed the importance of hydrocarbon ownership structures as a determinant of intrastate violence. Table 2 summarizes the effects of state and privately owned hydrocarbon wealth on civil war onset. As evident from Models 1 and 2, per capita private ownership loses statistical significance after the control variables are introduced. In contrast, per capita state ownership affects internal violence as hypothesized: intermediate levels of state-controlled oil and gas increase the potential for conflict, while high levels have a peace-buying effect (see Models 3 and 4). Standardized regression coefficients show that the effect size of state-owned hydrocarbons on civil war onset is substantive: the coefficient size for per

capita state hydrocarbons is the largest within the whole model, while the effect size of its squared term is considerably smaller. Finally, Table 3 reveals that results are very similar when hydrocarbon wealth is replaced by hydrocarbon dependence. As evident, state hydrocarbons as a share of GDP exert a curvilinear effect (see Models 3 and 4) while private hydrocarbons have no impact on the outbreak of civil wars.

Table 2: Per Capita State and Private Hydrocarbon Production and Civil War Onset

	(Model 1)	(Model 2)	(Model 3)	(Model 4)
	civil war onset	civil war onset	civil war onset	civil war onset
peace years	0.722	0.562	0.919*	0.771
	(0.528)	(0.631)	(0.514)	(0.611)
pc_priv_prod$_{(t-1)}$	15.48	6.563		
	(10.49)	(12.54)		
pc_priv_prod squared$_{(t-1)}$	-140.6** (67.92)	-65.76 (56.19)		
pc_gov_prod$_{(t-1)}$			40.56***	66.56***
			(12.33)	(21.75)
pc_gov_prod squared$_{(t-1)}$			-258.3*** (87.90)	-401.0** (171.5)
mixed regime$_{(t-1)}$		0.899*		0.817*
		(0.471)		(0.455)
instability$_{(t-1)}$		-0.531		-0.833
		(0.469)		(0.517)
gdppc$_{(t-1)}$		-0.0000671		-0.000234**
		(0.0000549)		(0.0000932)
(log)population$_{(t-1)}$		0.193		0.189
		(0.152)		(0.167)
growth$_{(t-1)}$		-0.0830***		-0.0770***
		(0.0313)		(0.0280)
fractionalization$_{(t-1)}$		1.294		1.188
		(0.951)		(1.071)
constant	-2.306*****	-4.739***	-3.273*****	-5.692***
	(0.535)	(1.804)	(0.543)	(2.145)
N	635	451	635	451
Prob > Chi^2	0.0000	0.0000	0.0000	0.0000
pseudo R^2	0.188	0.239	0.253	0.299

NOTE: Logit models using robust standard errors (shown in parentheses) with onset of minor civil wars as dependent variable. We account for duration dependence using peace-years correction and three natural cubic splines calculated with the program BTSCS Data Analysis Utility Version 4.0.4.
* p<0.10, ** p<0.05, *** p<0.01, ***** p<0.001

Source: Author's own compilation.

Table 3: State and Private Hydrocarbon Production (as Share of GDP) and Civil War Onset

	(Model 1)	(Model 2)	(Model 3)	(Model 4)
	civil war onset	civil war onset	civil war onset	civil war onset
peace years	0.555	0.536	0.791	0.707
	(0.562)	(0.646)	(0.543)	(0.651)
gdp_priv_prod$_{(t-1)}$	15.22	9.241		
	(26.11)	(41.94)		
gdp_priv_prod squared$_{(t-1)}$	-152.1 (407.7)	-18.42 (559.3)		
gdp_gov_prod$_{(t-1)}$			247.1***	237.0**
			(77.15)	(99.60)
gdp_gov_prod squared$_{(t-1)}$			-8282.9*** (2606.1)	-6926.9** (3317.5)
mixed regime$_{(t-1)}$		0.906*		0.661
		(0.469)		(0.491)
instability$_{(t-1)}$		-0.611		-0.491
		(0.469)		(0.494)
gdppc$_{(t-1)}$		-0.0000830		-0.0000914
		(0.0000562)		(0.0000582)
(log)population$_{(t-1)}$		0.278*		0.133
		(0.154)		(0.161)
growth$_{(t-1)}$		-0.0855***		-0.0756**
		(0.0314)		(0.0301)
fractionalization$_{(t-1)}$		1.162		0.713
		(0.971)		(1.029)
constant	-2.276*****	-5.458***	-3.669*****	-5.152**
	(0.554)	(1.887)	(0.704)	(2.063)
N	629	451	629	451
Prob > Chi^2	0.0000	0.0000	0.0000	0.0000
pseudo R^2	0.158	0.236	0.221	0.278

