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Revisiting the oil and democracy nexus: New evidence utilizing V-DEM democracy data in a GMM PVAR framework

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Abstract

This study re-examines the validity of oil-hinders-democracy hypothesis by comparing the long-term effects of oil abundance and oil dependence democracies individually. Based on five novel measures of democracy from V-DEM dataset, we test this hypothesis on data from 95 developing countries over the period 1932–2014. Our analyses show some nuances in the oil-democracy relationship. First, that oil wealth adversely affects democracy across the full sample. Second, once we classified developing countries into five sub-samples, we consistently find that the influence of oil wealth (abundance/dependence) measures on democracy varies across geographical regions as well as small and large-scale oil endowment countries. Third, we find that institutional quality in the form of rule of law plays a crucial role in altering the oil–democracy link. Overall, we provide ample support for 'Conditionalist view'. In other words, oil has different effects on democracy in the context of oil abundancy, geographic regions, and institutional aspects. More importantly, it seems that oil abundance does not hinder democracy in each of the five sub-samples and in some instances can even be a blessing. Thus, it is worthy to make a distinction between these two types of oil wealth to better understand the oil-democracy relationship.

Keywords

Resource curse, democratic institutions, oil abundance, oil dependence, PVAR

1 Introduction

Does natural-resource wealth foster or hinder democratic-institution outcomes? Notwithstanding decades of research, the question is still unresolved. A growing body of work in both economics and political science has pointed to the 'natural-resource-curse' thesis.[1] The debate over the resource curse has focused on why resource-rich countries tend to grow at a slower rate and perform more poorly in their economic growth than resource-poor ones (Sachs and Warner 1995).

In recent decades, the debate is focusing on the association between natural-resource wealth (and in particular, oil wealth) and political institutions (especially democratic institutions). For some time, a large number of political scientists have thought that oil wealth widely strengthens autocracy and inhibits democracy across a range of countries (Ahmadov 2014; Andersen and Aslaksen 2013; Anderson and Ross 2014; Aslaksen 2010; Cassidy 2019 ; Colgan 2010; Gassebner, Lamla, & Vreeland 2013; Goldberg et al 2008; Jensen & Johnston 2011; Jensen and Wantchekon 2004; Murshed 2004; Ramsay 2011; Ross 2001, 2012, 2015;Smith 2017; Ulfelder 2007; Wantchekon 2002; Wigley 2018). However, other researchers have begun to question the validity of this conventional wisdom – largely on empirical grounds (Dunning 2008; Haber and Menaldo 2009, 2011; Herb 2005; Liou and Musgrave 2014; O'Connor et al 2018; Oskarsson and Ottosen 2010). Some in the latter group find that oil wealth is good for democracy (Bruckner et al. 2012; Gurses 2009; Herb 2004; Liou and Musgrave 2014; Menaldo 2014; Wacziarg 2012), while others conclude that oil wealth has no effect on democracy (Haber and Menaldo 2009, 2012; O'Connor et al 2018). Still others find that the effect that oil wealth has on democracy is conditional on a host of factors (Brooks 2016; Caselli and Tesei 2016; Dunning 2008; Hendrix 2018; Houle 2018; Jones Luong and Weinthal 2010; Lall 2017; Masi and Ricciuti 2019) – for example, on inequality, temporal factors (before versus after a structural break in 1980, following the second-largest jump in oil prices – i.e. that of 1979), institutional strength, failures of authoritarian regimes and the structure of oil-industry ownership.

In the current literature, baseline studies have shown apparently varying effects of oil wealth on democratic-institution outcomes. However, the literature also reveals a number of gaps and shortcomings in these studies that led to ambiguous results – for example, using one single measure of democracy (the majority of prior research has made use of the Polity index as a proxy for democratic institutions) or employing variables that poorly measure the concepts of democracy (Oskarsson and Ottosen 2010). Another shortcoming of the studies was even more glaring: their measurement of oil rents. The data used in most studies measured oil in terms of oil dependence, which caused endogeneity problems (Tsui 2011). The time-series estimation methods that were used may not have been the most appropriate for estimating the relationship between oil and democracy; more advanced time-series econometric methods were not used until very recently (O'Connor et al 2018). Furthermore, the regression results were weakened by missing data – whether in the area of oil or democracy variables. Most of the existing literature has tended to focus on the short-term effects

[1] See, among others, Auty, 2001; Badeeb et al., 2017; Bhattacharyya et al., 2017; Doolot and Heathershaw, 2015; Frankel, 2012; Murshed 2018; Porter and Watts, 2017; Ross, 2015; Van der Ploeg and Poelhekke, 2016; Venables, 2016.

of oil resources on democracy rather than the long-term effects, which are more useful due to the typically slow speed of institutional change (Acemoglu and Robinson 2006). The estimations of the impact of natural resources on democracy were based mainly at the cross-sectional level rather than being based on within-country variations (Aslaksen 2010).

This study engages the aforementioned debate by testing the long-term effects of oil wealth on within-country democratic-institution outcomes. In particular, we examine the relationship between oil and democracy by using a newly released democracy-measuring dataset from the Varieties of Democracy project[2] – comprising the categories of electoral, liberal, deliberative participatory and egalitarian democracy – and by adopting more sophisticated time-series estimation methods than hitherto. As far as we know, all previous studies have used either a single measure of democracy (Polity) or different aspects of democracy – such as political constraints, civil liberties and political rights – to examine the relationship between oil and democracy.

Our paper contributes empirically to the scholarly debate over oil wealth and democracy in four ways:

1) It investigates the validity of the 'oil-hinders-democracy' hypothesis by comparing the long-term effects of oil abundance – measured by oil and gas value per capita– and oil dependence – measured by oil and gas value as a share of GDP– on democracies individually. The aforementioned studies have focused on the effects of either oil abundance or oil dependence as oil wealth indicators on democracy, while there is almost no study which takes into account the effects of both indicators. By considering the growing literature on the resource curse hypothesis, there are few studies have used individually both of oil abundance and oil dependence as oil wealth indicators. Although, they have linked the extraction of natural resource to economic growth or violent civil conflict. For instance, on economic growth, Alexeev and Conrad (2009) and Shahbaz et al (2019) have examined the effects of both of resource abundance and resource dependence on economic growth. On violent civil conflict, Brunnschweiler et al (2009) and Basedau and Lay (2009) have used both of oil abundance and oil dependence as oil wealth indicators to explore the effect of oil wealth on violent conflict.
2) To the best of our knowledge, it is one of very few studies that have employed a new approach in measuring democracy to determine the long-term relationship between oil wealth and democracy within countries over time. We use the data from V-DEM because it helps us in examining democratization with more reliable, valid, comprehensive and more nuanced measures than are commonly used. Most developing countries are neither fully democratic nor fully autocratic but something in the middle – referred to as 'anocracies'. V-DEM captures nuances of democracy that go beyond the multi-party electoral process focus of the Polity data.
3) Since the effects of oil on democracy may vary in different parts of the world, and for greater in-depth understanding, this study splits its full sample into two classifications: (a) We have selected three regional groups, Middle East and North African (MENA), Latin America and the Caribbean (LAC) and Sub-Saharan Africa (SSA); and (b) We break the full sample into two groups according

[2] Varieties of Democracy (V-DEM) is an international research project which aims to develop new indicators of democracy in all countries all over the world from 1789 to the present.

to their oil endowments, countries with large oil endowments and those with smaller oil endowments, measured in terms of oil wealth per capita. A separate treatment for these different sub-samples is required because of significant differences in their historical circumstances, cultural background and socioeconomic status.

4) Most importantly, we use a more advanced time-series econometric method, called panel VAR approach based on system GMM estimates, to capture the endogenous relationships between oil and democracy.

The remainder of the paper is organized as follows: Section 2 outlines the relevant literature review; Section 3 covers samples, variables, data and modelling; Section 4 reports on and discusses the main empirical results; Section 5 provides robustness checks; and, finally, conclusions are drawn in Section 6.

2 Literature Review

Since the end of the twentieth century, the relationship between resource wealth – especially oil wealth – and democratic institutions has received considerable attention. The existing literature on the effects of oil on democracy can be divided into three main branches.

The first, large branch is consistent with the claim that 'oil wealth impedes democracy and makes autocratic states more durable'. For instance, in his pathbreaking article 'Does oil hinder democracy?' (2001), by using pooled time-series cross-national data across 113 countries from 1971 to 1997, Ross finds strong evidence that oil wealth – measured by oil, gas and coal exports as a fraction of Gross Domestic Product (GDP) – hurts democracy and enables authoritarian governments to maintain their rule. He also was among the first to consider the causal relationship between oil wealth and democracy, and he suggested three causal mechanisms to explain the adverse effect of oil wealth on democracy:

(a) The 'rentier' effect: oil-rich governments use low tax rates (taxation effect) and high spending (spending effect) to dampen democratic pressures;

(b) The 'repression' effect: oil wealth enables governments to rule through strengthening their internal security forces;

(c) The 'modernization' effect: when growth based on oil exports fails, circumstances drive citizens to focus on industrial and service-sector jobs and render them less likely to push for democracy.

Hence, after Ross' findings some studies have argued that 'oil hinders democracy'. Ross himself re-examined this hypothesis in his later study 'Oil and democracy revisited' (Ross 2009) by using a more exogenous variable of oil wealth that measured by oil income per capita – and he finds similar results. Ross' main finding has been strengthened by a number of cross-country studies. Jensen and Wantchekon (2004) find a strong negative correlation between oil dependence and levels of democracy in 46 African states. Smith (2004) uses a different dependent variable by focusing on regime durability instead of the level of democracy. This study examines contrasting claims made by scholars of oil and politics that oil wealth either tends to undermine regime durability or to enhance it. Smith finds that oil wealth is robustly associated with increased regime stability. By using an event-history-analysis approach, Ulfelder (2007) confirms that autocratic governments are typically more durable in resource-rich countries. Tsui (2011) has used a unique dataset that exploits variation in the timing and

size of oil discoveries to identify the impact of oil wealth on democracy; his findings are also associated with discovery timing and size. He finds that discovering 100 billion barrels of oil significantly decreases a country's prospects for democratic improvement for three decades. He also finds evidence indicating a greater negative impact of oil discovery in countries that experienced major finds early in their (post-independence) history than in those countries that did so later. However, Tsui offers new evidence for the long-term negative effect of discovering oil wealth on democracy. More recently, Cassidy (2019) has examined the long-run effects of oil wealth on economic and political development outcomes by using information on geological basins to create an instrument for oil production across countries. Based on Instrumental variables estimation for 172 countries from 1966 to 2008. He demonstrates that oil production impedes democracy.

The second branch of the literature (that of the 'Conditionalist') is associated with the claim that 'the effect of oil wealth on democracy is conditional on a host of factors'. Dunning (2008) suggests that natural resources may be associated with either authoritarianism or democracy, and conditioning variables influence whether the relationship between natural resources and democracy is positive or negative. He finds that a positive relationship between natural resources and democracy depends on the level of the private-income-inequality variable, based on a panel dataset that observes Latin America, the world's most unequal region, since 1960. Luong and Weinthall (2010) follow in Dunning's footsteps. They attempt to explain the different political outcomes that have been witnessed in five mineral-rich states of the former Soviet Union (Russia, Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan), and they conclude that oil wealth only leads to hurtful political outcomes when the government has an overriding role in the structure of oil-industry ownership (public or private). Bhavnani and Lupu (2016) show evidence from a natural experiment in Brazil; they argue that the effect of natural-resource revenues on democracy is conditioned by the strength of institutions, and deduce that the greatest adverse effect of oil resources on democratic outcomes is seen when the municipalities of Brazil have weak institutions. Brooks and Kurtz (2016) also put forth a similar conclusion as Bhavnani and Lupu's and re-examine the relationship between oil wealth and political regimes based on a panel of 183 countries. They find that oil wealth is not necessarily a curse and may even be a blessing with respect to democratic development. Using data on 118 autocratic countries between 1946 and 2004, Houle (2017) finds that the negative effect of oil on democracy is conditional on the failure of the authoritarian regime in question. In terms of economic-forms theory, Aytac et al. (2014) have offered a new explanation for the conditional effects of the resource curse by distinguishing between two kinds of economies: contract-intensive and clientelist economies. Using a two-step robust system generalized method of moments (GMM) estimations for 150 countries from 1973 to 2000, their results indicate that the negative effect of natural-resource dependence on democracy is conditional on the prevailing economy type. Specifically, resource dependences are detrimental for democracy only in nations with clientelist economies while the resource curse is avoided in nations with contract-intensive economies. Caselli and Tsei (2016) find that resource-rent windfalls, which typically occur during commodity-price booms, encourage authoritarianism, as measured by the Polity scale, in countries that are already autocracies – prompting them to move towards greater levels of autocracy, and all the more so when the country displayed a relatively low initial degree of autocracy. Resource-rent windfalls have little impact on countries that are already

democracies in this connection. The findings are robust to a variety of techniques, including GMM techniques, as well as commodity classifications: more resources for dictators. But our hypothesis is that a resource windfall can be conditioned by rule of the law.

The third branch of the literature is consistent with the claim that 'oil wealth does not always impede democracy'. In other words, the second branch did not, in its view, find consistent support for the claim that 'oil wealth impedes democracy'. Herb (2005) has examined the claim that oil impedes democracy, which was addressed by Ross (2001). He finds weak support for the notion that there is a net negative effect of oil wealth on democracy. In their important study, which has had a powerful impact on the 'oil-hinders-democracy' debate, Haber and Menaldo (2011) have questioned the conventional wisdom that oil fuels authoritarianism. Their study tests whether there is a long-term relationship between oil wealth and the level of democracy within countries over time. Using a unique historical dataset on resource wealth that covers up to 168 countries from 1800 to 2006 and applying time-series-centric methods that control for country-fixed effects and operationalize explicitly specified counterfactuals, they find that the association between oil wealth and authoritarianism disappears over the long run, and generate results that suggest a resource blessing. Using a similar approach, Liou and Musgrave (2015) apply a synthetic controls method in a small set of countries, and they find little evidence that a resource curse systematically prevents democratization. O'Connor et al. (2018) re-evaluate Haber and Menaldo's findings by covering the latter's shortcomings in their study; the results that they end up with lead back to Haber and Menaldo's conclusion. By analysing the effect of oil on democracy in the context of colonization experiences, Omgba (2015) examines a large sample of oil-producing countries, and his main findings are that contemporaneous levels of democracy in oil countries are positively associated with the time elapsed between the beginning of oil production and a country's political independence. In general, this branch casts doubt on the existence of a straightforward political resource curse.

Consequently, the literature is inconclusive and, therefore, the present study aims to fill the research gap by testing the following research hypotheses:

Hypothesis 1. The effect of oil wealth on democratic institutions differs across geographic regions and oil endowment contexts.

Hypothesis 2. The effect of oil wealth on democratic institutions can be conditioned by institutional quality (rule of the law), and the effect is stronger the better is institutional quality.

3 Data and the Empirical Model

3.1 Data

Sample

The study examines the relationship between two measures of oil wealth and five measures of democracy. The panel data for this study is strongly balanced and it includes 95 developing countries[3] for the 1932–2014 period.[4] Table S. 1 in supplementary tables provides a list of countries in each group. Our dataset brings in data from a variety of different sources, including Ross and Mahdavi's (2015) Oil and Gas dataset, V-DEM (2019), Haber and Menaldo (2011) American Political Science Review (APSR) Dataset and the Maddison Database (2018).

Variables

To explore the effects of oil abundance and oil dependence on democracy outcomes, we mainly employ the Oil and Gas dataset provided by Ross and Mahdavi (2015).[5] This provides the best available information about the volume and value of oil and natural-gas production in all countries from 1932 to 2014.

A. Endogenous independent variables: Data on oil wealth

Before we choose the independent variable, we must discuss the measure of oil wealth that is supposed to explain the relationship between oil and democracy. Other empirical studies differ on this point. The most commonly used measure in empirical studies is resource dependence, which reflects the degree to which a country economically relies on resource rents within its overall economic activity (Haber and Menaldo 2011; Jensen and Wantchekon 2004; Ross 2001; Smith 2004; Ulfelder 2007; Wiens et al. 2014). Other studies use the measure of resource abundance, which reflects the national importance of a country's resource rents (Al-Ubaydli 2012; Dunning 2008; Ramsay 2011; Ross 2012). However, we distinguish our study from much of previous empirical work by employing two measures of oil wealth (oil abundance and oil dependence) rather than one. This will give us a unique insight into the conditions under which natural resources may block or encourage democracy.

To capture oil abundance, we used the quantity of extracted oil and gas multiplied by the per-unit world price and then divided by population size (oil and gas value per capita). For oil dependence, we used the quantity of oil and gas extracted in a given year multiplied by the per-unit world price divided by GDP (the share of oil and gas value in GDP). The data on oil and gas value is obtained from the dataset of Ross and Mahdavi (2015), who obtained data from the US Geological Survey, the US Energy Information Administration, the World Bank and the BP Statistical Review. This dataset

[3] We are particularly interested in the fate of developing countries, because most of developed countries like Norway and the United States have achieved the threshold level in democracy many years ago, while the developing countries they still struggling to reach the upper limit of democracy.

[4] Our choice of the period (1932-2014) is limited by the availability of the data on oil wealth from Ross & Mahdavi 2015 dataset.

[5] https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/ZTPW0Y (Ross & Mahdavi, 2015).

covers all countries from 1932 to 2014. Additionally, and as an alternative measure to oil wealth, we also employ the concept of oil income.[6]

Due to the highly skewed nature of the data on resource rents and to the presence of zero values in the 'log' transformation of oil wealth, we enter our regressions in the form of natural log of (1+oil wealth).

