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A Leadership Curse? Oil Price Shocks and the Selection of National Leaders

Kodjovi M. EKLOU

UNIVERSITÉ DE
SHERBROOKE

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Abstract

This paper examines the relation between oil price shocks and the selection of educated national leaders. Exploiting a cross-country dataset on national leaders and a Difference-in-Difference approach, I find that positive oil price shocks significantly reduce the probability of selecting educated leaders: a 'leadership curse'. I show that this phenomenon is driven by ethnically fragmented developing countries. I develop a model where a coalition of ethnic chiefs offers an electoral support to candidates in exchange for future favors. The model shows that positive oil price shocks deter the candidacy of educated citizens by allowing the coalition to tax the expected payoff from office. Hence, elites bargaining may constrain the ability of citizens to induce significant changes through the ballot box. The paper adds to the political aspects of the "resource curse" by showing that resource booms affect the "quality" of politicians before they take office.

Keywords: Leadership curse, Oil price shocks, Political selection, National leadership.

JEL Codes: D72; O1; Q33.

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†E-mail address: keklou@imf.org, International Monetary Fund (IMF), 1900 Pennsylvania Ave NW, Washington, DC, 20431, USA.

1 Introduction

Natural resources represent a tremendous opportunity for economic prosperity. Yet, seminal work by Sachs and Warner (2001) shows that resource-rich countries tend to grow at a slower rate than their counterparts less endowed in natural resources. Political factors are among the key reasons behind the "paradox of plenty" (Karl, 1999) also known as the "resource curse" (Sachs and Warner, 2001).[1] The main focus of the literature on the political foundations of the "resource curse" is on understanding how natural resource wealth distorts the incentives of those in power (Acemoglu et al, 2004; Acemoglu and Robinson, 2006; Robinson et al. 2006; Caselli and Tesei, 2016).[2] Robinson et al (2006) argue, for instance, that natural resource booms induce politicians to misallocate resources in the economy, by raising the value of being in power and by providing politicians with more resources which they can use to bribe voters.

In this paper, I add to the political aspect of the "resource curse" by studying whether natural resource wealth affects the "quality" of individuals that come to power. Previous empirical research show that political selection, i.e who is in charge, plays an important role in shaping policies (Pande, 2003; Chattopadhyay and Duflo, 2004; Jones and Olken, 2005; Dreher et al, 2006; and Besley et al. 2011).[3] Leaders also affect economic growth.[4] Closely related to this paper, Besley et al (2011) provide evidence showing that economic growth after a leader's death varies with the leader's educational attainment: a transition from a leader with a post-graduate qualification to a leader without a post-graduate qualification yields an average reduction in growth around 2.1% per year over the five years post-transition period. They show that "educated leaders matter". More recently, Martinez-Bravo (2017) shows that better educated village leaders in Indonesia have contributed to the increase in the provision of public goods.[5]

In light of this literature on the importance of leadership for economic growth and considering the "resource curse" phenomenon, the following question arises: Is the abundance of natural resources con-

[1] See Van der Ploeg (2011) and, Van Der Ploeg and Poelhekke (2017) for a review on the large literature and other explanations of the "resource curse".

[2] See also Caselli and Cunningham (2009) who provide a reduced form theoretical framework that is dedicated to the analysis of the leader's behavior in a resource-rich environment. A strand of the literature also analyzes the effects of natural resources on political instability (civil conflicts)-see for instance Collier and Hoeffler (2004), Van der Ploeg and Rohner (2012), Lei and Michael (2014) and Berman et al (2017).

[3] Indeed, Besley (2005) outlines that political selection is important because policy commitment and the electoral control of politicians are limited. Consistently, Pande (2003) finds that legislative representatives from minority casts choose policies targeted toward their own groups. In the same direction, Chattopadhyay and Duflo (2004) show that the gender matters for policy choices. In particular, selected female politicians invest more in public infrastructures that are directly relevant to the needs of their own gender such as water projects.

[4] In this regard, Jones and Olken (2005) find that random changes in national leaders stemming from their death significantly affect economic growth (especially in autocracies). Their findings suggest that their personal characteristics matter.

[5] See also Dreher et al (2006) who show that the professional background of national leaders matter for pro-growth reforms such as market liberalization. Figure 1 describes the average education of national leaders across countries. This map also shows that there is a significant variation in the average level of education of national leaders across countries. For instance, within Africa, the most economically successful countries (South Africa, Ghana) tend to be governed by highly educated national leaders on average over the period. Although it does not imply any causal relationship, it suggests that a national leader's education may be (positively) correlated with the country's economic performance.

ducive to less qualified national leaders? Indeed, resource windfalls may affect political selection by affecting differently the opportunity cost of, and the reward from public office for highly educated and less educated citizens. For instance, if resource windfalls generate high rewards from pursuing a career in the private sector (characterized by the reward of human capital and skills), highly educated citizens could be discouraged from seeking public office.

Moreover, as it is well-known that leaders tend to last in power in resource-rich countries, the quality of political selection may be crucial for economic development. Indeed, "while bad policies and corruption have multiple causes, anyone who pays even intermittent attention to the political news from the worst performing and the most corrupt countries, cannot fail to perceive that low quality of the political class is one of them", (Caselli and Morelli, 2004). For instance, in 2004, Forbes magazine ranked Mohamed Suharto, the president of Indonesia (over the period 1967-1998) who had only attended secondary school, as the world's all-time most corrupt leader.[6]

This paper highlights a political aspect of the "resource curse" that is not based on how natural resources affect the incentives of politicians while in power. The focus is rather on the influence of natural resources on the "quality" of (newly) selected national leaders, an issue that has attracted relatively few interest, by building on the strand of the literature that established the key role of political leaders in shaping economic success (Pande, 2003; Chattopadhyay and Duflo, 2004; Jones and Olken, 2005; Dreher et al, 2006; Besley et al. 2011; and Martinez-Bravo, 2017).In other words I study the adverse selection effects of natural resources rather than the moral hazard effects in politics, following Besley (2006)'s terminology. To the best of my knowledge, this paper is the first to empirically investigate whether oil price shocks may reduce the chances of selecting national leaders with a high expected competence. In order to investigate this adverse selection effect, I use a cross-country panel dataset covering 111 countries (developing and advanced) over the period 1930-2004. The data include more than 700 national leaders and their personal characteristics such as their level of education and former profession.

I employ a difference-in-differences approach to investigate whether the changes in crude oil prices have an unequal effect on the probability of selecting a national leader with a high level of education in countries with important oil reserves or oil endowments. This identification strategy exploits the variation in oil wealth induced by the change in oil prices. I find that positive oil price shocks reduce significantly the probability of selecting a national leader with a graduate level or a college level of education in oil-rich countries relatively to non-oil countries. In particular, the 182% increase in the changes in oil prices over the period, led to a reduction ranging between 11.8% and 20.79% in the probability of selecting a national leader with a graduate or a college level of education for the average oil-rich country. Furthermore, these oil price shocks tend to select national leaders that are relatively less educated than the rest of the population. The results are robust to various sensitivity analyses. For instance, in investigating violent transitions as a potential mechanism of the leadership curse, I find that positive oil price shocks reduce the probability of selecting a former military as a national leader. In the same vein, the results are robust

[6]He allegedly embezzled between 15 and 35 billions USD in a country with an income per capita of 695 USD (Transparency International Global Corruption Report 2004).

to the exclusion of coup leaders. These findings suggest that the leadership curse does not seem to stem from violent transitions led by less educated military (or individuals) during booms. It is consistent with Cotet and Tsui (2013) who show that oil wealth is not correlated to military coups and irregular political transitions. Furthermore, as the timing of selection of new leaders might be endogenous in the specific context of autocratic countries, in addition to controlling for the level of democratic institutions, I also exclude from the sample all country-years classified as autocratic. The results are robust to the exclusion of these autocratic country-years.

Next, I investigate potential sources of heterogeneity in the sample. First, I explore whether the constitutional arrangement and the electoral rules that govern the political game matter. I find that the effect of positive oil price shocks is twice and thrice larger respectively in presidential regimes and in countries under a proportional voting rule than in the baseline result (of 13.62%). However, the leadership curse is not statistically significant in parliamentary regimes. These results are consistent with Andersen and Aslasken (2008) who find that the "resource curse" is more pronounced in countries under a presidential regime or a proportional representation as they may be characterized by rent-seeking (Kucinová and Rose-Ackerman, 2005).[7] Relatedly, I also investigate whether there is an heterogeneity linked to autocracies. I find that while the latter tend to select less educated leaders, the effect of positive oil price shocks does not seem to mediate through this channel.