NOTE: Logit models using robust standard errors (shown in parentheses) with onset of minor civil wars as dependent variable. We account for duration dependence using peace-years correction and three natural cubic splines calculated with the program BTSCS Data Analysis Utility Version 4.0.4.
* p<0.10, ** p<0.05, *** p<0.01, ***** p<0.001
Source: Author's own compilation.

Several robustness checks were performed. All presented models were reestimated using rare-event logit methods, and the results were nearly identical.[26] The reported findings also proved to be robust to the inclusion or exclusion of different sets of independent variables. All models were reestimated including additional institutional indicators such as regime type or the level of democracy (as measured by Freedom House or Polity2) in order to address possible omitted-variable bias; the results did not change considerably. Likelihood ra-

26 The results are available upon request.

tio tests of the reported specification against several different nested models revealed that the applied full model had a proper specification. In addition, a stepwise inclusion of all independent variables indicated that the reported findings were unlikely to have been driven by multicollinearity. This was confirmed by an analysis of the predictors' variance inflation factor.

The present empirical analysis provides positive evidence for the hypothesized relationship between hydrocarbon's ownership structure and internal conflict onset. Unfortunately, a more detailed empirical test of each of the presented causal mechanisms lies beyond the scope of this paper and should be addressed by future research. However, given the strong findings linking resource production with social spending (e.g. Morrison 2008) as well as welfare spending and intrastate conflict onset (e.g. Taydas and Peksen 2012), it seems worthwhile to analyze whether differences in welfare spending patterns between diverging ownership structures may partially explain the findings reported above.

The next analysis explored whether the percentage of total hydrocarbons produced by either public or private companies is associated with changing levels of welfare spending. For this purpose, welfare spending (accounting for the three key areas of education, health, and social security) as a percentage of GDP was used as the dependent variable.[27] Again, the main independent variables of interest were the total amount of hydrocarbons produced by either state-owned or privately owned firms in per capita terms.

Several control variables that are commonly found in the literature (see e.g. Rudra and Haggard 2005; Ha 2008; Nooruddin and Simmons 2010) and are expected to affect the relationship between the key explanatory factor and the dependent variable were considered. To account for income effects and Wagner's Law, GDP per capita (purchasing power parity converted from the Penn World Table) was included in the models. Since economic growth may have a counter-cyclical effect on spending (e.g. Burgoon 2001) and, at the same time, may raise the revenue base of the welfare state, this variable was also included.[28] Trade openness (measured by the sum of total exports and imports divided by the GDP in constant prices) was considered in order to address previous findings of the so-called compensation theory (see e.g. Rodrik 1997).[29] Furthermore, I controlled for election years with a dummy that is coded as "1" when there has been a legislative or executive election in the given year and "0" when otherwise.[30] To control for the potential effect of partisan politics on welfare spending, a dummy variable indicating when a left-wing party was the largest government party was included.[31] Finally, since government leaders may overcompensate for inflation under sociopolitical pressure (see Ha 2008: 795), the total inflation rate (taken from the World Development Indicators) was equally considered as a control variable.