B. Dependent variables: Data on democracy

Researchers typically use the Polity index as a proxy for democratic institutions (Alexeev and Conrad 2009; Anyanwu et al. 2013; Aslaksen 2010; Bueno de Mesquita and Smith 2010; Dunning 2008; Haber and Menaldo 2011; Jensen and Wantchekon 2004; Murshed 2004; Ramsay 2011; Ross 2001; Smith 2004; Herb 2005; Tsui 2010; Ulfelder 2007), which has several shortcomings as a measurement of democracy in terms of political rights and liberties – as identified by Oskarsson and Ottosen (2010). One of these is that Polity does not consider to what extent the citizenry enjoys civil liberties and political rights, focusing mainly on the nature of multi-party electoral processes. Fortunately, since 2010, more than 50 scholars have responded with a global collaborative effort, known as the Varieties of Democracy (V-DEM) dataset, to stringently document the features of democracy for 201 countries from 1789 to 2017. To test our hypothesis, we draw our dependent variables from this unique database (V-DEM, Version 9). In this study we used five main indicators of democracy that offer distinctive approaches to defining democracy (Coppedge et al. 2016): Electoral, Liberal, Deliberative, Participatory and Egalitarian democracy. It is important to note that each democracy index is based on various subcomponents. Supplementary Table S. 2 summarizes the definitions of the five-outcome variables as defined by V-DEM. All of these democracy measures are reported in such a way that assigns values between 0 and 1. Larger values indicate a better quality of democracy. V-DEM data shows much greater variation and has the advantage of a variety of sub-components which are fine grained to capture more aspects of democracy. In particular, it separates a liberal component index from the electoral democracy index. While elections are common in most developing countries respect for liberal values are less common. The V-DEM electoral democracy index plays close attention to aspects of electoral fairness and freedom of expression. The separate liberal component index and is concerned with judicial and legislative constraints on the executive, as well as respect for human rights and equality before the law. Since Liberal component index is formed by averaging the following three indices: equality before the law and individual liberties (v2xcl_rol), judicial constraints on the executive (v2x_jucon), and legislative constraints on the executive (v2xlg_legcon). We have used legislative constraints on the executive index to capture liberal democracy, which excludes the rule of law to avoid multicollinearity as we use it as a control for the quality of institution. In addition, V-DEM also provides us with the participatory component index, which is a measure of civil society engagement and the role of sub-national government. The deliberative component index records the extent of policy dialogue and discourse underpinning government policy formation.

[6] The data source for this variable is taken from the data set constructed by Haber and Menaldo (2011).

C. Control variables

Oil wealth is, naturally enough, not the only variable affecting democracy. In order to avoid any potential omitted variable bias, we control for several other variables that have been defined in the literature on political science, which has been strongly associated with democratic institution outcomes:

1. Income per capita (Maddison Database 2018)
2. GDP growth (Maddison Database 2018)
3. Trade Openness: represents international economic Integration, measured as exports plus imports as a share of GDP (V-DEM 2019; Maddison Database 2018).

These first three explanatory variables are likely to be endogenous to democracy (Acemoglu et al 2008; Fortunato and Panizza 2015; Murshed 2018). Thus, we have treated them as an endogenous independent variable to democracy.

4. The log of population[7] (Maddison Database 2018);
5. Institutional quality: Following to Acemoglu, Johnson and Robinson (2001) and Alexeev and Conrad (2009), we mainly use the rule of law to proxy institutional quality as it is an important break on the abuse of power.
6. A series of dummy variables for regions to mark countries in Latin America, the Middle East and Sub-Saharan Africa as the reference category and for small and large per-capita oil endowments.

Supplementary Table S. 3 describes all the variables used in our empirical analysis.

3.2 The empirical model

We now investigate the long-term effects of oil abundance and oil dependence on within-country democratic institutions outcomes. We regress the five democracy measures on the two indicators of oil wealth and a series of other covariates over the period 1932–2014 by using the System-GMM panel VAR model in the global sample of 98 countries, which was originally proposed by Holtz-Eakin et al. (1988) based the traditional VAR model by Sims (1980). Specifically, we estimate the following two models:

$$\Delta \mathrm{D}_{\mathrm{it}} = A_1\, \Delta \mathrm{D}_{\mathrm{i,t-1}} + A_2 \Delta\, (\text{Oil Abundance})_{\mathrm{i,t-1}} + A_3 \Delta\, (\text{GDP pc})_{\mathrm{i,t-1}} + A_4 \Delta\, (\text{GDP growth})_{\mathrm{i,t-1}} + A_5 \Delta\, (\text{Openness})_{\mathrm{i,t-1}} + \mathrm{B}\, \Delta\, \mathrm{X}_{i,t-1} + \delta_{\mathrm{i}} + \omega_t + \mu_{\mathrm{i,t}} \qquad (I)$$

$$\Delta \mathrm{D}_{\mathrm{it}} = B_1\, \Delta \mathrm{D}_{\mathrm{i,t-1}} + B_2\, \Delta\, (\text{Oil Dependence})_{\mathrm{i,t-1}} + B_3 \Delta\, (\text{GDP pc})_{\mathrm{i,t-1}} + B_4 \Delta\, (\text{GDP growth})_{\mathrm{i,t-1}} + B_5 \Delta\, (\text{Openness})_{\mathrm{i,t-1}} + \mathrm{P}\, \Delta\, \mathrm{X}_{i,t-1} + \gamma_{\mathrm{i}} + \partial_t + \varepsilon_{\mathrm{i,t}} \qquad (II)$$

Where $D_{i,t}$ denotes a vector of the dependent stationary series – namely, democracy (Electoral, Liberal, Deliberative Participatory or Egalitarian) for country i at year t. The main variable of interest in Model I is oil abundance (the log of oil value per capita) and in Model II is Oil Dependence (the log of oil value as % of GDP). A_2 in Model I therefore captures the effect of oil abundance on each democracy

[7] Haber and Menaldo 2011.

measure and B_2 in Model II therefore captures the effect of oil dependence on each democracy measure. $X_{i,t}$ is a vector of the other variables. The vector of time-varying country characteristics $X_{i,t}$ includes the rule of law and Population. δ_i and γ_i denote country-fixed effects that capture unobservable time-invariant country characteristics. ω_t and ∂_t are time-fixed effects that capture common shocks to democracy for all countries. The error terms μ_{it} and ε_{it} capture all other omitted factors and are clustered at the country level –hence, they may be arbitrarily serially correlated within countries.

We test Models I and II both on the full sample and on a subsample. The size of subsample differs, depending on the level of oil endowment and the nature of the region. For per-capita oil endowment, the subsample includes 30 small oil endowment countries (compared with the full sample of 95) and 32 large oil endowment countries. For the regional groups, the sub-sample includes 14 Middle East and North African, 22 Latin American and 42 Sub-Saharan African countries. Splitting the sample into these country groups helps us to identify the effect of oil abundance and oil dependence on democracy

4 Empirical Results

4.1 General summary statistics

Table A.1 in Appendix A shows the summary statistics for the variables used in the analysis and for the full sample, and for each group individually. Column 1 reports the mean and standard deviation for the whole sample. In the next two Columns, the full sample is classified into two groups according to the scale of oil endowment (as measured by oil and gas value per capita). In the last three Columns, countries are classified into the three aforementioned regional groups. Panel A of Table A.1 presents the key independent variables: oil value per capita and oil value as share of GDP. Panel B provides descriptive statistics for the five dependent variables of democracy. Panel C shows the other variables. Panel A indicates that MENA countries are characterized by a greater oil abundance - oil value per capita- and oil dependence - Oil Value as % of GDP- than those of other regions. MENA countries tended to be richer and depend largely on oil than LAC and SSA countries. Also, it shows that SSA countries have the lowest oil value per capita. While LAC countries have the lowest oil and gas value as share of GDP from 1932 to 2014. Panel B shows that the average of five democracy variables in 1932 significantly above average of five democracy variables in 2014, reflecting a general tendency towards toward democratic institutions. Remarkably, Panel B demonstrates that small-scale oil endowment countries are associated with a higher mean score in all the democracy indices than are the large-scale oil endowed countries. Also, it shows that the LAC countries have achieved the highest mean score in all the democracy indices. Interestingly, in Panel C the LAC countries also have the greatest mean score in rule of law among the other regions.

Table 1 summarises separately each of the five democratic-institution measures and the other control variables according to whether a country has produced any oil from 1950 to 2014. In the full sample of 98 countries, 68 countries have produced oil and 43 had zero oil production. In 1950 average electoral democracy in non-oil countries was 0.8 percentage points higher than average democracy in

oil countries. By 2014 this difference had declined to 0.34 percentage points, though neither difference is statistically significant (p_{1950} = 0.7838, p_{2014}=0.9367). While the average of electoral democracy over the period 1950-2014 was greater in non-oil countries than oil countries ($p_{1950\text{-}2014}$= 0.000). Liberal, participatory, deliberative and egalitarian democracy were similar in the two groups from 1950 to 2014. However, oil countries had greater Per capita income from 1950 to 2014 compared to non-oil countries ($p_{1950\text{-}2014}$= 0.000). Average trade is almost indistinguishable in the two groups. Moreover, average rule of law which we used as a proxy to institutional quality, was slightly stronger in non-oil countries than non-oil countries, from 1950 to 2014.

Table 1

Summary Statistics for Oil and Non-Oil countries

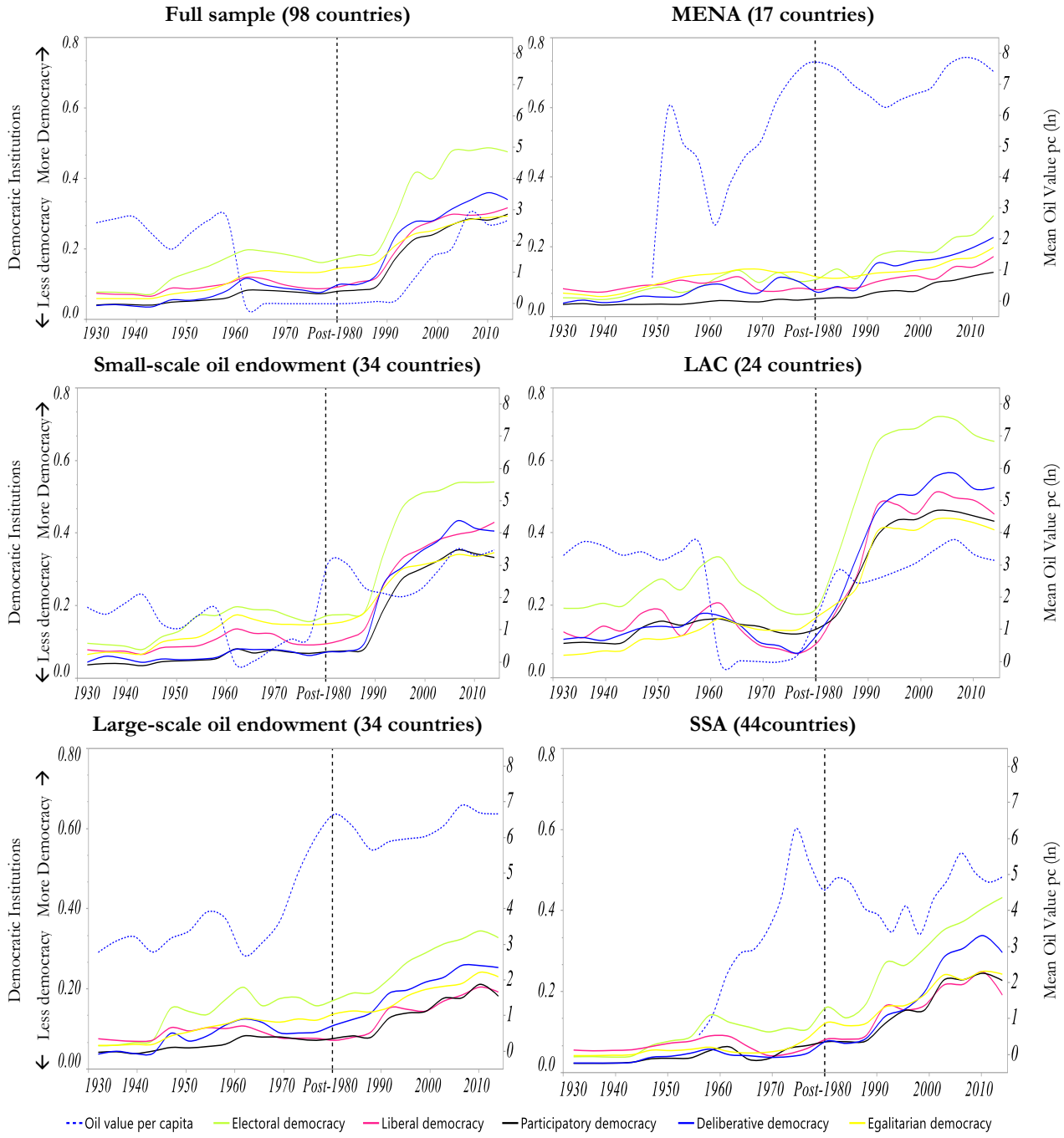
	Oil countries	Non-Oil countries	Difference	P-Value	Obs. of Oil Countries	Obs. of Non-Oil Countries	Obs.
Panel A. Democracy measures							
Electoral democracy in 1950	0.165	0.170	-0.005	0.876	62	43	105
Electoral democracy in 2014	0.478	0.501	-0.023	0.585	65	43	108
Electoral democracy 1950-2014	0.304	0.323	-0.019***	0.001	4172	2795	6967
Liberal democracy in 1950	0.318	0.265	0.053	0.255	62	43	105
Liberal democracy in 2014	0.544	0.550	-0.006	0.910	65	43	108
Liberal democracy 1950-2014	0.375	0.390	-0.015**	0.030	4172	2795	6967
Participatory democracy in 1950	0.081	0.089	-0.008	0.645	62	43	105
Participatory democracy in 2014	0.298	0.307	-0.008	0.794	65	43	108
Participatory democracy 1950-2014	0.173	0.183	-0.009**	0.015	4171	2795	6966
Deliberative democracy in 1950	0.104	0.104	0.000	0.985	62	43	105
Deliberative democracy in 2014	0.370	0.376	-0.006	0.886	65	43	108
Deliberative democracy 1950-2014	0.216	0.227	-0.011**	0.032	4172	2795	6967
Egalitarian democracy in 1950	0.112	0.099	0.012	0.521	62	43	105
Egalitarian democracy in 2014	0.332	0.331	0.000	0.993	65	43	108
Egalitarian democracy 1950-2014	0.220	0.218	0.002	0.588	4172	2795	6967
Panel B. Other control variables							
GDP per capita (ln)	8.282	7.688	0.595	0.000	3977	2470	6447
Trade	6.287	4.707	1.581	0.000	3556	1911	5467
Population (ln)	16.023	15.060	0.963	0.000	4215	2795	7010
Rule of law	0.421	0.438	-0.018	0.003	4192	2795	6987
Number of countries	68	43					

Notes: *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Figures 1 and 2 demonstrate how the trends of the five democratic-institutions measures and the two indicators of oil wealth (oil value per capita and oil value as share of GDP) have developed over the 1932–2014 period across the full sample of 98 countries and in each of the country groups. It appears that oil value per capita began to decrease gradually from the 1980s until the mid- to late 1990s, when it switched back to increasing in small and large oil countries as we as MENA.

Figure 1

Oil Abundance (Oil value per capita) & the five Democratic Institutions measures.
Smoothed trends (1932 – 2014)



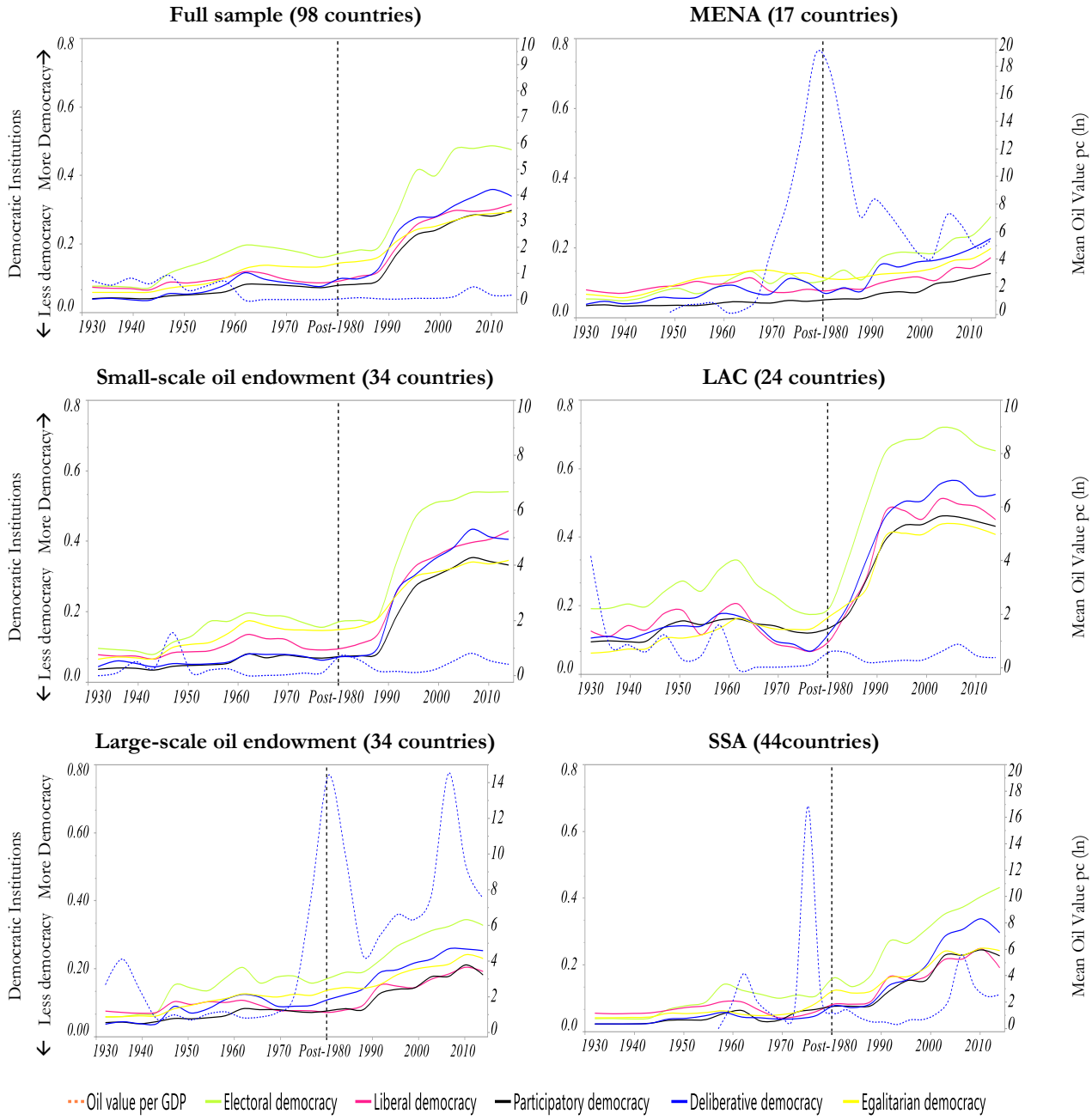
Source: Authors' construction using data from V-Dem (2018) and Ross (2014)

While it starts decrease gradually in LAC and SSA in mid-1980s. Similarly, oil value as share of GDP has the same tendency as oil value per capita.