In addition, as ethnic divides are central to the political economy of many developing countries, I explore also the relevance of ethnic fragmentation which measures the probability that two randomly selected individuals do not belong to the same ethnic group. I find that the leadership curse is driven by ethnically fragmented developing countries as the estimates are not statistically significant for high income countries and for developing countries characterized by a low level of ethnic fragmentation. The potential high cost-effectiveness of patronage politics, i.e vote buying in ethnically fragmented resource-rich countries (Collier, 2007) may have important implications for the quality of leadership.[8]

I provide a theoretical framework inspired by Dal Bó et al. (2006) with the aim to shed light on the finding that the leadership curse is driven by ethnically fragmented developing countries. The model features the interaction between a prospective national leader and a coalition of ethnic chiefs. The coalition offers an electoral support to a candidate in exchange for future favors. In order to guarantee that once the candidate becomes the leader, he respects the deal, the coalition specifies a threat of coups or revolution as part of this deal. The intuition is similar to Francois et al (2015) who show that the threat of revolution and coups is the driving force behind the allocation of ministerial post among ethnic groups in

[7] My findings on the constitutional arrangements and electoral rules can be reconciled with the resource curse as follows. Following Dee (2004) and Milligan et al, (2004) on the role of education for civic engagement and Caselli and Morelli (2004) on the role of leadership quality, the results suggest that the low quality of the political class combined with the constitutional environment may be conducive to political corruption. However, it does not seem to be a particularly strong channel as the results are not statistically different between constitutional arrangements and voting rules.

[8] Collier (2007) emphasizes that in ethnically fragmented resource-rich countries, patronage politics may be cost-effective because politicians need only to bribe ethnic leaders. He argues also that this cost effectiveness of patronage in resource-rich countries with a strong ethnic loyalty makes electoral competition malfunctions as it will attract "crooks rather than altruist" into politics.

African governments. The two instruments (electoral support and the threat of coups) are complements. The mechanism of the leadership curse is as follows. The large oil wealth generates a strong demand for redistributions, the so-called "voracity effect" (Tornell and Lane, 1999), which if not satisfied may lead to a revolution. A positive oil price shock makes therefore the threat of coups or revolution (which is similar to a tax on the reward from office) credible. This situation therefore deter the candidacy of highly educated citizens who prefer to stay in the private sector. This model highlights also the fact that price shocks during the period of selection are the ones that matter consistently to my empirical results (showing that lagged and forwarded shocks do not have any robust statistically significant effect) and to the "voracity effect" .

This paper complements the literature on the political foundations of the "resource curse" mentioned earlier by going back to the moment of the selection and hence, the "quality" of national leaders just before they begin to govern. The paper is closely related to two micro levels studies (Brollo et al, 2013; Carreri and Dube, 2017). Brollo et al (2013) study the effect of federal transfers to municipal governments on corruption and the "quality" of opponents candidates to the incumbent mayor in Brazilian municipalities. They find that large transfers increase corruption and reduce the average education of the candidates. But, Brollo et al (2013) focus on how the chances of reelection of the incumbent increase (even if he grabs rents) because he faces low "quality" challengers. In this paper, I rather study the implication of oil price shocks for the "quality" of the newly selected national leaders.

Carreri and Dube (2017) show that positive oil price shocks tend to increase pro-paramilitary legislators' rise to power and to reduce electoral competition (because increased paramilitary violence may deter candidacy) in more oil dependent Colombian municipalities. While Carreri and Dube (2017) study the effect of oil price shocks on the type of politician who comes to power, the difference is that they are focused on a partisan aspect of political selection in a context of violence. This paper is focused on the "quality" of selected national leaders measured as the level of education. Also, the cross-country aspect of my paper allows me to tackle the issue of the effect of natural resources on political selection at a global scale and it is not case-specific as in the two aforementioned microeconomic level papers.

This paper relates also to a growing literature that aims at understanding the determinants of political selection.[9] In a citizen-candidate model, Caselli and Morelli (2004) show that even when voters prefer high "quality" politicians, they can end up selecting low "quality" leaders because of a shortage of high "quality" candidates and the fact that bad politicians have low opportunity costs. The paper contributes to this literature by showing that oil price shocks can have an influence on who comes to power. Through this research, I complement the analysis found in the World Development Report (2017) by focusing on how elites bargaining may both constrain the ability of citizens to induce significant changes through the ballot box and affect the quality of national leaders before they enter the policy arena. Indeed the quality of of the pool of candidates maybe the outcome of such elite bargaining. Elite bargaining is, therefore, important to understand the roots of economic development.

The remainder of the paper is organized as follows. Section 2 describes the data, section 3 explains

[9] See Braendle (2014) for a survey of the literature on the institutional determinants of political selection.

the empirical methodology and Section 4 presents the main empirical finding, discusses it robustness in various ways and investigates heterogeneities. Section 5 investigates whether mineral resources can also generate a leadership curse. Section 6 provides a theoretical discussion on the causal mechanism of the leadership curse. Finally section 7 concludes.

2 Data

I exploit a unique cross-country panel dataset containing 111 countries (from all levels of development) over the period 1930-2004 to explore whether oil price shocks affect the quality of political selection.[10] Countries in the sample are selected only on the basis of the availability of the relevant data for the empirical analysis.[11] Given the length of the time series and the varied set of countries, I include a small set of relevant variables in order to avoid sacrificing too many observations. Table A_1 in appendix shows the descriptive statistics. Detailed information about the variables follow.

Oil abundance and oil price

My main measure of oil abundance is oil reserves. The data are from Cotet and Tsui (2013). It is measured in millions barrels per 100 000 persons. Oil reserves are calculated as the difference between the cumulative discoveries and cumulative productions. As oil wealth in any point in time is directly proportional to the stock of oil reserves (Miller and Upton, 1985), I calculate the average over the period. I employ also a measure of initial oil endowment in hundred of millions of barrels as a proxy for oil abundance. These data are also taken from Cotet and Tsui (2013). Oil endowment is estimated by geologists based on extensive studies of the exogenous geological characteristics of the countries. This measure of oil abundance is a good alternative to oil reserves because the latter are determined by past explorations and extractions rates which could be endogenous to political institutions (Robinson et al, 2006). I use these two alternative measures of oil abundance in the empirical analysis. Figure A_1 in Appendix shows the distribution of the initial oil endowment across geographical areas.

Crude Oil price per barrel series are taken from BP Statistical Review of World Energy June 2010. I use both the nominal prices series (Dollar price of the day) and the real oil price series (in 1990 USD). I transform the time series by taking the natural log, then obtain the first difference before merging with the cross-country dataset. The oil prices and oil reserves data are used to compute the oil price shock as detailed in the empirical approach. This measure of oil price shock captures mainly an oil wealth effect. Overall, the sample contains 57 countries without oil and 54 oil countries.

Personal characteristics of national leaders

All the data on the personal characteristics of national leaders are taken from Besley and Reynal-Querol

[10] The beginning of the period of analysis is constrained by the availability of oil data.

[11] Another constraint on the data is that I focus on the subset of data on personal characteristics of leaders that are classified as of high quality by Besley and Reynal-Querol (2011).

(2011). National leaders are the heads of governments (the prime minister in parliamentary regimes and the president in presidential regimes). This definition of a national leader is consistent with Archigos (Goemans et al, 2006).[12] National leaders are included the first time that they are selected. The main personal characteristic of the leaders of interest in this paper is their level of education. Besley (2005) considers that honesty and competence are the two principal dimensions of the quality of political leaders. The level of education is a good proxy of competence as it captures the quality of human capital of the leader. Also, the level of education of leaders has a significant effect on economic growth (Besley et al, 2011). In addition, education attainment enhance skills and signals ability (Besley and Reynal-Querol, 2011).[13] Besides, education is also strongly correlated with civic engagement (Dee, 2004 and Milligan et al, 2004).

The dataset includes 713 national leaders. Besley et al (2011) classify the level of education of the national leaders into 8 categories. The level of education varies from category 1 to 8, where higher discrete values correspond to higher levels of education. The category 1 includes illiterate national leaders. Leaders with no formal education are classified in category 2. The national leaders in the category 3 have grade or elementary or primary school education or benefited from the teaching of personal tutors. In category 4 are leaders with a high school or finishing secondary school education or trade school level of education. Category 5 national leaders are those with special training (beyond high school) in areas such as mechanical, nursing, art, music, or military school. The leaders with a college education are classified in category 6, while leaders with a graduate level of education (Master degree) and those with a doctorate are respectively classified in category 7 and 8. In the empirical analysis, following Besley et al (2011) I consider the leaders in categories 6 to 8 as leaders with a high level education. I use a dummy variable variable taking the value 1 for leaders in categories 7 and 8 , and 0 otherwise that captures graduate level of education. I also use a second dummy variable to capture a college degree of education taking the value 1 for categories greater or equal to 6 and 0 otherwise.

Finally, in addition to the absolute measure of the level of education of the leader, I employ also a measure that captures the level of education of the leader relative to the average level of education in the country. This measure of educational distance is the difference between the number of the years of education of the national leader and the average number of years of education of the population. Figure A_5 in the Appendix shows a description of the different educational categories of national leaders in the sample. It shows that the sample contains only literate national leaders. There are 388 college educated leaders and only 10 literate leaders with no formal education.