27 This data was taken from Taydas and Peksen (2012).

28 Growth is measured by the annual growth of GDP taken from World Development Indicators.

29 Source: Penn World Tables (Heston et al. 2009).

30 Source: Database of Political Institutions (DPI).

31 Source: Database of Political Institutions (DPI).

Given that private and public hydrocarbon production as well as welfare spending patterns differs considerably within countries for the period under analysis, I used fixed effects in order to estimate the effects of varying ownership structures on public expenditures. As the research question is primarily longitudinal in nature, exploring the variance of welfare spending within countries over time appears particularly pertinent (see Jackman 1985).[32] By using fixed-effects estimators, the differences between countries that drive welfare spending – such as countries' economic, political, and cultural institutions – as well as the different starting points can be better accounted for. In the absence of plausible empirical evidence for the random effects assumption, bias and consistency criteria favor a fixed-effects model.[33] In addition, theoretical considerations strongly support the use of a within-country estimator, because it predicts how changes within countries affect changes in welfare expenditure.

Table 4 below shows the estimation results for the period 1989–2005.[34] As evident, state production of oil and gas exerts a curvilinear effect on welfare spending (Models 3 and 4). While per capita government hydrocarbon production has a negative effect on social expenditure, its squared term is associated with more welfare spending. Thus from a within-country perspective, substantial increases of state-owned hydrocarbon production seem to drive governments to invest more in social policies such as health, education, and/or social security, while marginal increases induce state leaders to neglect these types of policies. Private hydrocarbon exploration, in contrast, shows no statistically significant impact on welfare spending (Models 1 and 2).[35]

Table 5 below shows the results of estimations using changes in hydrocarbon production instead of levels. As is evident, large changes in per capita state hydrocarbon production lead to an increase of social expenditures (Models 3 and 4). Unlike the previous estimations, however, minor changes have no impact on welfare spending (Models 1 and 2). These results reinforce the assumption that large amounts of state-owned oil and gas entail peace-buying ef-

32 Within the quantitative welfare spending literature, previous studies have often relied on the methods described in Beck and Katz (1996) or Plümper et al. (2005), suggesting the use of OLS estimators with panel-corrected standard errors, unit as well as period fixed effects, and either a lagged dependent variable or AR(1) correction to adjust for serial correlation. However, this estimation technique is rather inappropriate for panel data, exhibiting relatively few points in time. Beck (2001: 274), for example, notes that T should be large enough so that "averages over the T time periods for each unit make sense" and a proper modeling of TSCS data dynamics is possible. Given that the present dataset exhibits 17 points in time compared to 40 countries, the use of other estimation methods seems more appropriate.

33 As noted by Halaby (2004: 511), the random-effect estimator is strongly influenced by cross-sectional variance and underlies the assumption that unobserved heterogeneity is mean-independent from the causal variable.

34 The choice of this time period was contingent on the availability of the welfare spending data from Taydas and Peksen (2012).

35 Regarding the control variables, per capita GDP is negatively associated with welfare spending, which is in line with previous findings (Rudra and Haggard 2005; Ha 2008). Also, higher inflation increases social expenditure, suggesting that – under sociopolitical pressure – state leaders overcompensate for inflation. All other control variables remain nonsignificant.

fects as a result of increased social spending. By implementing broad welfare policies, state leaders may buy political legitimacy and internal stability.[36]

Table 4: Per Capita State and Private Hydrocarbon Production and Welfare Spending

	(Model 1)	(Model 2)	(Model 3)	(Model 4)
	welfare spending	welfare spending	welfare spending	welfare spending
pc_priv_prod(t-1)	-3.007	-4.042		
	(12.18)	(11.49)		
pc_priv_prod squared(t-1)	-11.24	14.01		
	(23.34)	(22.66)		
pc_gov_prod(t-1)			-19.59*****	-21.90*****
			(3.380)	(5.108)
pc_gov_prod squared(t-1)			6.161*****	12.18*****
			(1.554)	(2.470)
per capita gdp(t-1)		-0.000317*****		-0.000300*****
		(0.0000550)		(0.0000479)
growth(t-1)		0.0310*		0.0282
		(0.0180)		(0.0174)
elections(t-1)		0.173		0.190
		(0.291)		(0.282)
inflation(t-1)		0.000728**		0.000865***
		(0.000323)		(0.000312)
left party(t-1)		0.155		0.289
		(0.442)		(0.429)
trade openness(t-1)		0.00627		0.00250
		(0.00726)		(0.00711)
_cons	8.335*****	10.20*****	10.85*****	12.34*****
	(0.351)	(0.742)	(0.442)	(0.900)
N	489	451	489	451
Prob > F	0.0628	0.0000	0.0000	0.0000

NOTE: Fixed Effects Models. Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01, ***** p<0.001
Source: Author's own compilation.