Figure 2

Oil Dependence & the five Democratic Institutions measures.

Smoothed trends (1932 – 2014)



Source: Authors' construction using data from V-Dem (2019) and Ross (2014).

The increase in oil wealth post-1980 was due to the associated dramatic increases in oil prices. The period following this first, and greatest, oil shock gave a boost to the nationalization of oil, when oil-exporting countries nationalized the assets of foreign-owned oil companies and began managing it through new national companies. Moreover, adoption of the five democracy measures has generally increased over time in all the country groups – with a noticeable uptick from the 1990s onwards.

In addition, Electoral Democracy shows the greatest improvement compared with the remaining four democracy measures, while Participatory Democracy has the lowest level in most sup-sample groups. Overall, the five democracy indices generally exhibit the same tendency, but in SSA, there are differences between the democratic measures: electoral democracy keep increasing after the mid-1990s, while the rest of democracy variables declined in the mid-1990s. This demonstrates why we should consider multiple measures of democratic institutions rather than just relying on one. The claim that oil wealth associates negatively with democratic-institution outcomes can be clearly seen between oil abundance and oil dependence and the five democracy measures in large-scale oil endowed and MENA countries after the 1980s. In order to investigate the effect of oil wealth on democratic institutions, further analysis is warranted.

4.2 Results for Stationarity Test, Panel Cointegration Test and Panel VAR lag selection

Cross-sectional unit root test

As a first step, before estimating the panel VAR model, we examine the stationary properties of the variables by using Dickey Fuller, Fisher type panel tests (Choi, 2001), where the null hypothesis is that all panels (countries) contain a unit root. The empirical results of Dickey Fuller, Fisher type panel unit root tests are reported in supplementary Table S.4. The test shows that the null hypothesis of unit root process is accepted for all the variables at the level with intercept and trend for the majority of variables. This means that that all variables are stationary not in levels but in first differences, which is a vital condition for estimating a PVAR model.

The Westerlund panel cointegration test

The unit root analysis reveals that most series under study are integrated with first order I (1). The next step is to examine the long-term relationship between all the variables. In doing so, we employed the Westerlund (2007) panel cointegration tests, which account for cross-sectional dependence among countries in order to test the null hypothesis of cointegration against the alternative of absence of cointegration. The results of the Westerlund (2007) tests are reported in Supplementary Tables (S.5.1-S.5.4). Which show that the null hypothesis of no cointegration is not be rejected either for the full sample or for each of the five subsamples. Therefore, the best way in which to examine the existence of the long-term relationship between all the variables is to estimate Model I and II scenarios for all the variables in first differences by employing the System-GMM panel VAR approach.

Panel VAR lag selection

Before we estimate our models, it is important to select the correct lag length for panel VAR. We adopt the first-order panel VAR model based on the smallest likelihood criteria of modified Akaike information criteria (MAIC), Modified Bayesian information criteria (MBIC) and modified Hannan-Quinn information criteria (MQIC) values (see Supplementary Table S.6.1-S.6.5).

4.3 System-GMM panel VAR estimation results

Effect of oil wealth on democracy in full sample

We now begin our empirical investigation of the democratic effects of oil abundance and oil dependence. Table (2-4) present the main system-GMM panel VAR results. In each table, we categorized the analysis per type of oil wealth (abundance/dependence) measure to compare their effects on each of the five democratic-institution measures. Columns (1–5) present the results of the long-run effects of oil abundance (Model I), while Columns (6–10) summarizes the results of the long-run effects of oil dependence (Model II). In both models, we employed the dynamic System-GMM panel VAR approach.

Table 2 presents the long-run effects of oil abundance and oil dependence on each of the five democratic-institution measures in full sample by using the dynamic System-GMM panel VAR approach. The results presented in the first five Columns provide strong evidence that oil abundance hampers democracy over time for the full sample. According to PVAR estimates shown in Column (1) of Table 2, a 1 % increase in oil value per capita reduces the level of electoral democracy by 0.379%. In Columns 2-5, the same increase in oil value per capita reduces the level of liberal democracy by 0.128%, deliberative democracy by 0.281%, participatory democracy by 0.393% and egalitarian democracy by 0.430%.

Table 2

The effect of oil wealth on each of the five democratic-institution measures in full Sample: Oil Abundance vs Oil Dependence (1932–2014). System-GMM panel VAR.

	Oil Abundance (Oil Value per capita) and Democracy					Oil Dependence (Oil Value as % of GDP) and Democracy				
Dependent Variables	Δ Electoral Dem	Δ Liberal Dem	Δ Delib Dem	Δ Partic Dem	Δ Egalita Dem	Δ Electoral Dem	Δ Liberal Dem	Δ Delib Dem	Δ Partic Dem	Δ Egalita Dem
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Δ Oil Abundance (t-1)	-0.379***	-0.128***	-0.281***	-0.393***	-0.430***					
	[0.013]	[0.019]	[0.010]	[0.007]	[0.008]					
Δ Oil Dependence (t-1)						-0.071***	-0.315***	0.011	-0.084***	-0.167***
						[0.007]	[0.020]	[0.010]	[0.002]	[0.005]
Δ GDP per capita (t-1)	0.081	0.159**	0.044	-0.005	0.080	-0.211***	-0.207***	-0.092	-0.026	0.004
	[0.043]	[0.100]	[0.030]	[0.028]	[0.023]	[0.044]	[0.065]	[0.047]	[0.024]	[0.019]
Δ GDP growth (t-1)	-0.028	-0.018	-0.027*	-0.025**	-0.043**	-0.027**	-0.018	-0.033***	-0.018***	-0.012
	[0.010]	[0.013]	[0.005]	[0.003]	[0.004]	[0.005]	[0.020]	[0.004]	[0.002]	[0.002]
Δ Openness (t-1)	-0.062	-0.130**	-0.092	-0.164**	-0.126**	-0.004	-0.202***	-0.027	-0.068*	-0.058
	[0.014]	[0.032]	[0.010]	[0.008]	[0.007]	[0.008]	[0.022]	[0.008]	[0.005]	[0.005]
Δ (ln) Population (t-1)	0.066	0.004	0.062**	0.026	0.087***	-0.071***	-0.040**	0.030	0.013	0.058***
	[0.284]	[0.081]	[0.043]	[0.022]	[0.028]	[0.049]	[0.097]	[0.032]	[0.021]	[0.021]
Δ Rule of law (ln)	0.484***	-0.012	0.528***	0.374***	0.555***	0.426***	0.000	0.478***	0.265***	0.423***
	[0.037]	[0.048]	[0.037]	[0.039]	[0.052]	[0.024]	[0.036]	[0.027]	[0.034]	[0.022]
Hansen J: P-value	0.232	0.268	0.200	0.378	0.113	0.187	0.430	0.424	0.328	0.311
Observations	4582	4582	4582	4582	4582	4519	4519	4519	4519	4519
Countries	95	95	95	95	95	95	95	95	95	95

Note: Robust standard errors are in brackets. *p < 0.10, **p < 0.05, ***p < 0.01. All regressions were carried out using dynamic System-GMM panel VAR methodology (pvar command on stata). Hansen overidentification p values greater than 0.05 for all the specifications, this imply that we cannot reject the null hypothesis which states that instruments used are valid.

The effects are statistically significant at 1 % levels. On the other hand, this trend is shared with oil dependence as well (Columns 6-10), but with one exception – the electoral democracy was insignificant, even though, the sign remains negative. To obtain a negative relationship between oil wealth and democracy across a range of countries is not surprising because as discussed above the related literature on political resource curse thesis provide necessary arguments for this curse. For now, at least, we conclude that oil abundance and oil dependence impede democracy in the full sample. This result is consistent with Anderson and Ross (2014), Cassidy (2019), Fails (2019), Hendrix (2018), Ross (2001) and Wigley (2018).

Conditional effect of oil wealth on democracy: Oil abundancy context

To test whether the effect of oil on democracy may varies across oil-producing countries, we re-sample our data by calculating a threshold value for oil wealth. Following to Cotet and Tsui (2013), we calculate the median of average oil value per capita over the full sample period 1932–2014 (i.e. the log of oil value per capita is 3.84 million barrels per capita), and then we define the 3.84 value as the threshold level to determine whether an oil country has large or small oil endowment. Thus, we divide our sample into two groups: small-scale oil endowment and large- scale oil endowment countries based on the 3.84 value as threshold level. More precisely, a dummy variable takes a value of one if the country produces more than 3.84 million barrels per capita, and it takes a value of zero, otherwise.

Table 3 reports system dynamic panel data estimates for the two measures of oil wealth. Panel A presents PVAR results for small-scale of oil endowment countries, while Panel B for Large-scale of oil endowment countries. On the one hand, in small-scale oil countries (Panel A, Column 1-5), oil abundance does not have any significant effect on five democracy measures except deliberative democracy. Unlike small-scale oil countries, oil abundance does have a positive and significant effect on electoral democracy for large-scale oil countries (Panel B, Column 1) while it does not have any significant effect on the rest democracy measures. These results suggest that oil abundance promotes electoral democracy in large-scale oil countries. This result is similar to those obtained by Bruckner et al. 2012, Gurses 2009, Herb 2004, Liou and Musgrave 2014, Menaldo 2016 and Wacziarg 2012 who found a convincing evidence that oil wealth is good for democracy. For the other measure of oil wealth (oil dependence), there exist no long-run relationship between oil dependence and the five measures of democracy (Panel A, Column 6-10). On the other hand, estimates from Table 3 display that oil abundance and oil dependence have no effects on electoral, liberal, deliberative, participatory or egalitarian democracy during the period 1932–2014 for small-scale oil countries (Panel A, Column 1-10). This empirical finding supports the view put forward by Haber and Menaldo (2011), who suggest that natural resources and democracy are unrelated. Moreover, after confirming that oil wealth adversely affecting democracy across developing countries, it seems that our results from Table 3 clearly indicate that the negative effect has vanished once we classified developing countries into small and large oil endowment countries. we consistently find a positive relationship between "oil abundance" and two measures of democracy namely electoral and liberal democracy in large oil endowment countries, whilst there is no long run relationship in small oil endowment countries. Thus, oil's effect on democracy depends on whether an oil country has large or small oil endowment. Furthermore, the estimation results also clearly imply that the effect of oil on democracy in large-scale

oil countries has differed depends on two types of oil wealth. Thus, it is worthy to make a distinction between these two types of oil wealth to better understand the oil-democracy relationship.

Table 3

The effect of oil wealth on each of the five democratic-institution measures in small and large oil countries: Oil Abundance vs Oil Dependence (1932–2014). System-GMM panel VAR.

	Oil Abundance (Oil Value per capita) and Democracy					**Oil Dependence (Oil Value As % of GDP) and Democracy**				
Dependent Variables	Δ Electoral Dem	Δ Liberal Dem	Δ Delib Dem	Δ Partic Dem	Δ Egalita Dem	Δ Electoral Dem	Δ Liberal Dem	Δ Delib Dem	Δ Partic Dem	Δ Egalita Dem
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Panel A: Small-scale Oil Endowment (32 countries)									
Δ Oil Abundance (t-1)	-0.249	-0.055	-0.309*	-0.112	-0.287					
	[0.022]	[0.086]	[0.018]	[0.012]	[0.014]					
Δ Oil Dependence (t-1)						-0.105	-0.121	0.059	0.044	-0.150
						[0.020]	[0.081]	[0.016]	[0.013]	[0.015]
Δ GDP per capita (t-1)	0.168	0.017	0.237**	0.128	0.102	-0.037	-0.044	0.173*	0.156	0.005
	[0.096]	[0.377]	[0.073]	[0.049]	[0.055]	[0.086]	[0.308]	[0.064]	[0.049]	[0.048]
Δ GDP growth (t-1)	-0.062*	-0.136**	-0.069*	0.001	-0.064*	-0.061*	-0.122**	-0.060*	-0.032	-0.063*
	[0.021]	[0.084]	[0.018]	[0.015]	[0.012]	[0.020]	[0.080]	[0.016]	[0.013]	[0.012]
Δ Openness (t-1)	0.035	-0.262***	0.027	-0.112	0.049	0.098	-0.194*	0.063	0.009	0.082
	[0.012]	[0.042]	[0.009]	[0.008]	[0.007]	[0.015]	[0.045]	[0.011]	[0.007]	[0.009]
Δ (ln) Population (t-1)	0.142**	-0.047	0.044	0.066	0.096*	0.074	-0.039	0.063	0.025	0.067
	[0.181]	[0.419]	[0.132]	[0.107]	[0.102]	[0.175]	[0.420]	[0.132]	[0.090]	[0.092]
Δ Rule of law (t-1)	0.283***	-0.056	0.301***	0.106	0.262***	0.253***	-0.061	0.296***	0.095	0.256***
	[0.102]	[0.154]	[0.085]	[0.059]	[0.066]	[0.104]	[0.156]	[0.084]	[0.064]	[0.060]
Hansen J: P-value	0.085	0.378	0.282	0.352	0.247	0.037	0.186	0.141	0.127	0.061
Observations	1548	1548	1548	1548	1548	1521	1521	1521	1521	1521
	Panel B: Large-scale Oil Endowment (30 countries)									
Δ Oil Abundance (t-1)	0.330**	0.035	0.147	0.019	0.105					
	[0.018]	[0.049]	[0.014]	[0.008]	[0.008]					
Δ Oil Dependence (t-1)						-0.002	0.021	-0.031	-0.196*	-0.022
						[0.022]	[0.082]	[0.020]	[0.017]	[0.012]
Δ GDP per capita (t-1)	0.182	-0.020	0.189	0.130	0.160	0.242**	-0.020	0.233**	0.278**	0.357***
	[0.055]	[0.149]	[0.050]	[0.030]	[0.028]	[0.056]	[0.168]	[0.045]	[0.038]	[0.034]
Δ GDP growth (t-1)	0.028	0.012	0.046	0.011	0.049	0.015	0.053	0.031	-0.010	0.017
	[0.016]	[0.034]	[0.012]	[0.009]	[0.008]	[0.014]	[0.035]	[0.011]	[0.010]	[0.008]
Δ Openness (t-1)	-0.213	0.002	-0.120	-0.012	-0.077	-0.036	0.228	-0.019	-0.045	-0.131
	[0.043]	[0.124]	[0.035]	[0.019]	[0.020]	[0.033]	[0.120]	[0.029]	[0.023]	[0.021]
Δ (ln) Population (t-1)	-0.096	-0.143**	-0.151**	-0.088*	-0.087	0.007	-0.060	-0.085	-0.013	-0.036
	[0.141]	[0.453]	[0.135]	[0.078]	[0.077]	[0.119]	[0.420]	[0.118]	[0.076]	[0.074]
Δ Rule of law (t-1)	0.411***	0.054**	0.464***	0.220**	0.388***	0.354***	0.038	0.382***	0.259**	0.386***
	[0.094]	[0.078]	[0.096]	[0.070]	[0.055]	[0.087]	[0.091]	[0.080]	[0.078]	[0.051]
Hansen J: P-value	0.138	0.067	0.336	0.083	0.065	0.886	0.716	0.971	0.974	0.897
Observations	1560	1560	1560	1560	1560	1524	1524	1524	1524	1524

Note: Robust standard errors are in brackets. *p < 0.10, **p < 0.05, ***p < 0.01. All regressions were carried out using dynamic System-GMM panel VAR methodology (pvar command on stata). Hansen overidentification p values greater than 0.05 for almost all of the specifications, this imply that we cannot reject the null hypothesis which states that instruments used are valid.

Conditional effect of oil wealth on democracy: Geographic regions context

To investigate whether geographic areas is important in understanding the oil–democracy relationship, we break the full sample into three regional groups, Middle East and North Africa (MENA), Latin America and the Caribbean (LAC), and Sub-Saharan Africa (SSA).

Table 4 The effect of oil wealth on each of the five democratic-institution measures in different regions (LAC MENA & SSA countries): Oil Abundance vs Oil Dependence (1932–2014). System-GMM panel VAR.