The data on the professional background of national leaders are also available. The three categories of professions are : Dummy variables for Lawyers, military and, professors and scientists. In some specifications I test whether the professional background of the national leader matters. Information on how national leaders take power are also available. Archigos (Goemans et al, 2006) codes the entry of

[12] Archigos is a database on national leaders especially focused on how they take and leave power.

[13] See for instance Yu and Jong-A-Pin (2016) who use the level of education of national leaders as a proxy for economic competence.

a national leader either as regular or as irregular depending on the pre-established political institutions and the selection mechanism in place in a given country. A leader's entry is classified as regular if it is in line with these institutions. For instance, in democracies a leader may be selected through election or through a coalition of representatives in the legislature. Also, an hereditary succession in a monarchy is classified as regular. Regarding irregular as opposed to regular entries, they embody different aspects. They correspond to coups or assassination and any other means that are not consistent with the political institutions governing political transitions in the country.

In addition, a more precise indicator of how a leader comes to power is a dummy variable that takes the value of 1 if elected and 0 otherwise. I use also a dummy variable capturing coup leaders. These variables are useful in the empirical analysis for robustness checks and to test for potential mechanisms. Almost 80% of the leaders came in power through regular means, 60% of leaders were elected and only 14% of the leaders ceased power through a coup.[14] Figure A_6 in the Appendix shows the data on the 440 national leaders for whom I have the information on the professional background. The sample is composed of 162 lawyers, 100 professors and scientists and 178 professional military.

Democracy

I use the polity2 index from the polity IV database (Marshall and Jaggers, 2005) to take into account the level of democracy in the country. The polity 2 index is comprised between -10 (total autocracy) and 10 (total democracy) with higher scores meaning more democratic political institutions. The overall score is based on sub-scores for the constraints on the chief executive, the competitiveness of political participation, and the openness and the competitiveness of executive recruitment. Thus this index captures various dimensions related to the political selection of national leaders. Indeed, Besley and Reynal-Querol (2011) find that democratic countries select more educated leaders.

GDP per capita

GDP per capita data come from Maddison (2003) and is the main macroeconomic control available for a large number of countries and the over the period of analysis. Besley and Reynal-Querol (2011) argue for GDP per capita as a proxy for income that could capture the opportunity cost of national leaders. This interpretation is particularly interesting as I exploit a within-country variation in the empirical analysis.

Education level of the population

The data on the country-level education attainment is taken from Besley and Reynal-Querol (2011). They compile data on the average years of education of the population over 15 from Morrison and Murtin (2010) and the data on average years of education of the population over 25 from Barro and Lee (2001). As the data provide information only over every decade and for every five years respectively they impute missing information by a linear extrapolation. The data is available for few countries and generates a significant loss in the size of the sample. I employ these variables only in robustness checks. Besley

[14] The information on elected and coup leaders are not available for all the 713 national leaders in the sample.

and Reynal-Querol (2011) control for the average level of education in the population because they are concerned about a potential omitted variable bias as democracy is correlated to the level of education. However controlling for the average level of education could capture the average level of education of the pool of candidates as well. Also, if the level of education in oil-rich countries tend to be low (Gyfalson, 2001), it is important to take it into account in the empirical analysis.

3 Empirical Approach

The empirical strategy follows Dube and Vargas (2013). I use a difference-in-differences approach by exploring whether the changes in oil prices have a disproportionate effect on the probability of selecting a national leader of a high level of education in countries with large oil reserves. This strategy uses the cross-sectional variation based on oil reserves distribution across different countries and the time variation coming from movements in the annual change of oil prices. Let Educated$_{lct}$ be a measure of the level of education of a national leader l in country c taking power in year t. In order to test whether the realization of a positive oil price shock in year t reduces the probability of selecting a new leader of high level of education in country c in the same year, I estimate the following equation:[15]

$$\text{Educated}_{lct} = \beta_1(\text{Oil abundance}_c \times \Delta\ln(\text{Price\_t})) + \beta_2 X_{ct} + \beta_3 X'_{lct} + \delta_c + \delta_t + \text{trend}_c + \xi_{lct} \qquad (1)$$

Where Oil abundance$_c \times \Delta$ln(Price_t) is a measure of oil price shocks (with Oil abundance$_c$ the average oil reserve over the period), X_{ct} a set of control variables, δ_c a country fixed effect, δ_t is a year effect, trend$_c$ is a country-specific linear trend and ξ_{lct} is an error term. In some specifications, I include leaders professional backgrounds (X'_{lct}). Countries fixed effects help remove all time invariant unobserved countries heterogeneities such as the geographical concentration of oil wealth, history and culture of selection that may have an influence on the outcome of interest.

Also, as I have a dataset including only entry-years of leaders, the fixed effects may also account for the fact that some countries have more frequent political selections. Indeed, parliamentary regimes are characterized by more frequent political transitions in the data and country fixed effects account for such differences in the sample. The year effects control for changes common to all countries within the same year such as global macroeconomic trends. The country-specific (linear) trends are included in some specifications as controls for time-varying omitted variables (such as political events) and serial correlations.

In the baseline estimates, following Besley and Reynal-Querol (2011), I measure the level of education as dummy variable that takes the value 1 when the leader has a graduate level of education. I also

[15] This empirical strategy is also similar to Andersen et al (2017). In addition, I employ an alternative strategy that does not use the non-oil countries in the sample and therefore focuses on oil-rich countries (See Table A_2 in Appendix). I also provide in Appendix (Table A_{13}) an estimation without the inclusion of the interaction term to show that the controls still have the same effects.

employ alternative measures of educations in the robustness checks. Note that the specification does not include Oil abundance$_c$ and $\Delta\ln(\text{Price}_t)$ because their respective effects are already accounted for by the country-fixed effects and the year effects. The coefficient of interest is β_1 and I test $\beta_1 < 0$, meaning that positive oil price shocks reduce the probability of selecting a national leader with a high level of education. In addition, β_1 captures the differential effect of the change in oil prices (between the selection year and the year before) on the probability of selecting a leader of high level of education in countries characterized by oil abundance.

Following Besley and Reynal-Querol (2011), all the variables including the oil shocks are measured in the year in which the leader is selected. Note however that as I employ the first difference of the oil price series, $\Delta\ln(\text{Price}_t)$ captures the change in oil prices between the year of selection and the year before.[16] My measure of oil shock is similar to the approach in empirical research both at cross-country level (Brückner, Ciccone and Tesei, 2012; Brückner, Chong and Gradstein, 2012) and microeconomic level (Acemoglu et al, 2013; Dube and Vargas, 2013).[17] Brückner, Ciccone and Tesei (2012) and Brückner, Chong and Gradstein (2012) use the average share of net oil exports in GDP as a measure of oil abundance to construct their oil price shocks. Acemoglu et al (2013) employ initial oil reserves in the US economic sub-regions while Dube and Vargas (2013) use a time-invariant oil production at municipal level in Colombia as a measure of oil abundance.

In this paper I employ the average level of oil reserves over the period as the main proxy for oil abundance. I do not use Oil extraction or production because it may be correlated with political factors (Bohn and Deacon, 2000 and Robinson et al, 2006). This strategy is also related to the approach used in the literature on commodity price shocks (Deaton, 1999 and Brückner and Ciconne, 2010). The time invariant measure of oil abundance is not endogenous to policy change that may possibly take place in response to price change (Deaton, 1999). Finally, I use alternatively nominal and real oil prices in the empirical analysis. Taking the first difference in oil prices deals with the well-known presence of unit-root in oil price series in level (Hamilton, 2009; Brückner, Ciccone and Tesei, 2012; and Brückner, Chong and Gradstein, 2012).

Based on the exploitation of similar measures of oil price shocks in cross-country data as instruments (Brückner, Ciccone and Tesei, 2012; and Brückner, Chong and Gradstein, 2012) my specification could then be interpreted as a reduced form. Indeed, while just identified instrumental variable estimates are median-unbiased, reduced forms are unbiased because they are OLS estimates (Angrist and Krueger, 2001). However, I acknowledge that it is also arguable that some countries with significant market power can have an influence on the spot oil price. Regarding this potential source of endogeneity, as mentioned earlier, I use the annual change in time series of oil price and this should be less endogenous than the price in level. Indeed the changes in oil prices are nearly unpredictable (Hamilton, 2009).

[16] I also provide in Appendix (Table A_{19}) estimations including lagged and forwarded price shocks capturing respectively the change in oil wealth preceding and following the accession to power.

[17] Brückner, Ciccone and Tesei (2012); Brückner, Chong and Gradstein (2012) instrument GDP per capita (in a cross-country) analysis by oil price shocks while Acemoglu et al (2013) use the same approach and instrument local area income by oil price shocks. Dube and Vargas (2013) estimate the effect of oil price shocks on civil conflicts in Colombian municipalities.