36 The positive evidence found for the relationship between hydrocarbon ownership and welfare spending does certainly not mean that other causal mechanisms such as coercion or corruption are of minor importance. However, a detailed testing of each potential causal mechanism would require a thorough description of the chosen specification models and estimation techniques and thus lies beyond the space limitations of this paper. Considering the results of recent studies analyzing the relationship between oil wealth and social spending (as well as between welfare spending and intrastate violence), I opted to concentrate on this particular channel.

Table 5: Per Capita State and Private Hydrocarbon Production (Change) and Welfare Spending

	(Model 1)	(Model 2)	(Model 3)	(Model 4)
	welfare spending	welfare spending	welfare spending	welfare spending
Δpc_priv_prod(t-1)	25.91	9.621		
	(16.21)	(15.29)		
Δpc_priv_prod squared(t-1)	-50.68	-6.805		
	(30.85)	(29.60)		
Δpc_gov_prod(t-1)			-1.029	-5.051
			(4.879)	(9.032)
Δpc_gov_prod squared(t-1)			4.824*	12.28***
			(2.625)	(4.064)
per capita gdp(t-1)		-0.000272*****		-0.000338*****
		(0.0000511)		(0.0000492)
growth(t-1)		0.0199		-0.00287
		(0.0183)		(0.0185)
elections(t-1)		-0.00704		0.0461
		(0.297)		(0.278)
inflation(t-1)		0.000517		0.000454
		(0.000338)		(0.000318)
left party(t-1)		0.0645		0.224
		(0.443)		(0.416)
trade openness(t-1)		0.00263		0.00188
		(0.00744)		(0.00702)
_cons	8.043*****	10.16*****	8.019*****	10.85*****
	(0.124)	(0.717)	(0.121)	(0.703)
N	464	428	464	428
Prob > F	0.2482	0.0000	0.0023	0.0000

NOTE: Fixed Effects Models. Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01, ***** p<0.001
Source: Author's own compilation.

6 Conclusions

This paper argued that the property-rights structure for oil and gas is an important factor when predicting civil war onset. Compared to privately owned hydrocarbons, NOCs provide governments with a larger source of direct income. Furthermore, NOCs are generally characterized by less transparency and accountability. On the one hand, these properties inherent to state-owned firms may further greed and intensify competition for control over the key bodies that control oil and gas revenues, thereby increasing the risk of internal violence.

As has been argued, nontransparency may lead rebels to make exaggerated claims about a state's oil wealth. Also, the prospect of future rewards in the form of oil rents may act as a private good that facilitates the mobilization of insurgency.

On the other hand, large hydrocarbon revenues lying in state hands may allow governments to establish networks of clientelism and patronage, use pork-barrel spending, reduce their citizens' tax burden, increase welfare spending, and/or build up a large repressive apparatus. This way, state leaders may co-opt political dissidents, accommodate the opposition, offer private privilege in exchange for political support, and/or exert coercion, thereby securing stability and domestic peace.

The results of the logistic regressions confirm the importance of resource-ownership structures as a predictor variable for civil war onset. At intermediate levels, state-owned oil and gas wealth fosters internal violence, while reducing the likelihood of conflict at high levels. In contrast, privately owned hydrocarbons do not affect the risk of intrastate violence. These findings proved to be robust to various operationalizations, model specifications, and statistical estimations. Furthermore, within-country estimations showed that large amounts of state-owned hydrocarbons are associated with more welfare spending, while moderate, public hydrocarbon production reduces social expenditure. Therefore, it seems that differing welfare spending patterns can partially explain the effect of the resource-ownership structure on intrastate conflict onset.