	Oil Abundance (Oil Value per capita) and Democracy					**Oil Dependence (Oil Value as % of GDP) and Democracy**				
Dependent Variables	Δ Electoral Dem	Δ Liberal Dem	Δ Delib Dem	Δ Partic Dem	Δ Egalita Dem	Δ Electoral Dem	Δ Liberal Dem	Δ Delib Dem	Δ Partic Dem	Δ Egalita Dem
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Latin America and Caribbean (22 countries)										
Δ Oil Abundance (t-1)	0.065	-0.367	0.029	-0.164	-0.025					
	(0.044)	(0.162)	(0.039)	(0.027)	(0.022)					
Δ Oil Dependence (t-1)						-0.047	-0.276	-0.100	-0.220**	-0.001
						(0.056)	(0.385)	(0.057)	(0.049)	(0.037)
Δ GDP per capita (t-1)	0.082	-0.327	-0.088	-0.091	-0.094	-0.041	-0.765***	-0.009	-0.169	-0.197
	(0.202)	(0.612)	(0.196)	(0.131)	(0.106)	(0.178)	(0.707)	(0.154)	(0.117)	(0.103)
Δ GDP growth (t-1)	0.061	-0.053	-0.019	-0.019	-0.026	0.057	-0.161	0.032	-0.018	-0.015
	(0.057)	(0.162)	(0.051)	(0.027)	(0.027)	(0.046)	(0.201)	(0.038)	(0.026)	(0.024)
Δ Openness (t-1)	0.036	-0.175*	-0.010	0.048	-0.004	0.057	-0.259*	-0.011	0.046	0.009
	(0.019)	(0.057)	(0.015)	(0.012)	(0.008)	(0.020)	(0.097)	(0.013)	(0.012)	(0.009)
Δ (ln) Population (t-1)	0.003	0.037	0.003	0.029	0.055	-0.017	0.034	-0.012	0.017	0.039
	(0.099)	(0.289)	(0.096)	(0.079)	(0.062)	(0.107)	(0.347)	(0.090)	(0.078)	(0.063)
Δ Rule of law (t-1)	0.287**	0.052	0.505***	0.204*	0.244**	0.468***	0.111***	0.488***	0.228**	0.415***
	(0.164)	(0.089)	(0.156)	(0.086)	(0.071)	(0.171)	(0.109)	(0.143)	(0.084)	(0.092)
Hansen J: P-value	0.270	0.183	0.660	0.897	0.285	0.230	0.236	0.256	0.791	0.261
Observations	1265	1265	1265	1265	1265	1253	1253	1253	1253	1253
Panel B. Middle East and North Africa (14 countries)										
Δ Oil Abundance (t-1)	0.0406	0.2228	-0.0387	0.0049	-0.0494					
	[0.0198]	[0.0496]	[0.0146]	[0.0089]	[0.0074]					
Δ Oil Dependence (t-1)						-0.2397*	-0.0351	-0.3851**	-0.0417	-0.2789
						[0.0389]	[0.1224]	[0.0428]	[0.0228]	[0.0316]
Δ GDP per capita (t-1)	0.3318	-0.1922	0.4838*	0.2159	0.3885*	0.1035	-0.0833	0.0574	0.0750	0.2067
	[0.0817]	[0.2249]	[0.0652]	[0.0327]	[0.0351]	[0.0509]	[0.1268]	[0.0365]	[0.0245]	[0.0259]
Δ GDP growth (t-1)	0.0560	-0.0090	0.0081	-0.0170	0.0771	0.0377	-0.0011	0.0421	0.0287	0.0869
	[0.0139]	[0.0370]	[0.0114]	[0.0073]	[0.0067]	[0.0127]	[0.0293]	[0.0087]	[0.0069]	[0.0065]
Δ Openness (t-1)	0.5341*	0.0804	0.2147	-0.0098	-0.0174	0.2789	0.1422	0.1666	0.0516	0.0474
	[0.0433]	[0.1191]	[0.0308]	[0.0209]	[0.0196]	[0.0372]	[0.0935]	[0.0267]	[0.0189]	[0.0186]
Δ (ln) Population (t-1)	-0.1926	-0.1145	-0.1223	-0.0360	-0.0444	-0.1662	-0.1184	-0.1926**	-0.0899	-0.0321
	[0.2315]	[0.6456]	[0.1662]	[0.0864]	[0.1027]	[0.1698]	[0.5158]	[0.1300]	[0.0821]	[0.0905]
Δ Rule of law (t-1)	0.3621***	-0.0530	0.3615***	0.0426	0.3842**	0.2650*	-0.0755	0.1897	0.0787	0.4097**
	[0.1269]	[0.1783]	[0.0954]	[0.0616]	[0.0774]	[0.1442]	[0.1852]	[0.1021]	[0.0473]	[0.0799]
Hansen J: P-value	0.7403	0.7393	0.3294	0.4867	0.6211	0.9274	0.7724	0.7261	0.8107	0.8971
Observations	6810	6810	6810	6810	6810	6660	6660	6660	6660	6660
Panel C. Sub-Saharan Africa (38 countries)										
Δ Oil Abundance (t-1)	-0.193	-0.168	-0.228	-0.046	-0.785					
	[0.056]	[0.336]	[0.078]	[0.027]	[0.037]					
Δ Oil Dependence (t-1)						-0.229***	-0.029	-0.330**	-0.316	-0.279**
						[0.021]	[0.188]	[0.025]	[0.437]	[0.019]
Δ GDP per capita (t-1)	-0.629**	-0.854*	-0.246	-0.353	-0.512**	-0.174	-0.266	0.037	0.867	0.050
	[0.134]	[0.726]	[0.292]	[0.148]	[0.063]	[0.230]	[0.340]	[0.295]	[0.284]	[0.207]
Δ GDP growth (t-1)	0.367	0.003	0.795	-0.132	-0.138	-1.114	0.279	-1.247	-3.985	-1.898
	[0.154]	[0.083]	[0.269]	[0.112]	[0.148]	[0.314]	[0.410]	[0.396]	[0.578]	[0.342]
Δ Openness (t-1)	0.075	0.120	-0.020	0.054	0.169	0.107	0.027	0.135*	0.210	0.108
	[0.020]	[0.054]	[0.040]	[0.016]	[0.017]	[0.013]	[0.038]	[0.011]	[0.057]	[0.009]
Δ (ln) Population (t-1)	-0.165	-0.004	-0.002	-0.323	0.068	-0.013	-0.014	0.072	0.186	0.054
	[1.097]	[0.605]	[0.167]	[1.362]	[0.111]	[0.123]	[0.239]	[0.086]	[0.213]	[0.085]
Δ Rule of law (t-1)	0.276***	-0.012	0.200	0.181	0.390***	0.246***	0.128	0.316*	0.425	0.259**
	[0.101]	[0.349]	[0.319]	[0.112]	[0.083]	[0.093]	[0.420]	[0.164]	[0.317]	[0.073]
Hansen J: P-value	0.110	0.360	0.257	0.358	0.395	0.088	0.721	0.237	0.331	0.115
Observations	1670	1696	1670	1670	1670	1655	1655	1655	1655	1655

Note: Robust standard errors are in brackets. *p < 0.10, **p < 0.05, ***p < 0.01. All regressions were carried out using dynamic System-GMM panel VAR methodology (pvar command on stata). Hansen overidentification p values greater than 0.05, this imply that we cannot reject the null hypothesis which states that instruments used are valid.

Then re-estimate the same specifications separately for three regional groups and present the results in Table 4. Panel A presents PVAR results for LAC countries while Panel B and C present the results for MENA and SSA countries, respectively. The System-GMM Panel VAR estimates in Table 4 reveal that the effect of oil wealth on democracy in the three regional groups depends on type of oil wealth (abundance/dependence) measure.

First, unlike for the full sample, oil abundance does not have any significant effects on each of the five democracy measures for Middle East and North Africa, Latin America and the Caribbean, and Sub-Saharan Africa countries (Table 4, Columns 1-5). This empirical evidence is the same with the line of existing empirical studies such as O'Connor et al. (2018) who find similar results and suggest that oil abundance has no long-term effect on democracy in Middle East and North Africa.

Second, when we measure oil wealth in term of oil dependence (oil value as a share of GDP). for LAC countries (Panel A, Columns 6-10) oil dependence does not have any significant effect on five democracy measures.

For MENA countries (Panel B, Columns 6-10), we find that oil dependence has a negative effect on electoral democracy. For SSA countries (Panel C, Columns 6-10), we find that oil dependence has a negative and significant effect on three measures of democratic-institution namely electoral, deliberative and egalitarian democracy (Table 4, Columns 6-10). This evidence indicates that oil dependence hinders democracy in MENA and SSA countries. These results are consistent with Andersen and Aslaksen (2013), Aslaksen (2010), Murshed (2004, 2018) and Ross (2001) – and also, with Jensen and Wantchekon (2004) and Anyanwu et al. 2014, who confirmed the resource curse in SSA countries. In addition, the insignificant oil abundance-democracy relationship in LAC countries, mentioned above, are unexpected since oil wealth in Latin America has traditionally been considered a blessing in several of the earlier studies (Ahmadov 2014, Dunning 2008, Menaldo 2016 and Smith and Kraus 2005). One possible explanation for this unexpected result is an indirect effect of oil wealth on democracy through institutional quality, which lead us to re-estimate the relationship by including the interaction term in Model I and II identified above.

Conditional effect of oil wealth on democracy: Institutional context

Next, we investigate whether the effect of oil wealth on democracy is conditional on institutional quality. Some studies have considered that the effect of oil wealth on democracy depends on the quality of institutions. Nations with strong institutions are supposed to have an advantage to benefit from oil wealth, whereas the nations with weak institutions are subjected to the political resource curse (Dunning 2008, Jensen and Wantchekon 2004, Ross 2012 and Smith, 2007). According to Dunning (2008), the influence of oil wealth on democracy can be both direct and indirect. To crystallize the indirect effects of oil abundance and oil dependence on democracy via institutional quality, the more powerful approach that has been used in primary studies is by including an interaction term between the quality of institutions and oil wealth in both previous models to understand the role of strong institutions in the democracy impact of oil wealth. We use the rule of law as an indicator of institutional quality. Accordingly, the new estimation models are:

$$\Delta D_{i,t} = A_1\,\Delta D_{i,t-1} + A_2\,\Delta(\text{Oil Abundance})_{i,t-1} + A_3\Delta(\text{Oil Abundance} * \text{Rule of Law})_{i,t-1} + B\Delta(X)_{i,t-1} + \delta_i + \omega_t + \mu_{i,t} \quad \text{(III)}$$

$$\Delta D_{it} = B_1\Delta D_{i,t-1} + B_2\,\Delta(\text{Oil Dependence})_{i,t-1} + B_3\Delta(\text{Oil Dependence} * \text{Rule of Law})_{i,t-1} + P\Delta(X)_{i,t-1} + \gamma_i + \partial_t + \varepsilon_{i,t} \quad \text{(IV)}$$

Where rule of law is a proxy to institutional quality, A_3 captures the effect of the interaction between oil abundance and institutional quality on democracy, and B_3 captures the effect of the interaction between oil dependence and institutional quality on democracy. Figure 3 describes in graphical form the direct and indirect effects (via the institutional-strength channel) of oil wealth on the democratic institutions; these effects are represented by solid and dashed arrows.

Figure 3

Oil wealth and democratic institutions: Direct and Indirect Links.
Source: Authors. Solid arrow = direct link; dashed arrow = indirect link.

Table 5, reports estimates of the effects of the oil–institutional quality interaction on each of the five democratic-institution measures based on the dynamic System-GMM panel VAR model. The estimates of the indirect effect of oil abundance, A_3 in Model III, are presented in the Columns (1–5). The estimates of the indirect effect of oil dependence, B_3 in Model IV, are presented in the Columns (6–10).

The results of the conditional effect turn out to be fairly impressive. For the full sample and the five country groups, the negative or insignificant effect of oil wealth has switched to be positive. The estimates for oil abundance and oil dependence are positive and highly significant at 1 % level for almost all of the specifications, which suggests that some of the effects of oil wealth on each of the five democratic-institution measures are assisted by its effect on institutional quality.

The results support the claim that the effect of oil abundance and oil dependence on democracy is conditional on the quality of institutions. This finding confirms the studies of Dunning (2008), who shows that the positive effect of oil on democracy is conditional on levels of income inequality, and those of Bhavnani et al. (2016) and Mehlum et al (2006), for whom the significant factor is the quality of institutions. Ross (2012) argued that the resource curse is entirely confined to countries with bad institutions. Jensen and Wantchekon (2004) also argue that resource-rich countries can become democratic only If they choose to strengthen their institutions of accountability within the state. Moreover, this outcome implies that oil abundance and oil dependence promote democracy in indirect ways through strong institutions. Turning now to the subsample for MENA (Panel E). These results indicate that institutional quality does succeed in turning the oil curse into a blessing when we consider oil abundance. For oil dependence, we observe that the estimates of the interaction term are negative, which indicate that institutional quality fails in turning the oil curse into a blessing. Instead, it reduces the negative impact of oil dependence on democracy. Oil dependence is more important in retarding democratic development.

Table 5 The effect of oil - institutional quality interaction on each of the five democratic-institution measures: Oil Abundance vs Oil Dependence (1932–2014). System-GMM panel VAR.

	Oil Abundance (Oil Value per capita) and Democracy					Oil Dependence (Oil Value as % of GDP) and Democracy				
Dependent Variables	Δ Electoral Dem	Δ Liberal Dem	Δ Delib Dem	Δ Partic Dem	Δ Egalita Dem	Δ Electoral Dem	Δ Liberal Dem	Δ Delib Dem	Δ Partic Dem	Δ Egalita Dem
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. full sample (96 countries)										
Δ (Oil Abund×Rule of Law) t-1	0.541***	0.280***	0.437***	0.356***	0.529***					
	[0.030]	[0.038]	[0.021]	[0.018]	[0.017]					
Δ (Oil Depend×Rule of Law) t-1						0.150***	0.135***	0.070	0.155***	0.194***
						[0.042]	[0.090]	[0.029]	[0.028]	[0.022]
Hansen J: P-value	0.361	0.407	0.130	0.368	0.402	0.048	0.179	0.006	0.228	0.023
Observations	4480	4480	4480	4480	4480	4415	4415	4415	4415	4415
Panel B. Small-scale Oil Endowment (30 countries)										
Δ (Oil Abund×Rule of Law) t-1	0.188**	-0.029	0.201**	0.233***	0.216**					
	[0.017]	[0.056]	[0.017]	[0.012]	[0.012]					
Δ (Oil Depend×Rule of Law) t-1						0.262***	-0.457***	-0.096*	0.220***	0.339***
						[0.037]	[0.153]	[0.024]	[0.019]	[0.026]
Observations	0.053	0.043	0.047	0.051	0.140	0.427	0.281	0.221	0.184	0.320
	1513	1513	1513	1513	1513	1484	1484	1484	1484	1484
Panel C. Large-scale Oil Endowment (30 countries)										
Δ (Oil Abund×Rule of Law) t-1	1.091***	0.273	0.895***	0.503*	0.793***					
	[0.048]	[0.102]	[0.040]	[0.029]	[0.028]					
Δ (Oil Depend×Rule of Law) t-1						0.177***	0.011	0.240***	0.209***	0.205***
						[0.053]	[0.107]	[0.041]	[0.028]	[0.027]
Hansen J: P-value	0.536	0.672	0.735	0.365	0.538	0.285	0.402	0.508	0.441	0.177
Observations	1527	1527	1527	1527	1527	1491	1491	1491	1491	1491
Panel D. Latin America and Caribbean (22 countries)										
Δ (Oil Abund×Rule of Law) t-1	0.526***	0.695***	0.260*	0.254	0.598***					
	[0.034]	[0.072]	[0.028]	[0.026]	[0.020]					
Δ (Oil Depend×Rule of Law) t-1						0.310***	0.436***	0.109**	-0.094**	0.178***
						[0.055]	[0.152]	[0.057]	[0.037]	[0.035]
Hansen J: P-value	0.153	0.089	0.318	0.116	0.130	0.356	0.215	0.366	0.661	0.259
Observations	1246	1246	1246	1246	1246	1231	1231	1231	1231	1231
Panel E. Middle East and North Africa (14 countries)										
Δ (Oil Abund×Rule of Law) t-1	1.278***	0.383*	0.844***	0.561***	0.683**					
	[0.039]	[0.097]	[0.033]	[0.019]	[0.023]					
Δ (Oil Depend×Rule of Law) t-1						-0.146***	-0.168**	0.040	-0.065	0.019
						[0.067]	[0.288]	[0.056]	[0.032]	[0.052]
Hansen J: P-value	0.455	0.644	0.794	0.327	0.696	0.143	0.759	0.490	0.790	0.790
Observations	665	665	665	665	665	650	650	650	650	650
Panel F. Sub-Saharan Africa (38 countries)										
Δ (Oil Abund×Rule of Law) t-1	0.129***	0.043	0.110	0.324***	0.145*					
	[0.010]	[0.037]	[0.011]	[0.011]	[0.009]					
Δ (Oil Depend×Rule of Law) t-1						0.065***	0.249***	0.179***	0.295***	0.141***
						[0.017]	[0.092]	[0.026]	[0.023]	[0.016]
Hansen J: P-value	0.012	0.051	0.464	0.616	0.312	0.066	0.418	0.024	0.113	0.041
Observations	1509	1509	1547	1547	1547	1502	1540	1540	1540	1540

Note: Robust standard errors are in brackets. *p < 0.10, **p < 0.05, ***p < 0.01. All regressions were carried out using dynamic System-GMM panel VAR methodology (pvar command on Stata). Hansen overidentification p values greater than 0.05 for almost all of the specifications, this imply that we cannot reject the null hypothesis which states that instruments used are valid.

In that regard, we would like to highlight some important points. Overall, when we consider the full sample of developing countries, we find a robust evidence supporting oil hinders-democracy hypothesis for the both of oil wealth (abundance/dependence) measure. Our results provide strong evidence for the conditionality of the political resource curse 'conditionalists view'. Hence, this paper's findings provide evidence to reassure that oil abundance does not hinder democracy and can even be a blessing rather than a curse under the conditionalist view. However, a part of our findings diverges from the studies of Anderson and Ross 2014; Ahmadov 2014; Aslaksen 2010; Christian Houle 2018; Murshed 2004; Jensen and Wantchekon 2004; Ross 2001, 2008, 2009, 2012 and 2013; and Goldberg, Wibbels and Myukiyehe 2008, which claim that increased oil abundance retards democracy. This inconsistency may be attributed to the use of the new V-DEM dataset, which was not employed in any of these studies.

5 Further Robustness Checks

In this section we report on several exercises to ensure the robustness of our baseline results, we have conducted several changes – as follows:

- ✓ The substitution of the key independent variables;
- ✓ The substitution of the oil–institutional quality interaction;
- ✓ The substitution of the dependent variables; and
- ✓ Using four different temporal breaks (i.e. the post-1970, the post-1980, the post-1990 and the post-2008 period)

Reassuringly, the results (reported in Table A.3- A.5 in Appendix A) show that our main results are not driven by these changes. In what fellow, we will consider each of these several changes in turn.

5.1 Substitution of the key independent variables

For the data shown in Table A.2, we use the System-GMM panel VAR estimation method in order to further test the results. We examine whether the baseline results hold when two alternative measures of oil wealth are employed as a proxy for oil wealth. The first one is the log of oil income per capita plus (1); the second is the log of oil income as share of GDP plus (1). Both are taken from the dataset constructed by Haber and Menaldo (2011). In the first column, we repeat for comparison purposes the estimates of oil value per capita obtained from the base System-GMM panel VAR estimation method in Tables 2-4. The results for the alternative measures of oil abundance are shown in the second Column. In Column 6, we repeat the estimates of Oil Value as % of GDP obtained from the base System-GMM panel VAR estimation method in Tables 2-4. The results for the alternative measure of oil dependence are reported in Column 7. Reassuringly, as we can also see in Table A.2, the effects of the alternative indicator of oil abundance and oil dependence on each of the five democracy measures in the full sample and for each of the country groups are consistent with our baseline estimations – with only a couple of exceptions. One of these is found in Panel A, Column 2: the positive effect of abundance on electoral democracy in the large oil endowed countries has vanished and become insignificant, but the positive signs remain.