Also, It is difficult given my outcome variable of interest and the fact that I focus on newly selected leaders (who should not have any significant influence on the changes in oil prices) to argue that they could manipulate the prices. Omitted variables bias concerns should also be addressed by the inclusion of the country-specific trends. Finally, as shown by Kilian (2009) demand side shocks play more important roles than supply side shocks in the determination of oil prices. However, in order to be sure that the results are not drained by countries that may have the power to control international prices, I control for the OPEC membership in robustness checks. I estimate equation (1) mainly by OLS with clustered standard errors at the country-level in order to correct for arbitrary serial correlation.[18]

4 Empirical results

Now I present the main empirical finding followed by various robustness analyses.

4.1 Baseline results

Table 1 shows the estimates of equation (1). All the estimates show a negative and statistically significant effect of oil price shocks on the probability of selecting a national leader with a graduate level of education. My preferred estimates are column (6) as they include all the baseline control variables. In order to grasp the magnitude of the effect, note (from summary statistics, Table A_1 in Appendix) that the changes in oil prices rise by 1.82 log point over the period 1930-2004. For the average oil-rich country in the sample (with oil reserves of 0.15 millions barrels per 100.000 persons), these changes in the oil prices reduce the probability of selecting a national leader with a graduate level of education by 13.62% relatively to a non-oil country.

These results show that positive oil price shocks reduce significantly the probability of selecting a national leader with a high expected competence. As educated leaders matter for growth (Besley et al 2011), the reduced probability of having them could be interpreted as an increased probability of having a resource curse. If resource booms reduce the likelihood of selecting an educated leader with a high expected competence, then these booms may reduce future economic growth. Moreover, it has become an empirical regularity that leaders tend to last in power in resource-rich countries. If resource booms reduce the likelihood of selecting an educated leader with a high expected competence, then these booms may reduce future economic growth.

The effect of the control variables have the expected signs as in Besley and Reynal-Querol (2011). In particular, democracies (as measured by the polity2 index) tend to select more educated leaders. The results are robust to the inclusion of Democracy suggesting that positive oil price shocks do not reduce the quality of selected leaders by inducing less democracy (Tsui, 2011). Also, as mentioned earlier,

[18] In the Appendix, I show estimates for unconditional Probit and Logit with dummies as Katz (2001) and Coupé (2005) suggest that they yield estimates similar to the true parameters. In the Appendix I use also other maximum likelihood estimators such as Ordered Logit and ordered Probit.

consistently with Besley and Reynal-Querol (2011) GDP per capita is a proxy for income that could capture the opportunity cost of running for office. GDP per capita is thus negatively correlated with the level of education of the leader. This interpretation is consistent with the empirical approach exploiting a within-country variation. When focused on the cross-country variation however (as shown for instance in Table A_9), I find a positive correlation.

4.2 Robustness of the results

I carry out various tests in order to assess the robustness of the main empirical finding. First, I employ alternative measures of oil abundance (oil endowment) and the oil price series to ensure that the results do not depend upon on measurement issues.Second, a potential concern is the possibility that less educated leaders may cease power through violent channels such as coups in periods of resource booms. In this regard, I provide estimates showing that the results do not stem from low quality leaders that takes the power by force.

Third, another concern is the fact that resource-rich countries are characterized by low level of education (Gyfalson, 2001). It may therefore be important to control for the level of education of the population in order to test for a potential omitted variable bias. The inclusion of country-specific trends should address this concern but I take precaution to control for the average year of education in the population and the professional background of the national leader. Indeed, some professional backgrounds imply more years of education than others. Another way to deal with this is to use a measure of education relative the level of education in the population (see Table A_{14} in Appendix). Controlling for the average level of education of the population may also capture the average level of education of the pool of (potential) candidates.[19] Finally, I also estimate another specification focusing on oil countries only.[20]

Table 2 shows the results for the definition of oil abundance as the initial oil endowment. All specifications show consistently with the baseline results, a negative and statistically significant effect of oil price shocks. In column (6), the estimates suggest that for the average oil-rich or oil-endowed country (with oil reserves of 0.3 millions barrels per 100.000 persons) the change in oil prices over the period reduces the probability of selecting a national leader with a graduate level of education by 20.79% (roughly

[19] Another possibility is that oil revenues may contribute to raise the level of education of leaders (in the long run) if they are used to increase public expenditure in education. For instance, Martinez-Bravo (2017) documents a large program of school construction in Indonesia funded by oil revenues and that had contributed in the long run in an increase in the education of village leaders. Controlling for the average level of education in the population accounts also for this potential long term effect.

[20] Additional robustness analyses are presented in Tables A_2 to A_{20} with associated Figures A_2 and A_3 in the Appendix including alternative measurements of the educational attainment of the national leader (college level and education index), the exploitation of the cross-sectional variation (pooled estimations), Maximum Likelihood estimations, controlling for OPEC membership, focusing on elected leaders, leaders with regular entry, focusing on the post World War II period (1950-2004), excluding the 1973 and 1979 oil shocks, over the period 1960 - 2004, using a measure of educational distance between the national leader and the population, and using time-varying oil reserves instead of the average. Again, I also show specifications including the lag and the lead of the oil price shocks in Table A_{19} capturing respectively the change in oil wealth preceding and following the accession to power. The results show no statistically significant effect of the lag and and lead. Finally, Table A_{20} shows that the results are robust to the exclusion of all autocratic country-years.

21%) comparatively to a non oil-endowed country. The results from Table 2 are in line with the baseline results and show the robustness of the leadership curse to the measure of oil abundance.

Table 3 is dedicated to another measurement issue by analyzing the effects of nominal oil prices rather than the real oil price series (in 1990 USD) used so far. In columns (1)-(6), I separate positive price changes from negative ones to disentangle the effects of positive price shocks from the effects of negative price shocks. This procedure allows me to test for a potential asymmetric effect. The results show that only positive shocks have a negative and statistically significant effect. In particular, column (6) shows that for the average oil-rich country the change in oil prices over the period reduces the probability of selecting a national leader with a graduate level of education by 11.80% compared to a non-oil country. In addition, negative price shocks do not have a statistically significant effect. Columns (7)-(12) show comparable estimates to the baseline results using the nominal oil price series. In column (12), the result shows a reduction of 12.57% in the probability of a selecting a national leader with a graduate level of education for an average oil-rich country comparatively to a non-oil country. These results are also close to the baseline estimates.

Now I explore the possibility that the estimates may capture the arrival to power of national leaders with low education attainment by irregular means such as military coups. For instance, Carreri and Dube (2017) show that positive oil shocks can lead to the use of extra legal forces to take power in Colombian municipalities. This analysis is also important because military are preponderant in the sample. In order to test for this potential phenomenon, in Table 4, I estimate in columns (1)-(6) the effect of oil price shocks on the probability of selecting a military and in columns (7)-(12) I exclude coup leaders from the sample.[21] The idea for columns (1)-(6) estimates is that if this phenomenon is important in the sample, these estimates should show that military tend to be more selected following oil shocks. However, the results indicate otherwise. All the estimates show a negative and statistically significant effect meaning that oil price shocks do not encourage military to seize power. In addition, excluding coup leaders from the sample do not change the baseline results. For instance, in column (12) the effect of oil price shocks is the same as the one from column (6) in Table 1. In the Appendix, I also provide estimates focusing on the subsample of leaders that comes to power according to the existing institutions governing political transitions and on elected national leaders (see Table A_4). The results are robust to these restrictions and are consistent with Cotet and Tsui (2013) who show that oil wealth is not correlated to military coups and irregular political transitions.

In Table 5 below, I explore the possibility of an omitted variable bias. As natural resource wealth may reduce the incentives to invest in education (Gyfalson, 2001) it is important to control for the educational attainment in the country in order to be sure that the estimates presented so far do not suffer from a bias due to its omission. Again, country-specific trends should pick up the effect of education but I take the precaution to control for the average level of education of the population over 25 years old in columns

[21] Note that for the estimates excluding coup leaders in columns (7)-(12), I lose 93 leaders relative to our baseline estimates. These leaders are from 51 countries in the sample. Among these 51 countries, only two are completely missing from the sample (Omar with one leader and Qatar with 2 leaders).

(1)-(6). Besides, I also control for the professional background of the national leader in columns (7)-(12) as some professions may require more years of education. The results are similar to the baseline estimates. The educational attainment in the population does not have a statistically significant effect on the probability of selecting a national leader with a graduate level of education. Also, lawyers are 18% more likely to have a graduate level of education (column 8) while military are 30% less likely to have a graduate level of education (column 10). Table A_5 in the appendix, shows similar results controlling for the average year of education of the population over 15 years old.

The baseline empirical strategy includes the non-oil countries in order to capture a differential effect between oil countries and non-oil countries. As there can be differences among oil abundant and non-oil abundant countries regarding political transitions, Table A_2 in the Appendix focuses on the sample of oil countries only. The (marginal) effect of oil price shocks is stronger than in the baseline strategy including non-oil countries. For instance, in column (6), the results show that for the average oil country in the sample the change in oil prices over the period reduces the probability of selecting a national leader with a graduate level of education by 19.26%. This effect is larger than in the previous estimates employing oil reserves and including non-oil countries. Such a result is interesting and suggests that the main empirical strategy yields more conservative estimates.