Much room remains for future research. The intention of this paper was to gather initial statistical evidence for the link between resource-property-rights structures and intrastate conflict. Although it provided various explanations for the significant effect of NOCs on civil war onset and investigated one particular channel (welfare spending) in greater detail, it did not perform comprehensive tests for each potential causal mechanism underlying the relationship. Future studies should more carefully explore the precise channels through which state-owned resources may affect countries' conflict potential. The article also concentrated on hydrocarbons as previous studies showed that oil and gas, in particular, have an effect on intrastate violence (Hegre and Sambanis 2006; Ross 2006; Dixon 2009). However, it seems worthwhile to also investigate how the property-rights structures of other resources such as diamonds or gold impact on countries' risks of experiencing internal conflicts.

Drawing policy recommendations from the reported results would surely be premature and rather inappropriate. While NOCs may further internal violence or assure the survival of autocratic regimes under some circumstances, they may also promote socioeconomic development and democracy under other conditions. As noted by Artur (2012), state ownership of oil in Ghana may have a greater potential to promote social equality, equity, and internal stability than private-sector ownership. Norway is another case of responsible handling of state-owned hydrocarbons. Accordingly, more research is needed to assess the contextual conditions under which privately and state-owned hydrocarbon companies might enhance peoples' welfare.

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Annex

Table A1: Hydrocarbon Ownership Structure of All Countries within the Sample (Averages over the Period 1989–2010)

Country	*Share of government production (in %)*	*Share of Domestic Private Production (in %)*	*Share of Foreign Private Production (in %)*	*Per Capita government production (in thousand barrels of oil equivalent per day)*	*Per Capita private production (in thousand barrels of oil equivalent per day)*
Algeria	94	0	6	0.0863	0.0053
Angola	41	0	45	0.0340	0.0392
Argentina	20	13	49	0.0054	0.0221
Australia	0	41	45	0	0.0517
Azerbaijan	74	0	11	0.0345	0.0080
Bahrain	100	0	0	0.2539	0
Brazil	54	52	0.8	0.0036	0.0041
Brunei	47	0	49	0.5415	0.5611
Cameroon	65	0	34	0.0048	0.0025
Canada	6	30	26	0.0083	0.1010
China	75	17	3	0.0023	0.0006
Colombia	57	1	24	0.0100	0.0043
Congo	0	0	86	0	0.0615
Ecuador	65	0	14	0.0218	0.0048
Egypt	45	0	35	0.0085	0.0067
Equatorial Guinea	5	0	71	0.0247	0.2686
Gabon	11	0	74	0.0326	0.2037
Iran	100	0	0	0.0715	0
Iraq	100	0	0	0.0756	0
Kuwait	100	0	0	1.1149	0
Libya	56	0	18	0.1884	0.0565
Malaysia	66	0	28	0.0405	0.0173
Mexico	100	0	0	0.0404	0
Nigeria	58	2	34	0.0113	0.0071
Norway	56	8	33	0.4572	0.3330
Oman	54	36	30	0.2291	0.2790
Qatar	90	0	0	1.6846	0
Russia	46	46	2	0.0561	0.0532
Saudi Arabia	94	0	0	0.4594	0
Sudan	100	0	0	0.0048	0
Trinidad and Tobago	25	0	74	0.0654	0.2931
Tunisia	45	0	39	0.0054	0.0046
Turkmenistan	100	0	0	0.2195	0
United Arab Emirates	77	0	3	0.8387	0.0385
Venezuela	99	0	3	0.1394	0.0043

NOTE: Only country-years in which the sum of state-owned and privately owned oil and gas figures made up more than 65 percent of officially reported total hydrocarbon production were considered.
Only cases in which the sum of state-owned, privately-domestic-owned and privately-foreign-owned made up for more than 65% of the country's total hydrocarbon production were considered. For this reason, the following five countries have been exlcuded from the Table:
Bolivia, Indonesia, Kazakhstan, Syria and Vietnam.

Source: Author's own compilation.

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