5.2 Substitution of the oil–institutional quality interaction

In Table A.2, we examine whether the baseline results in Table 5 hold when an alternative measure of institutional quality is employed. To that end, we used the accountability index, taken from the V-DEM dataset, as a proxy for institutional quality. In Column 4, we repeat for comparison purposes the estimates of the interaction term between oil value per capita and accountability from Table 5. The results for the alternative measure of interaction term between oil abundance and institutional quality are reported in Column 5. In Column 9, we repeat the estimates of the interaction term between Oil Value as % of GDP and rule of law obtained from the base System-GMM panel VAR estimation method in Table 5.

The results for the alternative measure of the interaction term between oil dependence and institutional quality are reported in Column 10. Reassuringly, as we can also see in Table A.2, the effects of the alternative measure of the oil–institutional-quality interaction for each of the five democracy measures in the full sample and for each of the country groups are consistent with our baseline estimations – with only a couple of exceptions. One of these comes in Panel C, Column 5: the insignificant effect of the interaction term on deliberative democracy in SSA countries turns out to be positive highly significant at 1% level.

5.3 Substitution of the dependent variables

In Table A.2, we replace the dependent variable with an alternative indicator of democracy. In Columns 3 and 8, democratic institution is measured by the Polity index, which is the most frequently used measure. As we can see from Table A.2, the main results from Tables 3 and 4 remain unaltered. Only a couple of estimates have changed – and those insignificantly.

5.4 Using three different temporal breaks

Some studies have argued that the effects of oil wealth on political institutions should have differed over time and only appeared after the first great oil boom (1973), when oil prices experienced a significant increase that drove the oil-exporting countries to nationalize the assets of foreign-owned oil companies in the 1980s. Andersen and Ross 2014 argued that petroleum wealth's impact on democracy becomes negative in the post break period (post-1980 period). While Hendrix's (2018) argued that the adverse effect of oil on democracy grew substantially more in the post-Cold War period (post-1990). Based on these studies, we have chosen three different temporal breaks to check whether if our main results will hold or not.

(a) Following to Haber and Menaldo 2011 our first post break period is post-1970, we re-estimate our main models by adding an interaction term between oil wealth measures (abundance/dependence) and a post-1970 dummy variable. which takes the value 0 for the years 1932 to 1970 and 1 for the years 1971-2014.

(b) Following to Andersen and Ross 2014 our second post break period is post-1980, we add an interaction term between oil wealth measures (abundance/dependence) and a post-1980 dummy variable. which takes the value 0 for the years 1932 to 1980 and 1 for the years 1981-2014.

(c) Following to Hendrix's (2018) our third post break period is post-1990, we add an interaction term between oil wealth measures (abundance/dependence) and a post-1990 dummy variable. which takes the value 0 for the years 1932 to 1990 and 1 for the years 1991-2014.

Table A.3 and A.4 in Appendix A present the System-GMM panel VAR estimation results in order to examine whether the four different temporal breaks drove our baseline results. In each table, we repeat for comparison purposes the estimates of oil abundance and dependence (Column 1) obtained from the base System-GMM panel VAR estimation method in Tables 2-4. The results for temporal break of post-1970 are shown in the second Column. While Column 2-3 represent the results for post-1980 period and post-1990 period, respectively.

Reassuringly, as we can also see in Columns 2-4 of Table A.3 and A.4, the effects of the term interacting oil abundance and oil dependence with the post-1970 period, post-1980 period, post-1990 period and post-2008 period on each of the five democracy measures in the full sample and for each of the country groups did not lead to any substantial change in the main results as reported in Tables 2-4, with but a couple of exceptions. For instance, the insignificant negative effect of oil abundance on electoral democracy in small oil endowed countries becomes statistically significant at 10% level with negative sign post-1980 period.

6 Conclusion

This paper has explored empirically the long-term effects of oil abundance and oil dependence on five measures of democracy over the period 1932–2014 in 95 developing countries and in five country groups – namely, the Middle East and North Africa (MENA), Latin America and the Caribbean (LAC), Sub-Saharan Africa (SSA), and large- and small-scale oil endowed countries. In doing so, we employed the System-GMM panel VAR estimation method to take into account the potential problems of endogeneity. Our empirical findings strongly suggest mixed evidence, we find a support to oil hinders-democracy hypothesis for both of oil wealth (abundance/ dependence) measure across the full sample of developing countries. But once we break the sample, there exists substantial evidence for supporting the conditionality of the political resource curse. In other word, we find that oil wealth has different effects in the context of oil abundancy, geographic regions, and institutional aspects. More importantly, it seems that oil abundance does not hinder democracy over the period 1932-2014 in most sub-samples and in some instances can even be a blessing rather than a curse. Moreover, four conclusions stand out:

First, in oil abundancy context, when we measure oil wealth in term of oil abundance, oil abundance does not have any significant effect on democracy in small-scale oil countries. While in large-scale oil countries, oil abundance does have a positive and significant effect on electoral and liberal democracy. These results suggest that oil abundance promotes democracy in large-scale oil countries. This result is similar to those obtained by Bruckner et al. 2012, Gurses 2009, Herb 2004, Liou and Musgrave 2014, Menaldo 2016 and Wacziarg 2012 who found a convincing evidence that oil wealth is good for democracy. For the other measure of oil wealth (oil dependence), there exist no long-run relationship between oil dependence and the five measures of democracy during the period 1932–2014 for small and large-scale oil countries. This empirical finding supports the view put forward

by Haber & Menaldo (2011) and O'Connor et al, 2018, who suggest that natural resources and democracy are unrelated.

Second, in geographic regions context, our estimation results show that oil abundance does not have any significant effects on each of the five democracy measures in LAC, MENA and SSA countries. oil dependence has negative effects but not on all the five measures of democracy in the same three regional groups. This evidence indicates that oil dependence hinders democracy in LAC countries as well as MENA and SSA countries. LAC countries display no long-term effects on any of the five measures of democracy from oil abundance and two measures of democracy from oil dependence. This is not entirely surprising as the history of democracy is weaker in these two regions compared to Latin America. This supports the conclusion of Ross' (2009) study, which concluded that the ultimate effect of oil wealth will vary under different conditions, as well as Ahmadov's (2013) findings, which support the idea that the oil–democracy relationship varies across the world's regions.

Third, once we control for institutional quality in the form of rule of law, System-GMM panel VAR estimation results suggest that institutional quality plays a crucial role in altering the oil–democracy link across the full sample and all country groups. In other words, oil does not hamper democracy if the institutional setting is positive – a finding that supports the conditionalist view (Brooks and Kurtz 2016; Dunning 2008). In MENA case, the results also indicate that oil dependence especially retards democratic advances.

Fourth, the estimation results clearly imply that the effect of oil on democracy in small oil countries has differed depends on two types of oil wealth (abundance/dependence). Thus, it is worthy to make a distinction between these two types of oil wealth to better understand the oil-democracy relationship. These results are robust for several checks: (i) Using alternative measures of oil abundance and oil dependence; (ii) Substituting oil–institutional quality interaction; (iii) Using alternative measure of democracy; and (iv) Using three different temporal breaks (i.e. the post-1970, the post-1980, the post-1990 period).

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Appendices

Appendix A

Table A.1 Descriptive Statistics

Variable by Panel	Country by Group													
	Full sample		No-oil		Low oil		High oil		MENA		LAC		SSA	
	1		2		3		4		5		6		7	
	mean	s. d	mean	s. d	mean	s. d	mean	s. d	mean	s. d	mean	s. d	mean	s. d
Panel A. key Independent Variables														
Oil value per capita (ln) 1932	2.46	2.08	0.00	0.00	0.11	0.19	3.66	1.38	3.95	1.49	3.43	3.59	0.38	1.13
Oil value per capita (ln) 2014	2.94	3.13	0.00	0.00	3.00	1.88	6.81	1.66	3.31	3.33	5.65	3.35	1.83	2.87
Oil value per capita (ln) 1932-2014	2.30	2.85	0.00	0.00	1.86	1.74	5.20	2.74	2.83	2.81	5.01	3.50	1.09	2.30
Oil Value as % of GDP 1932	0.11	0.26	0.00	0.00	0.00	0.00	0.14	0.29	0.22	0.38	0.04	0.09	0.00	0.01
Oil Value as % of GDP 2014	0.18	0.53	0.00	0.00	0.16	0.41	0.45	0.82	0.13	0.36	0.19	0.26	0.22	0.70
Oil Value as % of GDP 1932-2014	0.16	0.59	0.00	0.00	0.14	0.69	0.37	0.71	0.12	0.36	0.25	0.40	0.14	0.57
Panel B. Dependent Variables														
Electoral democracy 1932	0.11	0.10	0.11	0.10	0.12	0.09	0.09	0.08	0.21	0.11	0.12	0.12	0.17	0.09
Electoral democracy 2014	0.49	0.22	0.50	0.20	0.53	0.22	0.43	0.22	0.65	0.20	0.31	0.19	0.45	0.18
Electoral democracy 1932-2014	0.27	0.23	0.28	0.23	0.29	0.23	0.25	0.22	0.41	0.26	0.16	0.15	0.22	0.19
Liberal democracy 1932	0.28	0.20	0.27	0.17	0.26	0.19	0.30	0.24	0.31	0.25	0.36	0.22	0.29	0.22
Liberal democracy 2014	0.55	0.28	0.55	0.27	0.60	0.29	0.49	0.28	0.58	0.31	0.56	0.26	0.49	0.28
Liberal democracy 1932-2014	0.36	0.27	0.37	0.27	0.36	0.28	0.35	0.26	0.41	0.30	0.39	0.24	0.32	0.25
Participatory democracy 1932	0.06	0.06	0.06	0.05	0.06	0.06	0.05	0.05	0.11	0.07	0.05	0.03	0.08	0.05
Participatory democracy 2014	0.30	0.16	0.31	0.15	0.33	0.16	0.26	0.17	0.43	0.16	0.17	0.11	0.26	0.12
Participatory democracy 1932-2014	0.15	0.15	0.16	0.15	0.16	0.16	0.14	0.14	0.25	0.18	0.08	0.08	0.12	0.11
Deliberative democracy 1932	0.07	0.08	0.07	0.07	0.08	0.07	0.06	0.06	0.12	0.11	0.09	0.08	0.10	0.08
Deliberative democracy 2014	0.37	0.20	0.38	0.20	0.43	0.20	0.31	0.20	0.51	0.22	0.23	0.16	0.34	0.18
Deliberative democracy 1932-2014	0.19	0.20	0.20	0.20	0.21	0.21	0.16	0.18	0.29	0.24	0.12	0.11	0.15	0.16
Egalitarian democracy 1932	0.07	0.06	0.07	0.05	0.08	0.06	0.06	0.04	0.09	0.09	0.09	0.07	0.10	0.07
Egalitarian democracy 2014	0.33	0.18	0.33	0.17	0.38	0.19	0.28	0.18	0.44	0.20	0.21	0.13	0.30	0.15
Egalitarian democracy 1932-2014	0.19	0.16	0.19	0.17	0.21	0.17	0.17	0.15	0.26	0.21	0.14	0.09	0.15	0.13
Panel C. Other Independent Variables														
GDP per capita (ln)	7.91	1.10	7.54	0.86	7.83	0.91	8.49	1.30	8.32	0.72	8.83	1.47	7.42	0.87
Openness	5.45	2.16	4.46	1.71	5.90	2.25	6.03	2.13	5.25	2.17	6.12	2.07	4.78	1.69
Population (ln)	15.63	1.70	15.05	1.49	15.95	1.63	16.04	1.83	15.64	1.57	15.28	1.86	15.58	1.55
Rule of law	0.43	0.24	0.44	0.27	0.47	0.21	0.36	0.22	0.45	0.29	0.36	0.18	0.40	0.22
Number of countries	98		43		34		34		17		24		44	

Notes: Countries are classified into five groups, two of those groups according to the scale of their oil endowment. To determine whether an oil country has large or small oil endowment, we calculate the median of average oil value per capita over the full sample period 1932–2014 (which is 3.85). Sample mean and standard deviation are reported for each variable.

Table A.2 Oil Wealth and Democracy: Alternative Measures of Oil Abundance and Oil dependence. Alternative Measures of democracy. Alternative Measures of Oil-Institutional strength interaction.