4.3 Heterogeneities

This section presents the exploration of potential heterogeneities in the sample that may help understand countries characteristics that are determinant for the leadership curse. I present four different analyses exploiting the difference in constitutional arrangements, difference in institutions (more specifically autocracy), different income groups, and the difference in the level of ethnic fragmentation. I investigate the role of the constitution and voting rules because Andersen and Aslasken (2008) show that constitutional arrangements matter for the "resource curse". In addition, it is possible that resource windfalls may have a greater impact on leaders' education in autocracies than in democracies because of the different opportunities to extract rents. Regarding the income groups, developing countries are usually characterized by a weak institutional environment and the quality of institutions is a key determinant of the resource curse (Mehlum et al, 2006). Finally, I will explore the relevance of high ethnic fragmentation because ethnic divides are central to the political economy of many countries. Also, higher levels of ethnic fragmentation have been shown to influence economic performance through public policies by impeding agreement about the provision of public goods. High ethnic fragmentation can also create rents for the groups in power at the expense of the society at large.[22]

First, I turn to the investigation of the empirical relevance of the constitutional arrangements and the electoral rules governing the political game. Empirical studies (Gerring and Thacker, 2004 ; Kucinová and Rose-Ackerman, 2005) show that constitution and electoral rules matter for political corruption. Gerring and Thacker (2004) find that parliamentary regimes exhibit lower political corruption as compared to

[22] See for instance Easterly and Levine (1997) and Alesina et al (2003).

presidential regimes. They explain this result by the fact that presidential regimes are characterized by too many veto points and an important political fragmentation where decision-making are diffused among a wide array of semi-independent actors.[23] On the other hand, Kucinová and Rose-Ackerman (2005) show that proportional representation systems are more characterized by corrupt political rent-seeking than plurality systems and this effect is particularly pronounced in presidential regimes.[24] Kucinová and Rose-Ackerman (2005) argue that proportional systems are not only characterized by a difficulty to monitor the actions of the leaders (both for voters and opposition parties) but also the leader can more effectively take the lion's share of corrupt opportunities.[25]

The empirical findings by Gerring and Thacker (2004) and Kucinová and Rose-Ackerman (2005) are consistent with Andersen and Aslasken (2008). The latter find that countries with presidential regimes suffer from the "resource curse" while countries with parliamentary regimes do not. They also find that countries with proportional electoral voting rules are more prone to the "resource curse". If the increase in the extractable rents from office is an important dimension of the mechanism of the leadership curse, then the effect of the latter should be more pronounced in presidential systems and in countries with a proportional representation because the access to rents is easy and leaders cannot be effectively monitored (Gerring and Thacker, 2004 ; Kucinová and Rose-Ackerman, 2005).

I estimate the baseline equation in the subsample of countries under a presidential and parliamentary regimes on one hand and in the subsample of countries that are characterized by a proportional voting rule.[26] I focus on the selections that take place under a given constitutional arrangement or voting rule. Table 6 shows the results for the exploration of the effect of oil price shocks on the probability of selecting an educated national leader for different types of regimes and electoral rules. The estimates show the results on the subsamples of country-years under a presidential regime (columns (1)-(2)), a parliamentary regime (columns (3)-(4)) and a proportional voting rule (columns (5)-(6)).

The estimates in Table 6 show that the leadership curse is more pronounced in presidential regimes and in countries with proportional representation while oil price shocks do not have a statistically significant effect in parliamentary regimes. More precisely, the estimates in column (2) imply that under presidential regimes, for the average oil-rich country, the change in oil prices over the period reduces the probability of selecting a national leader with a graduate level of education by 26.30% as compared to a

[23] Persson and Tabellini (2000) argue for the opposite in term of rent-seeking in a presidential(-congressional) regime but for the same reason (the separation of power). They argue rather that the separation of power may reduce political collusion.

[24] Proportional representation is an electoral system where the divisions in an electorate are reflected proportionally in the elected body. For instance if 20% of the electorate body supports a particular political party, then 20% of seats will be won by that party. In this case, all the votes contribute to the result as opposed to the plurality system or the majoritarian rule where it is the majority of the electorate that appoints the representatives.

[25] This finding on proportional representation is consistent with Persson and Tabellini (2003).

[26] The data on regimes and proportional representation come from the Database of Political Institutions (DPI), Beck et al (2001). The data are available from 1975. In order to preserve the size of the sample an thus to avoid loosing too many observations, I recode the different variables of presidential and parliamentary as dummies which take the value of 1 when a given institutional arrangement is in place and compute an average over the period for each country. If a country has been at least 50% of period 1975-2004 under a given institutional arrangement, I code it as having such characteristic. For instance, countries that have been under a presidential regime for at least 50% of the time period are classified as presidential regimes (see Table A_{14} in the Appendix). In Table 6, this approach was useful for the indicator of parliamentary regime.

non-oil country. Column (6) shows that in countries with proportional representation, the probability of selecting a national leader with a graduate level of education is 38.66% lower as compared to a non-oil country. These effects are significantly larger than in the baseline effect of 13.60% reduction in the probability. As mentioned earlier, these results show that the extractable rents from office are important for the underlying mechanism of the leadership curse because the effect is more pronounced in institutional environments that may be characterized by rent-seeking. These results are consistent with Andersen and Aslasken (2008) and Mehlum et al (2006).[27]

Secondly, I will investigate another aspect of the institutional characteristic, that is autocracy, as it may play an important role in determining the opportunities to extract rents. Considering the weak constraint on the executives that characterizes autocracies and therefore the relatively high ability to appropriate rents, positive oil price shocks' influence may be different in this particular institutional environment. Indeed, Mehlum et al (2006) argue that natural resources may induce a curse only when institutions are grabber-friendly. My strategy so far has been to include the polity2 index as control, accounting for the level of democracy and hence whether in a given year a country, is democratic or rather autocratic. Indeed, the index covers both with -10 capturing "absolute" autocracy and $+10$ capturing "perfect" democracy. I now take a different approach and estimate the baseline equation augmented with the interaction with country-years classified as autocratic according to Magaloni et al (2013).[28] The results in Table 7 show that while autocratic country-years are associated with a lower probability of selecting national leaders with graduate level of education, it doesn't seem that the effect of oil price shocks are amplified in this particular environment. The results still depict the leadership curse however. Furthermore, a related issue is that it may be possible that both the quality of the leader and the timing of replacement are functions of the oil shock. In other words the timing of the political selection may be endogenous in an autocratic set-up. In order to address this concern, I run the baseline regressions removing all country-years that are classified as autocratic. This investigation entails a significant data loss but the results show that the leadership curse is still alive.[29]

Thirdly, let explore the effect of oil price shocks in the subsample of developing as opposed to developed (high income) countries. Developing countries dominate the sample (92 countries).[30] Table 8 shows the results for the two subsamples of developing and high income countries. It is evidently clear that the results are driven by developing countries as the effect of oil price shocks is not statistically sig-

[27]Note however that, while we find statistically significant effects only in presidential regimes and in proportional voting rule the estimates are not statistically different between the three categories examined in Table 6. This calls therefore for caution in interpreting the constitutional and voting rule aspects of the leadership curse.

[28]The data come from Autocracies of the world, Version 1 database and cover the period 1950-2012. In investigating this particular heterogeneity I loose unfortunately many observations. This is firstly because of the loss of all the data before 1950 and because there is not a full coverage over the period 1950-2012 for all countries. Secondly, we also loose a country, United Arab Emirates, that got absorbed by the country-fixed effect as only one observation was left.

[29]See Table A_{20} in Appendix.

[30]Countries are considered as developing countries if they have a Gross National Income (GNI) per capita less than 12,736 USD in the year 2004 or in the year 2000s if the data in 2004 were not available. This classification follows the World bank classification of high income countries as countries with a GNI per capita at least of 12,736 USD.

nificant in the subsample of high income countries.[31] In column (6), the results show that for the average oil-rich country in the sample, the oil price shocks over the period reduce the probability of selecting a national leader by 10.64% as compared to non-oil countries. The fact that these results are only present in the sample of developing countries may be explained by the institutional weakness that generally characterize them and this is not surprising. However, given our previous result on autocracies, it may be interesting to investigate other channels.

Now that the results show that the leadership curse seems to be a phenomenon that is present in developing countries only, it is interesting to test whether even among developing countries the effect of oil price shocks on the quality of selected national leader is heterogeneous. To this end, I separate the developing countries into two groups: a group of countries characterized by a high ethnic fragmentation and a group of countries with low ethnic fragmentation.[32]

The index of ethnic fragmentation measures the probability that two randomly selected individuals do not belong to the same ethnic group. I define a country as highly fragmented if the probability that two randomly selected individuals do not belong to the same ethnic group is at least of 50%. Otherwise, a country is included in the group of low ethnic fragmentation. Table 8 shows that the results are driven by ethnically fragmented developing countries. Indeed, the leadership curse appears only in the subsample of developing countries characterized by a high ethnic fragmentation. In addition, in some estimations, in the sample of low ethnic fragmentation positive oil price shocks have a positive effect on the probability of selecting a national leader with a graduate level of education (Columns 9 and 11). But these effects are not statistically significant in estimations including the country-specific (linear) trends. It is prudent therefore to consider that the results for this subsample are not statistically significant. In column (6), the estimates suggest that for the average oil-rich country in the sample, the change in oil prices over the period reduce the probability of selecting a national leader with a graduate level of education by 18.90% relatively to non oil countries. Table 9 implies evidently that the previous results on developing countries (Table 7) is entirely due to ethnically fragmented ones. Overall, the results indicate that the leadership curse might stem from developing countries endowed with oil and that are characterized by a high ethnic fragmentation.