Alternative Measure	Oil Abundance (Oil Value per capita) and Democracy					Oil Dependence (Oil Value as % of GDP) and Democracy				
	Oil PC (Base)	Oil Income PC (HM)	Polity Index	Interaction (Base)	Interaction (Alternative)	Oil GDP (Base)	Oil Income GDP (HM)	Polity Index	Interaction (Base)	Interaction (Alternative)
Country Group	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Dependent Variable: Δ (Electoral Democracy)										
Δ (Oil Wealth) t-1 (full sample)	-0.379***	-0.112*	-0.2817**	0.541***	0.6653***	-0.071***	-0.255***	-0.2156***	0.150***	0.0694***
	[0.013]	[0.011]	[0.6165]	[0.030]	[0.0091]	[0.007]	[0.102]	[0.0704]	[0.042]	[0.0054]
Δ (Oil Wealth) t-1 (small oil)	-0.249	0.201	-0.0100	0.188**	0.1852***	-0.105	-0.058*	-0.1952***	0.262***	0.0644***
	[0.022]	[0.029]	[0.5003]	[0.017]	[0.0051]	[0.020]	[0.597]	[0.3301]	[0.037]	[0.0041]
Δ (Oil Wealth) t-1 (Big oil)	0.330**	0.035*	-0.4322**	1.091***	1.9294***	-0.002	-0.123*	0.2497***	0.177***	0.0848**
	[0.018]	[0.002]	[0.7546]	[0.048]	[0.0179]	[0.022]	[0.075]	[0.6710]	[0.053]	[0.0093]
Δ (Oil Wealth) t-1 (LAC)	0.335	0.269	-0.7027***	0.526***	0.6556***	-0.048	-0.153	-0.4895***	0.310***	0.0896
	[0.056]	[0.057]	[0.5695]	[0.034]	[0.0084]	[0.060]	[0.476]	[1.1907]	[0.055]	[0.0377]
Δ (Oil Wealth) t-1 (MENA)	0.0406	-0.089	0.1112	1.278***	0.7133***	-0.2397*	-0.215	0.0121	-0.146***	-0.0537
	[0.0198]	[0.020]	[1.0833]	[0.039]	[0.0112]	[0.0389]	[0.098]	[3.7016]	[0.067]	[0.0245]
Δ (Oil Wealth) t-1 (SSA)	-0.193	-0.483	-0.0945	0.129***	0.0322	-0.229***	0.258	-0.2286***	0.065***	0.0564***
	[0.056]	[0.109]	[0.7284]	[0.010]	[0.0021]	[0.021]	[0.681]	[0.7744]	[0.017]	[0.0047]
Panel B. Dependent Variable: Δ (Liberal Democracy)										
Δ (Oil Wealth) t-1 (full sample)	-0.128***	0.016	-0.2817**	0.280***	0.4619***	-0.315***	-0.246***	-0.2156***	0.135***	0.0172
	[0.019]	[0.035]	[0.6165]	[0.038]	[0.0158]	[0.020]	[0.168]	[0.0704]	[0.090]	[0.0131]
Δ (Oil Wealth) t-1 (small oil)	-0.055	0.180	-0.0100	-0.029	0.0171	-0.121	0.002	-0.1952***	-0.457***	-0.1283*
	[0.086]	[0.082]	[0.5003]	[0.056]	[0.0076]	[0.081]	[2.479]	[0.3301]	[0.153]	[0.0412]
Δ (Oil Wealth) t-1 (Big oil)	0.035	-0.116	-0.4322**	0.273	1.5057***	0.021	0.025	0.2497***	0.011	0.0808**
	[0.049]	[0.051]	[0.7546]	[0.102]	[0.0503]	[0.082]	[0.291]	[0.6710]	[0.107]	[0.0234]
Δ (Oil Wealth) t-1 (LAC)	0.108	-0.036	-0.7027***	0.695***	0.5062***	0.105	-0.148	-0.4895***	0.436***	0.3746***
	[0.184]	[0.144]	[0.5695]	[0.072]	[0.0232]	[0.197]	[1.343]	[1.1907]	[0.152]	[0.0741]
Δ (Oil Wealth) t-1 (MENA)	0.2228	0.109	0.1112	0.383*	0.2414	-0.0351	0.023	0.0121	-0.168**	0.6638***
	[0.0496]	[0.047]	[1.0833]	[0.097]	[0.0293]	[0.1224]	[0.274]	[3.7016]	[0.288]	[0.1373]
Δ (Oil Wealth) t-1 (SSA)	-0.168	-0.061	-0.0945	0.043	0.0092	-0.029	-0.051	-0.2286***	0.249***	0.0468
	[0.336]	[0.048]	[0.7284]	[0.037]	[0.0081]	[0.188]	[4.202]	[0.7744]	[0.092]	[0.0328]
Panel C. Dependent Variable: Δ (Deliberative Democracy)										
Δ (Oil Wealth) t-1 (full sample)	-0.281***	-0.056	-0.2817**	0.437***	0.5716***	0.011	-0.193***	-0.2156***	0.070	0.0114
	[0.010]	[0.009]	[0.6165]	[0.021]	[0.0070]	[0.010]	[0.051]	[0.0704]	[0.029]	[0.0044]
Δ (Oil Wealth) t-1 (small oil)	-0.309*	0.335	-0.0100	0.201**	0.1432**	0.059	0.033	-0.1952***	-0.096*	0.0141
	[0.018]	[0.030]	[0.5003]	[0.017]	[0.0042]	[0.016]	[0.551]	[0.3301]	[0.024]	[0.0030]
Δ (Oil Wealth) t-1 (Big oil)	0.147	0.126	-0.4322**	0.895***	1.6156***	-0.031	0.022	0.2497***	0.240***	0.0689
	[0.014]	[0.010]	[0.7546]	[0.040]	[0.0151]	[0.020]	[0.062]	[0.6710]	[0.041]	[0.0091]
Δ (Oil Wealth) t-1 (LAC)	0.230	0.225	-0.7027***	0.260*	0.5447***	-0.090	-0.135	-0.4895***	0.109**	0.0509
	[0.050]	[0.044]	[0.5695]	[0.028]	[0.0086]	[0.062]	[0.369]	[1.1907]	[0.057]	[0.0335]
Δ (Oil Wealth) t-1 (MENA)	-0.0387	-0.263	0.1112	0.844***	0.2639	-0.3851**	-0.071	0.0121	0.040	-0.2955***
	[0.0146]	[0.016]	[1.0833]	[0.033]	[0.0081]	[0.0428]	[0.048]	[3.7016]	[0.056]	[0.0229]
Δ (Oil Wealth) t-1 (SSA)	-0.228	0.548	-0.0945	0.110	0.1925***	-0.330**	-0.032	-0.2286***	0.179***	0.0586
	[0.078]	[0.078]	[0.7284]	[0.011]	[0.0034]	[0.025]	[0.451]	[0.7744]	[0.026]	[0.0085]
Panel D. Dependent Variable: Δ (Participatory Democracy)										
Δ (Oil Wealth) t-1 (full sample)	-0.393***	-0.110	-0.2817**	0.356***	0.3901***	-0.084***	-0.299***	-0.2156***	0.155***	0.0744***
	[0.007]-	[0.010]	[0.6165]	[0.018]	[0.0057]	[0.002]	[0.086]	[0.0704]	[0.028]	[0.0037]
Δ (Oil Wealth) t-1 (small oil)	0.112	0.141	-0.0100	0.233***	0.0947	0.044	-0.015	-0.1952***	0.220***	0.0474***
	[0.012]	[0.022]	[0.5003]	[0.012]	[0.0040]	[0.013]	[0.401]	[0.3301]	[0.019]	[0.0025]
Δ (Oil Wealth) t-1 (Big oil)	0.019	0.064	-0.4322**	0.503*	2.2365***	-0.196*	-0.129*	0.2497***	0.209***	0.0208
	[0.008]	[0.008]	[0.7546]	[0.029]	[0.0151]	[0.017]	[0.054]	[0.6710]	[0.028]	[0.0055]
Δ (Oil Wealth) t-1 (LAC)	0.075	-0.158	-0.7027***	0.254	0.5778***	-0.095	-0.220*	-0.4895***	-0.094**	-0.0137
	[0.031]	[0.027]	[0.5695]	[0.026]	[0.0053]	[0.040]	[0.263]	[1.1907]	[0.037]	[0.0193]
Δ (Oil Wealth) t-1 (MENA)	0.0049	0.300	0.1112	0.561***	1.4398***	-0.0417	-0.044	0.0121	-0.065	1.2613***
	[0.0089]	[0.013]	[1.0833]	[0.019]	[0.0077]	[0.0228]	[0.051]	[3.7016]	[0.032]	[0.0268]
Δ (Oil Wealth) t-1 (SSA)	-0.046	-1.534	-0.0945	0.324***	0.1784**	-0.316	-0.103	-0.2286***	0.295***	0.1657***
	[0.027]	[0.354]	[0.7284]	[0.011]	[0.0036]	[0.437]	[0.644]	[0.7744]	[0.023]	[0.0104]
Panel E. Dependent Variable: Δ (Egalitarian Democracy)										
Δ (Oil Wealth) t-1 (full sample)	-0.430***	-0.140	-0.2817**	0.529***	0.5899***	-0.167***	-0.286***	-0.2156***	0.194***	0.0409**
	[0.008]	[0.009]	[0.6165]	[0.017]	[0.0053]	[0.005]	[0.040]	[0.0704]	[0.022]	[0.0028]
Δ (Oil Wealth) t-1 (small oil)	-0.287	0.049	-0.0100	0.216**	0.1000	-0.150	-0.019	-0.1952***	0.339***	0.0171
	[0.014]	[0.016]	[0.5003]	[0.012]	[0.0030]	[0.015]	[0.363]	[0.3301]	[0.026]	[0.0019]
Δ (Oil Wealth) t-1 (Big oil)	0.105	0.068	-0.4322**	0.793***	1.7306***	-0.022	-0.098	0.2497***	0.205***	0.0424
	[0.008]	[0.006]	[0.7546]	[0.028]	[0.0123]	[0.012]	[0.043]	[0.6710]	[0.027]	[0.0054]
Δ (Oil Wealth) t-1 (LAC)	0.181	-0.028	-0.7027***	0.598***	0.5987***	0.025	-0.105	-0.4895***	0.178***	0.1530**
	[0.029]	[0.026]	[0.5695]	[0.020]	[0.0048]	[0.048]	[0.231]	[1.1907]	[0.035]	[0.0204]
Δ (Oil Wealth) t-1 (MENA)	-0.0494	-0.157	0.1112	0.683**	0.4446*	-0.2789	0.040	0.0121	0.019	-0.3170***
	[0.0074]	[0.014]	[1.0833]	[0.023]	[0.0060]	[0.0316]	[0.033]	[3.7016]	[0.052]	[0.0170]
Δ (Oil Wealth) t-1 (SSA)	-0.785	0.506	-0.0945	0.145*	0.1550***	-0.279**	-0.206	-0.2286***	0.141***	0.0387
	[0.037]	[0.072]	[0.7284]	[0.009]	[0.0022]	[0.019]	[0.501]	[0.7744]	[0.016]	[0.0047]

Note: Robust standard errors are in brackets. *p < 0.10, **p < 0.05, ***p < 0.01. All regressions were carried out using dynamic System-GMM panel VAR methodology (pvar command on Stata). HM = Haber Menaldo 2011 APSR Dataset.

Table A.3 Effect of Oil Abundance on Democracy: Using Different Temporal Breaks

Oil Abundance (Oil Value per capita) and Democracy				
Year of post-year dummy	Based (1932-2014) (1)	Post-1970 Interaction term (2)	Post-1980 Interaction term (3)	Post-1990 Interaction term (4)
Panel A. Dependent Variable: Δ (Electoral Democracy)				
Δ (Oil Abundance) t-1× Post-year dummy (Full Sample)	-0.379***	-0.375***	-0.282***	-0.100
	[0.013]	[0.010]	[0.019]	[0.018]
Δ (Oil Abundance) t-1× Post-year dummy (Small oil)	-0.249	-0.147	-0.296	-0.221
	[0.022]	[0.019]	[0.027]	[0.027]
Δ (Oil Abundance) t-1× Post-year dummy (Big oil)	0.330**	0.102***	0.051	0.079*
	[0.018]	[0.005]	[0.007]	[0.008]
Δ (Oil Abundance) t-1 × Post-year dummy (LAC)	0.335	-0.015	0.112	-0.108
	[0.056]	[0.060]	[0.063]	[0.065]
Δ (Oil Abundance) t-1 × Post-year dummy (MENA)	0.0406	0.215	-0.026	0.039
	[0.0198]	[0.021]	[0.020]	[0.037]
Δ (Oil Abundance) t-1 × Post-year dummy (SSA)	-0.193	-0.096	0.211	0.466
	[0.056]	[0.069]	[0.065]	[0.039]
Panel B. Dependent Variable: Δ (Liberal Democracy)				
Δ (Oil Abundance) t-1 × Post-year dummy (Full Sample)	-0.128***	-0.099**	0.014	-0.012
	[0.019]	[0.017]	[0.023]	[0.023]
Δ (Oil Abundance) t-1 × Post-year dummy (Small oil)	-0.055	0.012	0.054	-0.056
	[0.086]	[0.084]	[0.114]	[0.121]
Δ (Oil Abundance) t-1 × Post-year dummy (Big oil)	0.035	-0.007	-0.017	-0.276*
	[0.049]	[0.062]	[0.077]	[0.080]
Δ (Oil Abundance) t-1 × Post-year dummy (LAC)	0.108	0.179	0.060	-0.045
	[0.184]	[0.234]	[0.173]	[0.148]
Δ (Oil Abundance) t-1 × Post-year dummy (MENA)	0.2228	0.386**	0.019	0.396
	[0.0496]	[0.072]	[0.043]	[0.173]
Δ (Oil Abundance) t-1 × Post-year dummy (SSA)	-0.168	0.070	0.719	-0.246
	[0.336]	[0.381]	[0.280]	[0.131]
Panel C. Dependent Variable: Δ (Deliberative Democracy)				
Δ (Oil Abundance) t-1 × Post-year dummy (Full Sample)	-0.281***	-0.363***	-0.253***	-0.057
	[0.010]	[0.012]	[0.014]	[0.017]
Δ (Oil Abundance) t-1 × Post-year dummy (Small oil)	-0.309*	-0.266*	-0.362**	-0.276
	[0.018]	[0.016]	[0.021]	[0.022]
Δ (Oil Abundance) t-1 × Post-year dummy (Big oil)	0.147	0.244	0.260	0.101
	[0.014]	[0.019]	[0.029]	[0.035]
Δ (Oil Abundance) t-1 × Post-year dummy (LAC)	0.230	0.112	0.167	-0.203
	[0.050]	[0.053]	[0.069]	[0.058]
Δ (Oil Abundance) t-1 × Post-year dummy (MENA)	-0.0387	0.242	0.014	0.189
	[0.0146]	[0.019]	[0.015]	[0.030]
Δ (Oil Abundance) t-1 × Post-year dummy (SSA)	-0.228	-0.470	-0.478	0.490
	[0.078]	[0.037]	[0.122]	[0.033]
Panel D. Dependent Variable: Δ (Participatory Democracy)				
Δ (Oil Abundance) t-1 × Post-year dummy (Full Sample)	-0.393***	-0.341***	-0.275***	0.025
	[0.007]	[0.007]	[0.009]	[0.007]
Δ (Oil Abundance) t-1 × Post-year dummy (Small oil)	-0.112	-0.096	-0.292*	-0.157
	[0.012]	[0.011]	[0.015]	[0.014]
Δ (Oil Abundance) t-1 × Post-year dummy (Big oil)	0.019	0.092	0.221	0.215
	[0.008]	[0.011]	[0.015]	[0.019]
Δ (Oil Abundance) t-1 × Post-year dummy (LAC)	0.075	0.036	0.048	-0.072
	[0.031]	[0.039]	[0.050]	[0.051]
Δ (Oil Abundance) t-1 × Post-year dummy (MENA)	0.0049	0.077	-0.083	0.052
	[0.0089]	[0.012]	[0.014]	[0.020]
Δ (Oil Abundance) t-1 × Post-year dummy (SSA)	-0.046	-0.047	-0.173	0.491
	[0.027]	[0.022]	[0.054]	[0.024]
Panel E. Dependent Variable: Δ (Egalitarian Democracy)				
Δ (Oil Abundance) t-1 × Post-year dummy (Full Sample)	-0.430***	-0.464***	-0.381***	-0.259*
	[0.008]	[0.007]	[0.014]	[0.016]
Δ (Oil Abundance) t-1 × Post-year dummy (Small oil)	-0.287	-0.250	-0.401*	-0.245
	[0.014]	[0.013]	[0.020]	[0.018]
Δ (Oil Abundance) t-1 × Post-year dummy (Big oil)	0.105	0.110	0.154	0.097
	[0.008]	[0.009]	[0.017]	[0.021]
Δ (Oil Abundance) t-1 × Post-year dummy (LAC)	0.181	-0.056	0.222	0.003
	[0.029]	[0.040]	[0.048]	[0.043]
Δ (Oil Abundance) t-1 × Post-year dummy (MENA)	-0.0494	0.070	0.034	-0.001
	[0.0074]	[0.010]	[0.009]	[0.017]
Δ (Oil Abundance) t-1 × Post-year dummy (SSA)	-0.785	-0.677	0.029	0.154
	[0.037]	[0.032]	[0.075]	[0.020]

Note: Robust standard errors are in brackets. *p < 0.10, **p < 0.05, ***p < 0.01. All regressions were carried out using dynamic System-GMM panel VAR methodology (pvar command on stata).

Table A.4 Effect of Oil Dependence on Democracy: Using Different Temporal Breaks

Oil Dependence (Oil Value as % of GDP) and Democracy				
Year of post-year dummy	Based (1932-2014) (1)	Post-1970 Interaction term (2)	Post-1980 Interaction term (3)	Post-1990 Interaction term (4)
Panel A. Dependent Variable: Δ (Electoral Democracy)				
Δ (Oil Dependence) t-1 × Post-year dummy (Full Sample)	-0.071***	-0.089***	-0.050***	-0.022*
	[0.007]	[0.005]	[0.004]	[0.005]
Δ (Oil Dependence) t-1 × Post-year dummy (Small oil)	-0.105	-0.109	-0.041	-0.056
	[0.020]	[0.021]	[0.017]	[0.019]
Δ (Oil Dependence) t-1 × Post-year dummy (Big oil)	-0.002	-0.039	0.049	-0.012
	[0.022]	[0.022]	[0.033]	[0.030]
Δ (Oil Dependence) t-1 × Post-year dummy (LAC)	-0.048	-0.057	-0.017	0.044
	[0.060]	[0.075]	[0.071]	[0.047]
Δ (Oil Dependence) t-1 × Post-year dummy (MENA)	-0.2397*	-0.238*	-0.206**	-0.081
	[0.0389]	[0.039]	[0.035]	[0.032]
Δ (Oil Dependence) t-1 × Post-year dummy (SSA)	-0.229***	-0.233***	-0.013	0.065
	[0.021]	[0.021]	[0.337]	[0.035]
Panel B. Dependent Variable: Δ (Liberal Democracy)				
Δ (Oil Dependence) t-1 × Post-year dummy (Full Sample)	-0.315***	-0.324***	-0.019*	-0.096***
	[0.020]	[0.020]	[0.010]	[0.007]
Δ (Oil Dependence) t-1 × Post-year dummy (Small oil)	-0.121	-0.124	-0.018	-0.105
	[0.081]	[0.082]	[0.059]	[0.075]
Δ (Oil Dependence) t-1 × Post-year dummy (Big oil)	0.021	0.011	0.150	-0.029
	[0.082]	[0.084]	[0.120]	[0.052]
Δ (Oil Dependence) t-1 × Post-year dummy (LAC)	0.105	0.115	0.000	-0.075
	[0.197]	[0.190]	[0.183]	[0.176]
Δ (Oil Dependence) t-1 × Post-year dummy (MENA)	-0.0351	-0.040	0.005	0.006
	[0.1224]	[0.123]	[0.104]	[0.089]
Δ (Oil Dependence) t-1 × Post-year dummy (SSA)	-0.029	-0.040	-0.144	-0.041
	[0.188]	[0.184]	[0.266]	[0.117]
Panel C. Dependent Variable: Δ (Deliberative Democracy)				
Δ (Oil Dependence) t-1 × Post-year dummy (Full Sample)	0.011	0.001	-0.029**	-0.032***
	[0.010]	[0.006]	[0.004]	[0.004]
Δ (Oil Dependence) t-1 × Post-year dummy (Small oil)	0.059	0.060	-0.016	-0.032
	[0.016]	[0.016]	[0.012]	[0.014]
Δ (Oil Dependence) t-1 × Post-year dummy (Big oil)	-0.031	-0.060	0.017	-0.081
	[0.020]	[0.021]	[0.034]	[0.025]
Δ (Oil Dependence) t-1 × Post-year dummy (LAC)	-0.090	-0.084	-0.083	0.023
	[0.062]	[0.082]	[0.089]	[0.048]
Δ (Oil Dependence) t-1 × Post-year dummy (MENA)	-0.3851**	-0.381**	-0.299**	-0.215**
	[0.0428]	[0.043]	[0.040]	[0.037]
Δ (Oil Dependence) t-1 × Post-year dummy (SSA)	-0.330**	-0.329**	-1.207	0.033
	[0.025]	[0.025]	[0.303]	[0.022]
Panel D. Dependent Variable: Δ (Participatory Democracy)				
Δ (Oil Dependence) t-1 × Post-year dummy (Full Sample)	-0.084***	-0.064***	0.009	-0.002
	[0.002]	[0.003]	[0.003]	[0.006]
Δ (Oil Dependence) t-1 × Post-year dummy (Small oil)	0.044	0.039	-0.014	0.080
	[0.013]	[0.013]	[0.009]	[0.013]
Δ (Oil Dependence) t-1 × Post-year dummy (Big oil)	-0.196*	-0.221*	0.036	-0.038
	[0.017]	[0.019]	[0.024]	[0.020]
Δ (Oil Dependence) t-1 × Post-year dummy (LAC)	-0.095	-0.066	0.063	0.080*
	[0.040]	[0.054]	[0.061]	[0.045]
Δ (Oil Dependence) t-1 × Post-year dummy (MENA)	-0.0417	-0.039	-0.042	0.029
	[0.0228]	[0.023]	[0.022]	[0.025]
Δ (Oil Dependence) t-1 × Post-year dummy (SSA)	-0.316	-0.307	-1.193	0.091
	[0.437]	[0.443]	[0.415]	[0.024]
Panel E. Dependent Variable: Δ (Egalitarian Democracy)				
Δ (Oil Dependence) t-1 × Post-year dummy (Full Sample)	-0.167***	-0.173***	-0.131***	-0.084***
	[0.005]	[0.006]	[0.007]	[0.005]
Δ (Oil Dependence) t-1 × Post-year dummy (Small oil)	-0.150	-0.151	-0.026	-0.035
	[0.015]	[0.015]	[0.010]	[0.011]
Δ (Oil Dependence) t-1 × Post-year dummy (Big oil)	-0.022	-0.043	-0.046	-0.051
	[0.012]	[0.012]	[0.022]	[0.021]
Δ (Oil Dependence) t-1 × Post-year dummy (LAC)	0.025	0.085	0.090	0.054
	[0.048]	[0.062]	[0.060]	[0.038]
Δ (Oil Dependence) t-1 × Post-year dummy (MENA)	-0.2789	-0.273	-0.081	-0.119
	[0.0316]	[0.031]	[0.025]	[0.024]
Δ (Oil Dependence) t-1 × Post-year dummy (SSA)	-0.279**	-0.260**	-0.334	0.139
	[0.019]	[0.016]	[0.311]	[0.019]

Note: Robust standard errors are in brackets. *p < 0.10, **p < 0.05, ***p < 0.01. All regressions were carried out using dynamic System-GMM panel VAR methodology (pvar command on stata).