5 Further investigation: Are other natural resources also relevant for the leadership curse?

In this section, I investigate whether the leadership curse can be extended to other natural resources. I take data on mineral rent as share of GDP from the WDI as a proxy for mineral resource abundance.[33] The data are available starting in 1960 and this implies a reduction in the sample size.

[31] Note that there is only 19 high income countries in the sample and this can explain the result. However the number of national leaders considered in these estimations (168) is reasonably sizable.

[32] The data on ethnic fragmentation are taken from Reynal-Querol and Montalvo (2005).

[33] Minerals included are: bauxite, copper, gold, iron, lead, nickel, phosphate, silver, tin and zinc.

I construct a country-specific mineral resource price index following Deaton (1999), Brückner and Ciccone (2010) and Eklou (2015) in computing the country-specific price index as :

$$\text{Mineral Price index}_{it} = \sum_{r=1}^{8} \varpi_{ir} \times \text{Price}_{rt} \tag{2}$$

Where ϖ_{ir} is the country i's time invariant export share of resource r and Price_{rt} is the international price of resource r in year t.[34] Because the country-specific international price index uses a time invariant weight, it allows the measurement of price growth to be plausibly exogenous. The time invariant weights are not endogenous to policy change that may take place in response to the change in prices (Deaton, 1999). In order to compute the index, the starting point is the raw data on yearly nominal international prices from the World Bank. All the prices are set equal to unity in 2000 in order to obtain a price index with 2000 as the base year. I construct the country-specific mineral resource price index as a weighted average as shown in equation (2).

I take a similar approach to the empirical strategy previously employed: investigating whether mineral wealth induced by changes in prices affect the probability of selecting an educated national leader. However the set-up is slightly different. I use the average share of mineral rents in GDP over the period 1960-2004. In addition, as the price index is country-specific, it is also included among control variables. Also, there are only 23 countries with no (zero) mineral rents over the period.[35]

Table 10 shows the results. First of all, note that we lose some observations because this investigation is over the period 1960-2004.[36] The results show a negative effect of mineral price shock (the interaction term) only for specifications including country-specific (linear) trends. The point estimates are larger than in the baseline but in order to compare them one should take into account the magnitude of the shocks. For instance, in column (6), the point estimate implies the following. For the average country with a mineral of 0.8% of GDP, the changes in mineral prices over the period reduce the probability of selecting a national leader with a graduate level of education by 8.15%.[37] The changes in oil prices over the same period are associated with a reduction in the probability by 13.22%.

The finding shows that the leadership curse is stronger and more robust with oil compared to other minerals. In Table 11, we include both price shocks: oil price shocks and mineral resource price shocks. The results remain similar. Overall, Table 9 and Table 10 show results that are consistent with the

[34] I obtain each country's export share of the resources from United Nations Conference on Trade and Development (UNCTAD) for the year 2000. The data were available from 1995 to 2013. The export share of a given resource is the ratio of this resource's export over the total export of the country in the year 2000. The data on the international price of bauxite and the data on phosphate exports were not available. It is the reason for summing only up to 8 instead of 10.

[35] These countries are: Angola, Bahrain, Comoros, Cape Verde, Chad, Djibouti, Estonia, Gambia, Guinea-Bissau, Haiti, Iraq, Kuwait, Lebanon, Libya, Lesotho, Malawi, Mauritius, Moldova, Paraguay, Qatar, Singapore, Trinidad and Tobago, and United Arab Emirates.

[36] I lose also one country for which there were not available data on mineral rents (Somalia). Table A_{17} in Appendix shows that the leadership curse (based on oil price shocks) still hold and allows us to have a benchmark.

[37] Table A_{18} in Appendix focusing on the sub-sample of countries with positive rents shows similar results. I also investigated the heterogeneities and I find that the leadership curse based on mineral rents is present both in developing and advanced countries. In addition, the ethnic fragmentation does not seem to matter in this case. These results are not included but available upon request.

predominant place of oil in the literature on the "resource curse" (Ross, 2001 ; Tsui, 2011; Sala-i-Martin and Subramanian, 2013 and, Lei and Michael, 2014).

6 Theoretical Framework

In this section, I develop a theoretical framework inspired by Dal Bó et al. (2006) in order to provide an explanation for the leadership curse based on the role of ethnic fragmentation and patronage (or lobbying). The main feature of this model is to emphasize the role of a positive oil price shock (and its interaction with ethnic fragmentation) in explaining the composition of the pool of candidates and therefore the level of education of selected leaders. The composition of the pool of candidates is important because as stated by Key (1956) "if the people can choose only from among rascals [low quality politicians or politicians with a low level of education], they are certain to choose a rascal". I introduce the role of oil wealth and ethnic fragmentation in the framework by Dal Bó et al. (2006).

An intuitive path is to understand how a positive oil price shock may affect the rewards to holding office (relative to the opportunity cost, e.g. wages in the private sector). The intuition is that it may affect differently the incentives of highly educated citizens and the ones with a low level of education to run for pubic office. Many studies stress how the rewards from office can shape the quality of candidates and their performance once in office (Besley, 2004; Kotakorpi and Poutvaara, 2011; and Gagliarducci and Nannicini, 2013).[38] For instance, Kotakorpi and Poutvaara (2011) find that a higher salary increases the fraction of candidates with higher education among females candidates. On the other hand, Gagliarducci and Nannicini (2013) find that in Italian municipalities higher wages attract more educated candidates. Furthermore, they find that better-paid politicians make the government machinery more efficient (by reducing the size of the government and by increasing the speed of revenue collection). More importantly they find that this effect is solely driven by the selection of competent politicians.

6.1 Set-up

Consider a developing country populated by citizens that are individually characterized by an observable ability parameter α, with $\alpha \in [0,\infty[$. As education signals the ability (or competence) of an individual (Besley and Reynal-Querol, 2011 and, Yu and Jong-A-Pin, 2016), it is an example of an observable ability. The ability is distributed according to a function $\Phi(\alpha)$ with an associated density function $\phi(\alpha)$. In addition, the country has a stock of r barrels of oil. Thus, again, as oil wealth (R) in any point in time is directly proportional to the stock of oil reserves (Miller and Upton, 1985), $R = \Delta p \times r$, where Δp is the change in the \$ price per barrel of oil.

[38] In the theoretical literature, the effect of an increase of salary on the quality of candidates is ambiguous. Besley (2004) argues that it is possible that this increase in salary results in a worse pool of candidates as monetary incentives may attract low quality candidates (crowding out high quality candidates who are characterized by a public service motivation). Poutvaara and Takalo (2007) show in their theoretical framework that increasing pay to politicians does not necessarily improve the quality of the pool when campaign is costly.

The population is composed by a large number (N) of ethnic groups. Each citizen in this developing country is assumed to be loyal to her own ethnic group. One way that this loyalty can be seen is through citizens' trust and obedience to their ethnic leaders. It follows that, ethnic chiefs can influence the choices made by citizens including how they cast their votes. Let λ be a parameter capturing the strength of ethnic loyalty in the country. The higher is λ, the stronger is the ethnic loyalty in the country and the stronger is the influence of ethnic chiefs. During election years, chiefs of ethnic groups can constitute a coalition and offer a lobbying (or patronage) deal to candidates in order to get them elected. I will describe in more detail the nature of this deal.

The economy is composed by two sectors: the public sector and the private sector. In the public sector, the wage (ω) is fixed while in the private sector individuals are paid according to their ability (α). Indeed, wages of politicians do not usually depend on their level of education or their human capital. In this framework, this assumption on wages implies that the ability ("quality") of leaders is directly determined by the payoff that they will get in office.

6.2 Timing of events

This is a two-stage model as follows. In the first stage, citizens with different level of abilities (education) make their choices about whether to enter the pool of candidates or to stay in the private sector. In the second stage, there are three sub-stages. In the the first sub-stage, the coalition of ethnic chiefs observe the economy regarding the level of resource wealth (R) and decide to offer a deal to candidates.[39] This deal consists in offering an electoral support (v) in exchange for favors in the form of a share of rents (ξ) once the candidate is in office. Rents from office are therefore extractable.

In addition, in order to make the deal credible so that once in office the previously candidate honors it, the coalition of ethnic chiefs has the capacity to formulate coup or revolution threats. In sum, the deal has three components: a vote support, an amount of rent in exchange for this support and a threat (in case the leader does not obey). An interesting example of ξ, is the allocation of ministerial posts to ethnic groups in the government. For instance, Francois et al (2015) show that in Africa since independence (in 1960s), the cabinet composition is allocated proportionally to the share of ethnic groups in the population. In the second sub-stage, the selection takes place while in the third and last sub-stage, the newly selected leader decides to respect the engagement with a probability θ.

First stage: Decision of entering the pool of candidates

Let ω be the expected return from office. Citizens with an ability level such that $\alpha \leq \omega$ will enter the pool of candidates. It implies that the expected return from public office determines the quality (ability or education) of the pool of candidates. As I will explain in the next section, the earning in public office

[39] Note that as the candidate is from a given ethnic group, the coalition of ethnic chiefs are from the remaining $N-1$ ethnic groups. The implicit assumption is therefore that any candidate will need the support of the other ethnic groups to win an election.

also depends on the behavior of the coalition of ethnic chiefs. If the coalition did not exist or were not powerful to exert an influence, all citizens with an ability level such that $\alpha \leq \omega$ will enter the pool of candidates. In sum, individuals decide to run for office if the expected return from public office is higher than the opportunity cost i.e, the wage in the private sector α. It is assumed that if an individual is indifferent between entering the pool and staying in the private sector, she will run for office.

Second stage: Interaction with the coalition of ethnic chiefs

As mentioned earlier, the coalition has two instruments to influence the leader in return for an allocation of rents (ξ). The first instrument is providing an electoral support (v). The second instrument is a coup or a revolution threat (t). This second instrument is a complement to the first one because the electoral support takes place before the leader takes power. The threat of political instability ensures therefore that once in office the leader respects the deal. The intuition is similar to Francois et al (2015) who show that the threat of revolution and coups is the driving force behind the allocation of ministerial post among ethnic groups in African governments. As these two instruments are complementary, when the coalition is active, it also has the bargaining power. It costs $\delta S(v,\lambda) = \delta \times \frac{v}{\lambda}$ to deliver the electoral support and $\tau T(t,R) = \tau \times \frac{t}{R}$ to stage a coup or initiate a revolution.[40]

As λ captures the degree of ethnic loyalty, I model the cost of delivering a political support as a decreasing function of this parameter. The stronger is the ethnic loyalty in the country, the lower is the cost for the ethnic chiefs to influence their co-ethnics. In other words, the stronger the ethnic loyalty, the easier it is for the coalition to gather an electoral support. In addition, a large oil wealth (R) through a positive oil price shock, reduces the cost of staging a coup or initiating a revolution.[41] The intuition is that a large oil wealth will increase the incentive of the coalition to challenge the leader.[42] The large oil wealth may also generate a strong demand for redistributions, the so-called "voracity effect" (Tornell and Lane, 1999), which if not satisfied may lead to a revolution. Indeed, the larger the oil wealth, the larger is the size of the pie to be shared among different ethnic groups. For these reasons, a positive oil price shock makes the revolution or coup threat credible.

6.3 Preferences

The leader cares about the reward from office composed by wages (ω) and being in power (v), the coup or the revolution threat (t) and the moral or reputation cost for being involved in such a deal (μ).[43]

[40] I use these simple functions $S(\cdot)$ and $T(\cdot)$ in order to make the model tractable without any loss of generality. The parameters $\delta > 0$ and $\tau > 0$ capture institutional and technological constraints that affect respectively the cost of delivering electoral (or political) support and staging a coup.

[41] It is straightforward to see that given the modeling, if $\lambda \to \infty$, the cost of providing a political support converges to 0. In the same way, if there is no ethnic loyalty ($\lambda \to 0$) the cost of providing the electoral support explodes ($S(v,\lambda) \to \infty$). The same intuition holds for the cost of staging a coup, regarding R.

[42] See for instance Caselli and Cunningham (2009).

[43] One could also model this reputation cost as a function of the ability in order to reflect the fact that citizens with a high ability may suffer a more important reputation cost. This is because they could have difficulty finding a job in the private sector

The future leader will accept the proposition of the coalition of ethnic leaders if:

$$\omega + \nu - \mu \geq \omega - t \tag{3}$$

It is assumed within the framework that with a probability $(1-\theta)$ it is impossible for the leader to respect the deal and the coalition initiates the coup or the revolution, in which case the payoff of the leader is $\omega - t$. Inequality (3) is equivalent to $\nu \geq \mu - t$. This condition has a particular meaning. It means that a citizen candidate accepts the offer if only the value of being in power is larger or equal to the moral cost of being part of the deal and the cost associated to the possibility of a coup or a revolution. In other words, citizens who particularly value power are more likely to take such an offer. This situation is close to the one described by Collier (2007). He argues that the cost effectiveness of patronage in resource-rich countries with a strong ethnic loyalty makes electoral competition malfunctions as it will attract "crooks rather than altruist" into politics. However, this does not say anything about the ability (or the level of education) of politicians. In order to show the effect on the level of ability of political leaders, I will compare the scenario with an inactive coalition of ethnic chiefs to a scenario where the latter is active.

The coalition on the other hand chooses to provide an electoral support (and political stability) and makes the threat of a coup such that it maximizes its expected payoff defined as:

$$\Gamma(\nu,t) = \theta[\xi - \delta S(\nu,\lambda)] + (1-\theta)\tau T(t,R) \tag{4}$$

$$\text{subject to : } \nu \geq \mu - t$$

Recall that ξ is the share of rent allocated to the coalition, $\delta S(\nu,\lambda)$ is the cost of electoral support and $\tau T(t,R)$ the cost of the coup or the revolution threat. For tractability, I assume that the coalition has the following set of choices $\nu \in \{0,1\}$ and $t \in \{0,1\}$. The value 1 means that the coalition makes a given choice while the value 0 means that it does not. For instance, $\nu = 1$ means that the coalition chooses to provide an electoral support to the candidate. As I will show in more details in the next section, there are only two plausible cases $\{\nu = 1 \text{ and } t = 1\}$ on one hand and, $\{\nu = 0 \text{ and } t = 0\}$ on the other hand. In brief, either the coalition is active by providing an electoral support and the threat or it is inactive.

6.4 Equilibrium and Result

I will start by presenting the benchmark case (with an inactive coalition) followed by the case of an active coalition.

The benchmark case: the coalition of ethnic chiefs is inactive

and this loss is important as the remuneration is equal to the level of ability (see for instance Brollo et al, 2013). Modeling μ as a constant makes the model more tractable without any loss of generality. Note also that modeling the reward from office as dependent on oil wealth will not quantitatively change the theoretical result.

Lemma 1: The level of ability in the pool of candidates is ω when there is no ethnic pressure

In the absence of the coalition of ethnic chiefs, all citizens with a level of ability such that $\alpha \leq \omega$ will enter the pool of candidates. Indeed, the quality of politicians is determined by the expected payoff from office. When the coalition is absent, the payoff from office is the fixed wage ω.

Result for an active coalition

Lemma 2: a) The necessary condition for the coalition to be active is a positive oil price shock ($R > 0$) and a strong ethnic loyalty ($\lambda > 0$). b) The sufficient condition for the coalition to be active is that the expected benefit $\theta\xi$ is equal or larger than the total cost $\theta\delta S(\nu,\lambda) + (1-\theta)\tau T(t,R)$ i.e the value of ξ is not smaller than $\bar{\xi} \equiv \delta S(\nu,\lambda) + \frac{1-\theta}{\theta}\tau T(t,R) \equiv \delta\frac{1}{\lambda} + \frac{1-\theta}{\theta} \times \frac{1}{R}$.

From inequality (3) and Lemma 2 a), if the coalition is active, it always chooses $\{\nu = 1 \text{ and } t = 1\}$. Indeed, the only case where the coalition is active is when there is a positive oil price shock and a strong ethnic loyalty.[44] Consider the case of no positive oil price shock and a strong ethnic loyalty ($R = 0$ and $\lambda > 0$). In this case, there is no incentive for the coalition to make a deal even if it is possible to provide the electoral support because the coup or revolution threat is not possible. The reason is that, without a credible threat, there is no guarantee that the leader once in office will respect the deal. In the case of a positive oil price shock and no ethnic loyalty ($R > 0$ and $\lambda = 0$), the coalition does not have the ability to provide an electoral support, the centerpiece of the deal.

The activity of the coalition has an implication for the level of ability of the pool of candidates and therefore the level of ability or education of the leader. In order to derive this implication, I will determine the equilibrium payoff of the leader. In the case of an active coalition of ethnic chiefs, the leader receives $\omega - t$ regardless of his actions. Indeed, if the leader refuses to respect the deal, this payoff is $\omega - t$. Even if he honors the deal, the payoff is $\omega - t$.

Proposition: During an electoral period with a large positive oil price shock in a country with a strong ethnic loyalty, the level of ability of a selected leader is lower than in a period without this shock.