Supplementary Tables

Table S. 1: List of Countries and their classifications

Middle East and North Africa	Latin America and Caribbean	Sub/Saharan Africa		Rest Sample
1) Algeria (Large oil)	1) Argentina (Large oil)	1) Angola (Large oil)	25) Mali	1) Albania (Small oil)
2) Egypt (Low oil)	2) Bolivia (Low oil)	2) Benin	26) Mauritania	2) Bangladesh
3) Iraq (Large oil)	3) Brazil (Low oil)	3) Botswana	27) Mauritius	3) Bhutan
4) Jordan	4) Chile (Low oil)	4) Burkina Faso	28) Mozambique	4) Bulgaria
5) Libya (Large oil)	5) Colombia (Large oil)	5) Burundi	29) Niger	5) China (Small oil)
6) Morocco	6) Costa Rica	6) Cameroon (Small oil)	30) Nigeria (Large oil)	6) Fiji
7) Oman (Large oil)	7) Cuba	7) Central African Republic	31) Rwanda	7) Hungary (Small oil)
8) Qatar (Large oil)	8) Dominican Republic	8) Chad (Small oil)	32) Senegal	8) India (Small oil)
9) Saudi Arabia (Large oil)	9) Ecuador (Low oil)	9) Comoros	33) Sierra Leone	9) Indonesia (Small oil)
10) Sudan (Low oil)	10) El Salvador	10) Congo, Dem. Rep.	34) Somalia	10) Korea, Rep.
11) Syria (Low oil)	11) Guatemala	11) Congo, Rep. (Large oil)	35) South Africa	11) Laos
12) Tunisia (Low oil)	12) Guyana	12) Cote d'Ivoire	36) Swaziland	12) Malaysia (Large oil)
13) Arab Emirates (Large oil)	13) Haiti	13) Equatorial Guinea	37) Tanzania	13) Mongolia
14) Yemen (Low oil)	14) Honduras	14) Ethiopia	38) Togo	14) Nepal
	15) Jamaica	15) Gabon (Large oil)	39) Uganda	15) Pakistan
	16) Mexico (Large oil)	16) Gambia, The	40) Zambia	16) Papua New Guinea (Small oil)
	17) Panama	17) Ghana	41) Zimbabwe	17) Philippines
	18) Paraguay	18) Guinea		18) Poland
	19) Peru (Low oil)	19) Guinea-Bissau		19) Romania (Large oil)
	20) Suriname	20) Kenya		20) Sri Lanka
	21) Uruguay	21) Lesotho		21) Taiwan
	22) Venezuela (Large oil)	22) Liberia		22) Thailand (Small oil)
		23) Madagascar		23) Vietnam (Small oil)
		24) Malawi		
14 Countries	***22 Countries***	***41 Countries***		***23 Countries***
		Total= 100 Countries		

Source: Authors Calculations

Table S. 2 The Main Five Outcome Variables

Variable	V-Dem tag	Definition
Electoral democracy index	v2x polyarchy	The electoral principle of democracy embodies the core value of making rulers responsive to citizens through competition for the approval of a broad electorate during periodic elections, as captured by Dahl's (1971, 1989) conceptualization of "polyarchy."
Liberal democracy index	v2x libdem	The liberal component of democracy embodies the intrinsic value of protecting individual and minority rights against a potential "tyranny of the majority." This is achieved through constitutionally protected civil liberties, strong rule of law, and effective checks and balances that limit the use of executive power.
Deliberative democracy index	v2x_delibdem	The deliberative component enshrines the core value that political decisions in pursuit of the public good should be informed by respectful and reasonable dialogue at all levels rather than by emotional appeals, solidary attachments, parochial interests, or coercion.
Participatory democracy index	v2x_partipdem	The participatory principle of democracy emphasizes active participation by citizens in all political processes, electoral and non-electoral. It is motivated by uneasiness about a bedrock practice of electoral democracy: delegating authority to representatives. Thus, direct rule by citizens is preferred, wherever practicable. This model of democracy thus takes suffrage for granted, emphasizing engagement in civil society organizations, direct democracy, and subnational elected bodies.
Egalitarian democracy index	v2x_egaldem	The egalitarian principle of democracy holds that material and immaterial inequalities inhibit the exercise of formal rights and liberties, and diminish the ability of citizens from all social groups to participate. Egalitarian democracy is achieved when 1 rights and freedoms of individuals are protected equally across all social groups; and 2 resources are distributed equally across all social groups; 3 groups and individuals enjoy equal access to power.

Source: V- DEM Codebook V8.

Table S. 3: Variable Descriptions and Sources

Variable Names as Shown in Tables	Actual Transformed Variable, if any, Used in Regressions	Variable Description	Source
Oil Wealth			
Oil pc	Log of (1+Oil Gas Value per capita)	Where oil and gas value are the quantity of oil and gas extracted in a given year multiplied by the per-unit world price divided by population.	Ross Mahdavi (2015), Oil and Gas dataset.
Oil GDP	Log of (1+Oil Gas Value per GDP)	Where oil and gas value are the quantity of oil and gas extracted in a given year multiplied by the per-unit world price divided by GDP.	Constructed based on Ross Mahdavi (2015), Oil and Gas dataset.
Oil income pc	Log of (1+ Oil income per PC)	Total value (in 2007 dollars) of petroleum produced, divided by population	Haber Menaldo (2011) APSR Dataset.
Oil income GDP	Log of (1+ Oil income per GDP)	Total value (in 2007 dollars) of petroleum produced, divided by GDP.	Constructed based on Haber Menaldo (2011) APSR Dataset.
Democracy:			
Electoral democracy		An Index of Electoral democracy ranging from 0 to 1.	V-Dem Project Coppedge et al. (2019).
Liberal democracy		An Index of Liberal democracy ranging from 0 to 1.	V-Dem Project Coppedge et al. (2019).
Deliberative democracy		An Index of deliberative democracy ranging from 0 to 1	V-Dem Project Coppedge et al. (2019).
Participatory democracy		An Index of Participatory democracy ranging from 0 to 1	V-Dem Project Coppedge et al. (2019).
Egalitarian democracy		An Index of Egalitarian democracy ranging from 0 to 1	V-Dem Project Coppedge et al. (2019).
Polity		Polity Score; measuring on a scale from -10 to +10 the polity of a country	Polity IV (2017)
Control variables:			
GDP per capita	Log of GDP per capita	The gross domestic production in 2011US$ divided by population.	The Maddison Project Database (2018).
Population	Log of Population	Population, mid-year (thousands).	The Maddison Project Database (2018).
Trade Openness			V-Dem Project Coppedge et al. (2019).
Rule of law			V-Dem Project Coppedge et al. (2019).

Source: Authors Construction.

Table S.4 Fisher-type Panel unit-root tests results Based on augmented Dickey-Fuller tests

Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
Oil value per capita (ln)	Inverse chi-squared P	0.9975	0.925	0.0002	0	0.9999	1
	Inverse normal Z	0.9401	0.8929	0.8308	0.2119	0.5918	0.9964
	Inverse logit L*	0.4498	0.8757	0.0916	0	0.5822	0.9944
	Modified inv. chi-squared Pm	0.9951	0.9148	0	0	0.9979	1
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
Δ Oil value per capita (ln)	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes
Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
Oil value GDP	Inverse chi-squared P	0.9975	0.0614	0.1643	0.2177	0.9753	0.9935
	Inverse normal Z	0.9401	0.1686	0.1291	0.2078	0.2132	0.2347
	Inverse logit L*	0.4498	0.1002	0.112	0.1836	0.2125	0.1238
	Modified inv. chi-squared Pm	0.9951	0.0529	0.1664	0.231	0.9603	0.9864
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
Δ Oil value GDP	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes
Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
Electoral	Inverse chi-squared P	0.9767	0.6192	0.3754	0.0175	0.9998	0.9497
	Inverse normal Z	0.9997	0.9547	0.8812	0.2687	0.9997	0.8941
	Inverse logit L*	0.9991	0.9151	0.8537	0.2065	0.9995	0.899
	Modified inv. chi-squared Pm	0.9708	0.6384	0.3963	0.0081	0.9974	0.9394
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
Δ Electoral	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes
Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
Liberal	Inverse chi-squared P	1	0.9992	0.9303	0.3872	0.9999	0.993
	Inverse normal Z	1	0.9999	0.9965	0.5566	1	0.9938
	Inverse logit L*	1	0.9999	0.996	0.6324	0.9999	0.9925
	Modified inv. chi-squared Pm	0.9999	0.996	0.9196	0.417	0.9981	0.986
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
Δ Liberal	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes
Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
Participatory	Inverse chi-squared P	1	0.9998	0.055	0.3387	1	0.9998
	Inverse normal Z	1	0.9999	0.6389	0.9019	1	0.9988
	Inverse logit L*	1	0.9997	0.5003	0.9053	1	0.9981
	Modified inv. chi-squared Pm	1	0.9982	0.0462	0.368	0.9994	0.9986
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
Δ Participatory	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes
Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
Deliberative	Inverse chi-squared P	0.9979	0.9998	0.9492	0.1364	0.9983	0.799
	Inverse normal Z	1	0.9991	0.9767	0.8518	0.999	0.8537
	Inverse logit L*	0.9999	0.9986	0.9752	0.8436	0.9987	0.7716
	Modified inv. chi-squared Pm	0.9958	0.9983	0.9372	0.1352	0.9922	0.802
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
Δ Deliberative	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes
Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
Egalitarian	Inverse chi-squared P	0.9999	0.9511	0.6609	0.5566	0.6129	0.9282

	Inverse normal Z	0.9999	0.985	0.8464	0.5708	0.8102	0.8728
	Inverse logit L*	0.9998	0.9764	0.793	0.5647	0.7656	0.8675
	Modified inv. chi-squared Pm	0.9995	0.9393	0.6777	0.5899	0.6357	0.9192
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
Δ Egalitarian	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes
Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
	Inverse chi-squared P	0.9856	0.7724	0.0862	0.3099	0.9212	0.999
GDP pc (ln)	Inverse normal Z	0.9998	0.9694	0.9996	0.5046	0.983	1
	Inverse logit L*	0.9996	0.96	0.988	0.418	0.9803	1
	Modified inv. chi-squared Pm	0.9804	0.7789	0.0791	0.3363	0.9088	0.9959
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
Δ GDP pc (ln)	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes
Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
	Inverse chi-squared P	0.676	0.9556	0.1646	0.0001	0.0135	0.1603
trade	Inverse normal Z	1	0.9996	0.4983	0.7296	0.0244	0.3298
	Inverse logit L*	1	0.9995	0.3229	0.1497	0.0096	0.246
	Modified inv. chi-squared Pm	0.6851	0.9436	0.1668	0	0.0066	0.1616
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
Δ trade	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes
Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
	Inverse chi-squared P	1	0.001	0.9879	0.492	0.9633	0.1603
Rule of law	Inverse normal Z	1	0.055	0.9995	0.6203	0.9968	0.3298
	Inverse logit L*	1	0.0171	0.9987	0.5766	0.9968	0.246
	Modified inv. chi-squared Pm	1	0.0002	0.9778	0.5274	0.9488	0.1616
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
Δ Rule of law	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes

Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
Oil PC*Rule of	Inverse chi-squared P	1	0.9963	0.1873	0.1543	1	0.1603
law	Inverse normal Z	1	0.999	0.2662	0.5579	0.9945	0.3298
	Inverse logit L*	1	0.9988	0.2105	0.5323	0.9915	0.246
	Modified inv. chi-squared Pm	1	0.9898	0.1922	0.1564	0.9999	0.1616
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
Δ Oil PC* Rule	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
of law	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes

Variable	Test Statistic (p-values)	Full Sample	Small Oil	Large Oil	MENA	LAC	SSA
Oil gdp*Rule of	Inverse chi-squared P	0.9859	0.0214	0.7322	0.0049	0.9949	0.1603
law	Inverse normal Z	0.0922	0.1078	0.8696	0.0057	0.4916	0.3298
	Inverse logit L*	0.0515	0.0687	0.9021	0.0039	0.4945	0.246
	Modified inv. chi-squared Pm	0.9806	0.0139	0.7429	0.001	0.9851	0.1616
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
Δ Oil gdp* Rule	Inverse chi-squared P	0.000	0.000	0.000	0.000	0.000	0.000
of law	Inverse normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse logit L*	0.000	0.000	0.000	0.000	0.000	0.000
	Modified inv. chi-squared Pm	0.000	0.000	0.000	0.000	0.000	0.000
	Stationarity Support	Yes	Yes	Yes	Yes	Yes	Yes

Note: Null hypothesis test is the existence of unit roots. All tests include a linear trend. Pesaran's CIPS statistics are averages of the student t-statistics.
Source: Author calculations.

Table S.5.1 Panel Cointegration between Oil Abundance and the five democratic institution measures. Westerlund Panel Tests. (Model I)

Country Group		Full Sample		Small Oil		Large Oil		MENA		LAC		SSA	
Dependent Variables	Group tests	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value
Electoral	Group Mean Test t (Gt)	1	0.200	1	1	0.58	0.1	0.974	0.7	0.996	0.8	0.941	0.3
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	0.4	0.998	0.8	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Liberal	Group Mean Test t (Gt)	1	0.900	0.998	0.600	0.993	0.400	1	0.700	0.999	0.900	0.989	0.500
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	0.100	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Participatory	Group Mean Test t (Gt)	1	0.800	0.999	0.800	0.999	0.600	1	1	1	0.600	0.993	0.300
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	0.900	1	1	1	1	1	0.900
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Deliberative	Group Mean Test t (Gt)	1	1	0.959	0.7	0.97	0.4	0.952	0.5	0.997	1	0.999	0.6
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	0.8	1	0.9	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Egalitarian	Group Mean Test t (Gt)	1	0.800	1	0.800	1	0.800	1	0.900	0.954	0.500	0.998	0.400
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	1	1	0.800	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No

Notes: We allow for a constant and deterministic trend in the cointegration relationship. Results for null hypotheses (H0): No cointegration.
Source: Authors' estimate

Table S.5.2 Panel Cointegration between Oil dependence and the five democratic institution measures . Westerlund Panel Tests. (Model II)

Country Group		Full Sample		Small Oil		Large Oil		MENA		LAC		SSA	
Dependent Variables	Group tests	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value
Electoral	Group Mean Test t (Gt)	0.999	0.100	0.924	0.300	0.951	0.300	1	0.900	0.704	0.100	0.945	0.100
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	0.900	1	1	1	1	1	0.700	1	0.500
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Liberal	Group Mean Test t (Gt)	0.975	0.200	0.111	0.000	0.611	0.990	0.300	0.261	0.100	0.975	0.200	0.975
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	0.000	0.991	0.200	1	0.999	0.700	1	0.000	1	1	1
	Panel Test t (Pa)	1	0.800	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Participatory	Group Mean Test t (Gt)	1	0.8	1	0.9	0.6	0.2	0.959	0.5	1	1	0.982	0.4
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	0.8	1	0.9	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Deliberative	Group Mean Test t (Gt)	1	1	0.959	0.7	0.97	0.4	0.952	0.5	0.997	1	0.999	0.6
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	0.8	1	0.9	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Egalitarian	Group Mean Test t (Gt)	1	1	1	1	0.946	0.3	0.997	0.6	0.999	0.8	1	0.8
	Group Mean Test t Ga	1	0.7	1	0.1	1	1	1	0.1	1	1	1	1
	Panel Test t (Pt)	1	0	1	0	1	0.7	1	0	1	1	1	0.9
	Panel Test t (Pa)	1	0.1	1	0.1	1	1	1	0	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No

Notes: We allow for a constant and deterministic trend in the cointegration relationship. Results for null hypotheses (H0): No cointegration.
Source: Authors' estimate

Table S.5.3 Panel Cointegration between Oil Abundance and the five democratic institution measures. Westerlund Panel Tests. (Model III)

Country Group		Full Sample		Small Oil		Large Oil		MENA		LAC		SSA	
Dependent Variables	Group tests	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value
Electoral	Group Mean Test t (Gt)	1	0.8	1	0.9	0.962	0.3	0.999	0.6	0.994	0.3	0.939	0.1
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	0.8	1	1	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Liberal	Group Mean Test t (Gt)	0.892	0	0.397	0.1	0.684	0.2	0.966	0.6	0.683	0	0.869	0.1
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	0.8	0.997	0.5	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Participatory	Group Mean Test t (Gt)	1	1	1	1	1	1	1	1	1	1	1	0.7
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	1	1	1	1	1	1	0.7
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Deliberative	Group Mean Test t (Gt)	1	0.8	0.98	0.1	1	1	1	0.9	0.996	0.8	1	0.8
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	1	1	1	1	1	1	0.9
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Egalitarian	Group Mean Test t (Gt)	1	1	1	0.8	1	1	1	1	1	0.8	1	0.7
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	1	1	0.8	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No

Notes: We allow for a constant and deterministic trend in the cointegration relationship. Results for null hypotheses (H0): No cointegration.
Source: Authors' estimate

Table S.5.4 Panel Cointegration between Oil dependence and the five democratic institution measures. Westerlund Panel Tests. (Model IV)

Country Group		Full Sample		Small Oil		Large Oil		MENA		LAC		SSA	
Dependent Variables	Group tests	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value	P-value	Robust P-value
Electoral	Group Mean Test t (Gt)	1	0.9	1	1	0.999	0.6	1	0.8	0.999	0.8	0.888	0
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	0.8	1	1	1	1	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Liberal	Group Mean Test t (Gt)	1	0.3	0.841	0.1	0.998	0.3	1	0.9	0.949	0.1	0.924	0.1
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	0.8	1	0.9	1	1	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Participatory	Group Mean Test t (Gt)	1	1	1	1	1	1	1	1	1	1	0.991	0.3
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	0.8	1	1	1	1	1	0.8
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Deliberative	Group Mean Test t (Gt)	1	1	0.987	0.5	1	1	0.999	0.9	1	0.8	1	0.6
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	1	1	1	1	1	1	0.8
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No
Egalitarian	Group Mean Test t (Gt)	1	1	1	1	1	0.9	1	1	1	1	0.999	0.4
	Group Mean Test t Ga	1	1	1	1	1	1	1	1	1	1	1	1
	Panel Test t (Pt)	1	1	1	1	1	1	1	0.9	1	1	1	1
	Panel Test t (Pa)	1	1	1	1	1	1	1	1	1	1	1	1
	Cointegration Support	No	No	No	No	No	No	No	No	No	No	No	No

Notes: We allow for a constant and deterministic trend in the cointegration relationship. Results for null hypotheses (H0): No cointegration.
Source: Authors' estimate

Table S.6.1 Panel VAR's Lag order selection: Oil Abundance and five democratic institution measures (Model I)

	Δ Electoral Dem			Δ Liberal Dem			Δ Deliberative Dem			Δ Participatory Dem			Δ Egalitarian Dem		
Lag	**BIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**
Panel A. full sample (96 countries)															
(1)	-535.2	-53.0	-222	-540	-57.8	-227	-526	-44.1	-213	-561	-78.8	-248.6	-529.7	-47.4	-217
(2)	-378	-56.5	-169.7	-366.9	-45.4	-158.5	-370.7	-49.2	-162.4	-392.0	-70.5	-183.7	-377.4	-55.9	-169.1
(3)	-197.7	-36.9	-93.5	-190.6	-29.9	-86.5	-194.6	-33.9	-90.5	-200.1	-39.4	-95.9	-198.9	-38.1	-94.7
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel B. Small-scale Oil Endowment (30 countries)															
(1)	-466.3	-65.5	-214.6	-469.5	-68.7	-217.8	-454.5	-53.7	-202.8	-476.8	-76.0	-225.1	-467.4	-66.5	-215.6
(2)	-321.6	-54.3	-153.7	-319.7	-52.5	-151.9	-310.8	-43.5	-142.9	-328.2	-60.9	-160.3	-320.8	-53.6	-153.0
(3)	-172.8	-39.2	-88.9	-172.9	-39.3	-89.0	-165.8	-32.2	-81.9	-177.3	-43.7	-93.4	-170.4	-36.8	-86.5
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel C. Large-scale Oil Endowment (30 countries)															
(1)	-459,8	-58,4	-207,7	-457,5	-56,0	-205,3	-463,7	-62,3	-211,5	-455,6	-54,2	-203,4	-460,3	-58,9	-208,2
(2)	-307,2	-39,6	-139,1	-302,9	-35,3	-134,8	-310,4	-42,7	-142,2	-306,6	-38,9	-138,4	-306,9	-39,3	-138,8
(3)	-163,3	-29,5	-79,3	-146,4	-12,6	-62,4	-167,7	-33,9	-83,6	-162,8	-29,0	-78,8	-172,0	-38,2	-88,0
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel D. Latin America and Caribbean (22 countries)															
(1)	-453,0	-67,3	-212,2	-459,3	-73,6	-218,5	-482,7	-97,0	-241,9	-451,5	-65,8	-210,7	-424,9	-85,6	-217,0
(2)	-322,0	-64,9	-161,5	-317,1	-60,0	-156,6	-331,6	-74,5	-171,1	-315,5	-58,3	-155,0	-287,0	-60,9	-148,4
(3)	-166,4	-37,9	-86,2	-164,7	-36,1	-84,4	-168,5	-40,0	-88,3	-162,8	-34,2	-82,5	-152,8	-39,7	-83,5
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel E. Middle East and North Africa (14 countries)															
(1)	-424,9	-85,6	-217,0	-427,3	-88,0	-219,3	-417,9	-78,6	-209,9	-430,8	-91,5	-222,8	-427,3	-88,0	-219,3
(2)	-287,0	-60,9	-148,4	-283,3	-57,2	-144,7	-282,9	-56,7	-144,3	-289,7	-63,5	-151,1	-285,2	-59,0	-146,5
(3)	-152,8	-39,7	-83,5	-144,1	-31,1	-74,8	-147,1	-34,0	-77,7	-147,3	-34,2	-78,0	-142,5	-29,4	-73,1
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel F. Sub-Saharan Africa (38 countries)															
(1)	-451,3	-48,6	-198,2	-444,7	-42,0	-191,6	-454,3	-51,6	-201,2	-448,9	-46,2	-195,8	-454,6	-51,9	-201,5
(2)	-308,5	-40,0	-139,7	-296,7	-28,3	-128,0	-309,1	-40,7	-140,4	-314,4	-45,9	-145,6	-313,2	-44,7	-144,4
(3)	-150,4	-16,2	-66,0	-161,6	-27,4	-77,2	-160,5	-26,2	-76,1	-165,1	-30,8	-80,7	-152,1	-17,9	-67,8
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		

Note. MBIC = modified Bayesian criteria; MAIC = modified Akaike information criteria; MQIC = modified Hannan–Quinn information criteria. The optimal Lag order selection based on the smallest likelihood criteria of MBIC, MAIC and MQIC values. ***Source*:** Authors' estimates.

Table S.6.2 Panel VAR's Lag order selection: Oil Dependence and five democratic institution measures (Model II)

	Δ Electoral Dem			Δ Liberal Dem			Δ Deliberative Dem			Δ Participatory Dem			Δ Egalitarian Dem		
Lag	**BIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**
Panel A. full sample (96 countries)															
(1)	-564,2	-83,0	-252,5	-566,3	-85,1	-254,6	-554,9	-73,7	-243,2	-577,0	-95,8	-265,4	-553,7	-72,5	-242,0
(2)	-383,5	-62,7	-175,7	-381,5	-60,7	-173,7	-384,3	-63,5	-176,5	-389,9	-69,1	-182,1	-381,7	-60,9	-173,9
(3)	-199,8	-39,4	-95,9	-195,8	-35,4	-91,9	-195,0	-34,6	-91,1	-202,2	-41,8	-98,3	-192,1	-31,7	-88,2
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel B. Small-scale Oil Endowment (30 countries)															
(1)	-471,8	-72,2	-221,0	-466,2	-66,6	-215,4	-463,1	-63,5	-212,3	-479,4	-79,8	-228,6	-463,7	-64,1	-212,9
(2)	-326,0	-59,6	-158,8	-310,2	-43,9	-143,0	-313,3	-47,0	-146,1	-323,1	-56,7	-155,9	-324,0	-57,6	-156,8
(3)	-171,9	-38,8	-88,3	-167,5	-34,3	-83,9	-162,0	-28,8	-78,4	-172,1	-38,9	-88,5	-171,6	-38,4	-88,0
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel C. Large-scale Oil Endowment (30 countries)															
(1)	-481,3	-81,6	-230,4	-487,3	-87,6	-236,4	-487,9	-88,2	-237,0	-483,9	-84,2	-233,0	-484,8	-85,1	-233,9
(2)	-324,8	-58,4	-157,6	-325,2	-58,7	-157,9	-332,0	-65,5	-164,7	-330,2	-63,8	-163,0	-328,2	-61,8	-161,0
(3)	-173,3	-40,0	-89,6	-169,1	-35,9	-85,5	-175,4	-42,2	-91,8	-172,0	-38,8	-88,4	-171,5	-38,3	-87,9
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel D. Latin America and Caribbean (22 countries)															
(1)	-463,4	-78,4	-223,1	-455,8	-70,8	-215,5	-464,1	-79,1	-223,8	-480,6	-95,6	-240,4	-455,8	-70,8	-215,5
(2)	-322,6	-65,9	-162,4	-316,1	-59,4	-155,9	-326,1	-69,5	-165,9	-332,8	-76,1	-172,6	-316,9	-60,3	-156,7
(3)	-163,5	-35,1	-83,4	-161,8	-33,4	-81,7	-166,0	-37,7	-85,9	-171,1	-42,8	-91,0	-157,9	-29,5	-77,8
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel E. Middle East and North Africa (14 countries)															
(1)	-431,4	-93,8	-224,6	-425,6	-88,0	-218,8	-429,8	-92,2	-223,0	-431,7	-94,1	-224,9	-441,8	-104,2	-235,0
(2)	-290,7	-65,6	-152,8	-293,2	-68,1	-155,3	-294,1	-69,0	-156,2	-297,3	-72,3	-159,5	-298,6	-73,5	-160,7
(3)	-148,4	-35,9	-79,5	-147,8	-35,3	-78,9	-145,0	-32,5	-76,1	-147,8	-35,3	-78,9	-149,4	-36,9	-80,5
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel F. Sub-Saharan Africa (38 countries)															
(1)	-441,1	-38,8	-188,3	-446,9	-44,6	-194,1	-443,4	-41,1	-190,6	-450,9	-48,6	-198,1	-451,5	-49,2	-198,7
(2)	-318,6	-50,5	-150,1	-305,3	-37,1	-136,7	-315,5	-47,3	-146,9	-319,5	-51,3	-151,0	-326,3	-58,1	-157,8
(3)	-161,3	-27,2	-77,0	-156,0	-22,0	-71,8	-163,8	-29,7	-79,5	-165,8	-31,8	-81,6	-165,0	-30,9	-80,7
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		

Note. MBIC = modified Bayesian criteria; MAIC = modified Akaike information criteria; MQIC = modified Hannan–Quinn information criteria. The optimal Lag order selection based on the smallest likelihood criteria of MBIC, MAIC and MQIC values. ***Source*:** Authors' estimates.

Table S.6.3 Panel VAR's Lag order selection: Oil Abundance, Interaction term and five democratic institution measures (Model III)

	Δ Electoral Dem			Δ Liberal Dem			Δ Deliberative Dem			Δ Participatory Dem			Δ Egalitarian Dem		
Lag	**BIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**
Panel A. full sample (96 countries)															
(1)	-780,6	-86,2	-330,6	-797,4	-103,0	-347,5	-785,8	-91,4	-335,9	-794,1	-99,7	-344,1	-777,4	-83,0	-327,4
(2)	-541,5	-78,6	-241,6	-547,9	-84,9	-247,9	-540,0	-77,1	-240,0	-550,9	-88,0	-251,0	-537,4	-74,4	-237,4
(3)	-280,4	-48,9	-130,4	-278,3	-46,8	-128,3	-276,5	-45,1	-126,5	-279,3	-47,8	-129,3	-279,9	-48,4	-129,9
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel B. Small-scale Oil Endowment (30 countries)															
(1)	-697,8	-120,6	-335,3	-679,2	-102,0	-316,7	-670,9	-93,7	-308,4	-692,7	-115,5	-330,2	-698,1	-120,8	-335,5
(2)	-474,5	-89,7	-232,8	-470,5	-85,7	-228,9	-460,9	-76,1	-219,2	-481,5	-96,7	-239,8	-471,5	-86,7	-229,8
(3)	-250,0	-57,6	-129,2	-243,3	-50,8	-122,4	-239,3	-46,9	-118,5	-247,2	-54,8	-126,4	-244,7	-52,3	-123,9
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel C. Large-scale Oil Endowment (30 countries)															
(1)	-674,3	-96,3	-311,2	-674,5	-96,4	-311,3	-685,1	-107,1	-322,0	-667,8	-89,8	-304,7	-668,1	-90,0	-304,9
(2)	-456,0	-70,6	-213,9	-448,7	-63,3	-206,6	-461,1	-75,7	-219,0	-446,9	-61,5	-204,8	-453,7	-68,3	-211,6
(3)	-238,8	-46,1	-117,8	-231,9	-39,2	-110,9	-242,9	-50,2	-121,8	-232,7	-40,1	-111,7	-237,1	-44,5	-116,1
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel D. Latin America and Caribbean (22 countries)															
(1)	-655,5	-100,1	-308,8	-656,2	-100,8	-309,5	-662,2	-106,7	-315,4	-667,5	-112,0	-320,7	-648,6	-93,1	-301,8
(2)	-462,7	-92,4	-231,5	-454,2	-83,9	-223,0	-463,5	-93,2	-232,3	-463,4	-93,1	-232,3	-454,8	-84,6	-223,7
(3)	-242,5	-57,3	-126,9	-234,0	-48,9	-118,4	-239,4	-54,2	-123,8	-237,5	-52,3	-121,9	-234,3	-49,2	-118,7
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel E. Middle East and North Africa (14 countries)															
(1)	-600,2	-111,7	-300,8	-610,5	-122,0	-311,1	-606,0	-117,4	-306,5	-610,5	-122,0	-311,1	-612,4	-123,8	-312,9
(2)	-411,2	-85,5	-211,6	-405,0	-79,3	-205,3	-411,4	-85,8	-211,8	-410,6	-84,9	-211,0	-412,3	-86,6	-212,7
(3)	-210,9	-48,0	-111,1	-212,1	-49,2	-112,2	-212,4	-49,6	-112,6	-214,0	-51,1	-114,2	-210,9	-48,1	-111,1
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel F. Sub-Saharan Africa (38 countries)															
(1)	-673,3	-93,4	-308,8	-672,3	-92,4	-307,8	-682,1	-102,1	-317,6	-683,4	-103,4	-318,9	-680,5	-100,6	-316,0
(2)	-465,3	-78,6	-222,3	-454,1	-67,5	-211,1	-455,6	-69,0	-212,6	-461,3	-74,7	-218,3	-461,0	-74,4	-218,1
(3)	-235,5	-42,2	-114,0	-229,4	-36,1	-107,9	-237,5	-44,2	-116,0	-234,8	-41,5	-113,3	-228,5	-35,2	-107,0
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		

Note. MBIC = modified Bayesian criteria; MAIC = modified Akaike information criteria; MQIC = modified Hannan–Quinn information criteria. The optimal Lag order selection based on the smallest likelihood criteria of MBIC, MAIC and MQIC values. ***Source*:** Authors' estimates.

Table S.6.4 Panel VAR's Lag order selection: Oil Abundance, Interaction term and five democratic institution measures (Model IV)

	Δ Electoral Dem			Δ Liberal Dem			Δ Deliberative Dem			Δ Participatory Dem			Δ Egalitarian Dem		
Lag	**BIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**	**MBIC**	**MAIC**	**MQIC**
Panel A. full sample (96 countries)															
(1)	-819,3	-126,4	-370,5	-824,7	-131,8	-375,9	-739,1	-43,8	-288,5	-836,3	-143,4	-387,5	-805,4	-112,5	-356,6
(2)	-557,9	-95,9	-258,7	-558,5	-96,5	-259,2	-506,9	-43,4	-206,5	-562,8	-100,8	-263,6	-559,5	-97,5	-260,3
(3)	-285,6	-54,7	-136,0	-283,5	-52,5	-133,9	-259,9	-28,1	-109,7	-285,2	-54,2	-135,6	-280,4	-49,4	-130,8
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel B. Small-scale Oil Endowment (30 countries)															
(1)	-665,1	-87,2	-302,1	-872,1	-105,0	-390,6	-853,1	-86,0	-371,6	-884,6	-117,5	-403,0	-876,5	-109,4	-395,0
(2)	-459,0	-73,8	-217,0	-645,9	-70,6	-284,8	-651,7	-76,4	-290,6	-677,3	-102,0	-316,2	-666,6	-91,3	-305,4
(3)	-232,0	-39,4	-111,0	-461,0	-77,4	-220,2	-450,7	-67,2	-209,9	-456,5	-72,9	-215,7	-453,8	-70,3	-213,1
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel C. Large-scale Oil Endowment (30 countries)															
(1)	-897,3	-129,9	-415,5	-710,2	-134,7	-348,9	-899,3	-131,9	-417,6	-874,3	-106,9	-392,6	-891,9	-124,5	-410,1
(2)	-664,0	-88,5	-302,7	-472,3	-88,7	-231,5	-678,1	-102,6	-316,8	-651,6	-76,1	-290,3	-667,9	-92,3	-306,6
(3)	-445,6	-61,9	-204,8	-244,5	-52,6	-124,0	-460,1	-76,4	-219,3	-449,3	-65,6	-208,4	-452,7	-69,0	-211,8
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel D. Latin America and Caribbean (22 countries)															
(1)	-877,3	-138,1	-415,9	-853,2	-114,0	-391,9	-862,8	-123,6	-401,4	-881,2	-142,0	-419,8	-859,1	-119,9	-397,7
(2)	-673,8	-119,4	-327,8	-648,5	-94,1	-302,5	-659,4	-105,0	-313,4	-663,2	-108,8	-317,2	-651,0	-96,6	-304,9
(3)	-445,4	-75,8	-214,8	-440,2	-70,6	-209,5	-440,4	-70,8	-209,7	-443,5	-73,9	-212,8	-428,8	-59,2	-198,2
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel E. Middle East and North Africa (14 countries)															
(1)	-788,3	-140,1	-391,2	-780,5	-132,3	-383,5	-784,9	-136,7	-387,8	-791,3	-143,1	-394,2	-797,4	-149,2	-400,4
(2)	-580,8	-94,6	-283,0	-600,0	-113,9	-302,2	-600,4	-114,3	-302,6	-599,7	-113,5	-301,9	-594,6	-108,5	-296,8
(3)	-396,2	-72,1	-197,7	-403,2	-79,1	-204,7	-400,1	-76,0	-201,5	-404,7	-80,6	-206,2	-398,1	-74,0	-199,6
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		
Panel F. Sub-Saharan Africa (38 countries)															
(1)	-859,7	-87,3	-374,3	-860,8	-88,4	-375,4	-862,1	-89,7	-376,7	-852,5	-80,1	-367,1	-851,0	-78,6	-365,6
(2)	-657,0	-77,7	-293,0	-657,9	-78,6	-293,9	-658,0	-78,7	-293,9	-660,6	-81,3	-296,6	-649,7	-70,4	-285,7
(3)	-433,8	-47,6	-191,1	-430,8	-44,6	-188,1	-430,8	-44,6	-188,1	-447,5	-61,3	-204,8	-439,9	-53,7	-197,2
Optimal lag	Lag (1)			Lag (1)			Lag (1)			Lag (1)			Lag (1)		

Note. MBIC = modified Bayesian criteria; MAIC = modified Akaike information criteria; MQIC = modified Hannan–Quinn information criteria. The optimal Lag order selection based on the smallest likelihood criteria of MBIC, MAIC and MQIC values. ***Source***: Authors' estimates.