During an electoral period without a positive oil price shock, the coalition is not active and the payoff from public office is ω (from Lemma 1). The quality of the pool in term of ability is ω as all citizens with a level of ability $\alpha \leq \omega$ will be candidates. However, in the case of an active coalition, that is a positive oil price shock and a strong ethnic loyalty, the payoff from public office is $\omega - 1$. The level of ability in the pool of candidates in the case of an active coalition is lower than in the case of an inactive coalition ($\omega - 1 < \omega$). The main mechanism is that the threat of revolution or of coups deter the candidacy of

[44] Empirically, the positive price shock during the electoral period is the one that matters because it is the best predictor of future oil wealth and thus future rents (to be shared among ethnic groups) during the leader's tenure in office. It comes from the fact that oil prices are characterized by unit-root and hence unpredictable. The findings in Table A_{19} in the Appendix corroborate the relevance of the positive price shock during the electoral period.

citizens with a high ability. The threat of revolution and coups is similar to a tax on the reward from office and therefore reduce the incentive of high ability citizens to run for office. These high ability citizens would rather stay in the private sector.

This theoretical framework generates an implication that is consistent with the finding that the leadership curse is driven by ethnically fragmented developing countries. I provide an additional evidence of the link between the level of ability of leaders and oil wealth (proxied by oil reserves). I exploit data on the cognitive ability of leading politicians covering 40 countries from Rindermann et al (2009).[45] Using information on the level of education, Rindermann et al (2009) provide IQ estimates of leading politicians over the period 1960-2009. The latter are defined as those who have the real decisive power (mostly presidents and heads of governments). In Figure 2, focusing on the sample of developing countries, there is a negative correlation between the oil wealth and the cognitive ability of leading politicians.[46] In addition, this correlation is stronger in the sub-sample of developing countries with high ethnic fragmentation (-0.52) than in countries with low ethnic fragmentation (-0.39).

7 Conclusion

Do natural resources reduce the quality of the leading political class? This paper investigates the political selection aspect of the "resource curse" and thus departs from the literature focusing on how natural resources affect the leader's behavior once in office.

Analyzing the effect of natural resources on political selection is important because a large part of the literature on the political aspects of the "resource curse" focuses on how these resources affect the leader's behavior once in office. In addition, there is a strong empirical evidence that the type of politicians in power affects policy choices. This paper bridges this gap in the literature by making the point that precisely, natural resources may distort who comes to power and then decides which policy choices to make.

Using a cross-country panel dataset on more than 700 leaders from 111 countries over the period 1930-2004, I investigate whether a resource boom, specifically a positive oil price shock reduces the chances of selecting highly educated leaders. The empirical strategy exploits a difference-in-differences approach. I investigate whether positive oil price shocks have a disproportionate effect on the probability of selecting a national leader with a high level of education in oil-rich countries. The results show that the historical rise in oil prices observed over the period contributed to a reduction ranging between 11.80% and 20.79% in the probability of selecting a national leader with a graduate level of education for the average oil-rich country.

I explored also potential heterogeneities in the sample in order to shed more light on the mechanisms

[45] Cognitive ability or intelligence is "the ability to reason, to solve problems, to understand complex ideas well, to learn quickly and to benefit from one's experiments".

[46] See Figure A_4 in the Appendix that shows the correlation between oil wealth and the cognitive ability of 40 countries including high income countries. I exclude Saudi Arabia from the two figures as it is an outlier with quite large oil wealth.

of the leadership curse. I find that, this effect is particularly pronounced in presidential regimes and in countries under a proportional voting rule. The empirical investigation shows also that the results are driven by developing countries characterized by a high ethnic fragmentation. I propose a theoretical framework to shed light on this latter finding. The model features the interaction between a prospective national leader and a coalition of ethnic chiefs. The coalition offers an electoral support to a candidate in exchange for future favors. Also, in order to guarantee that the new leader respects the deal, the coalition specifies a threat of coups or revolution. A positive oil price shock makes this threat (which is similar to a tax on the reward from office) credible. This situation therefore deter the candidacy of highly educated citizens who prefer to stay in the private sector. The feasibility of patronage in ethnically fragmented environments is therefore likely to induce a leadership quality trap: only low quality candidates have the incentives to run for office. The models also highlight that the period of selection is empirically relevant for the leadership curse.

While there is a growing research on the determinants of political selection and the political aspects of the "resource curse", this paper is the first to the best of my knowledge to show that positive oil price shocks reduce the chances of selecting a competent national leader. However, it is clear that the present paper is only a first pass and much more needs to be done in order to understand the political foundations of the "resource curse". The results suggest that the political foundations of the resource curse may have their root (partly) in the quality of selected leaders. Indeed I find also a similar result for mineral wealth (however less robust). This is particularly relevant because the volatility in resource-rich countries make it difficult for voters to discern between an incumbents competence and luck. In other words, electoral control is well-known to be difficult in resource-rich countries. Moreover, it is also well-known that leaders tend to last in power in resource-rich countries and therefore the quality of political selection is crucial for economic development. In this regard, the literature in its current state focuses only on the effects of natural resources on the incentives of politicians once in office. But if the peoples that are selected for public office are not competent, it is likely that their performance in office would be poor.

Overall, the findings in this paper motivate the importance of having a theoretical framework that includes both the adverse selection and the moral hazard effects. In addition, in future works it would be interesting to disentangle empirically the selection from the incentive effects in a unified framework. Relatedly, with the suitable data, the paper could also be extended in order to exploit oil windfalls in the year of election as an instrument for leader's quality in investigating the latter's effect on economic growth in oil rich countries. This would allow to extend the story to investigate whether short-term windfalls in oil oil rich countries could have long-lasting negative effects through the appointment of low-quality politicians. Also, due to the lack of data, I could not test for instance the effects on the composition of the pool of candidates, or exploit besides the level of education of national leaders, their area of studies. The use of microeconomic level data (focusing on a country for instance) is a promising approach in order to investigate the leadership curse and provide more granular explanations in future works. The paper then suggests a future avenue for research related to how natural resources may influence the type of leader that takes power and thereby affect economic performance.

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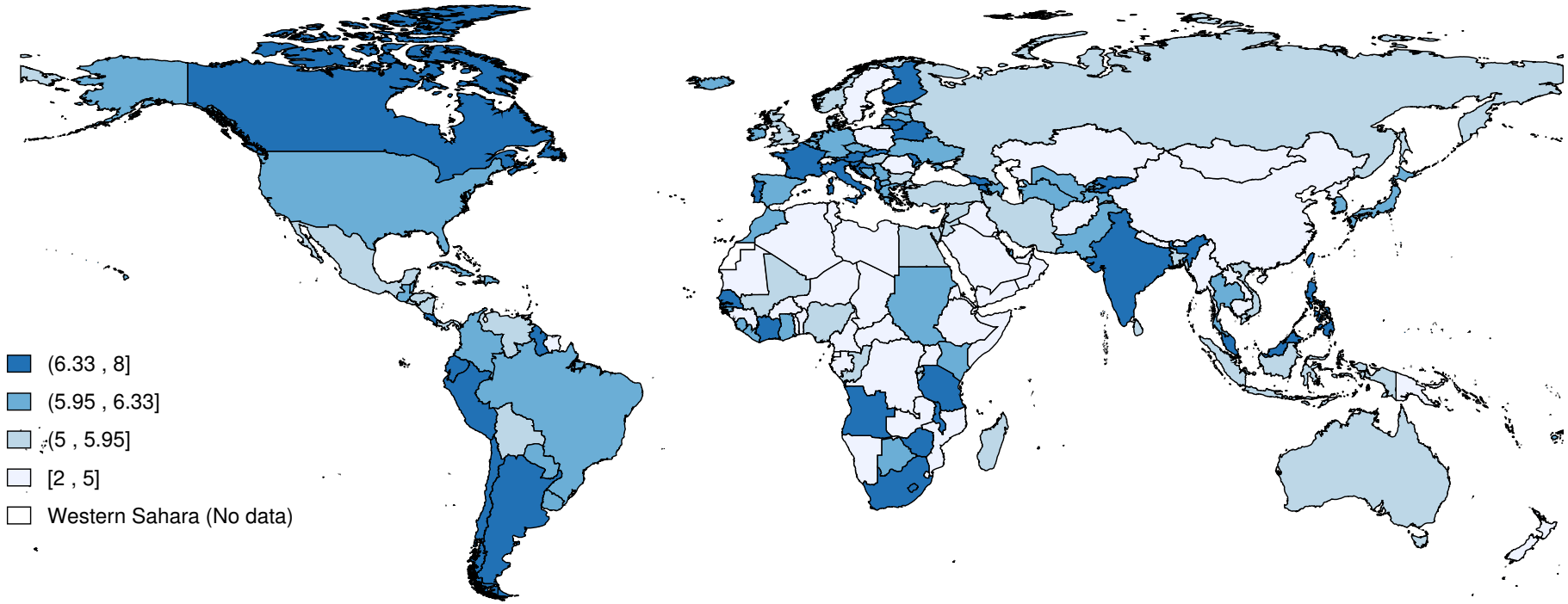
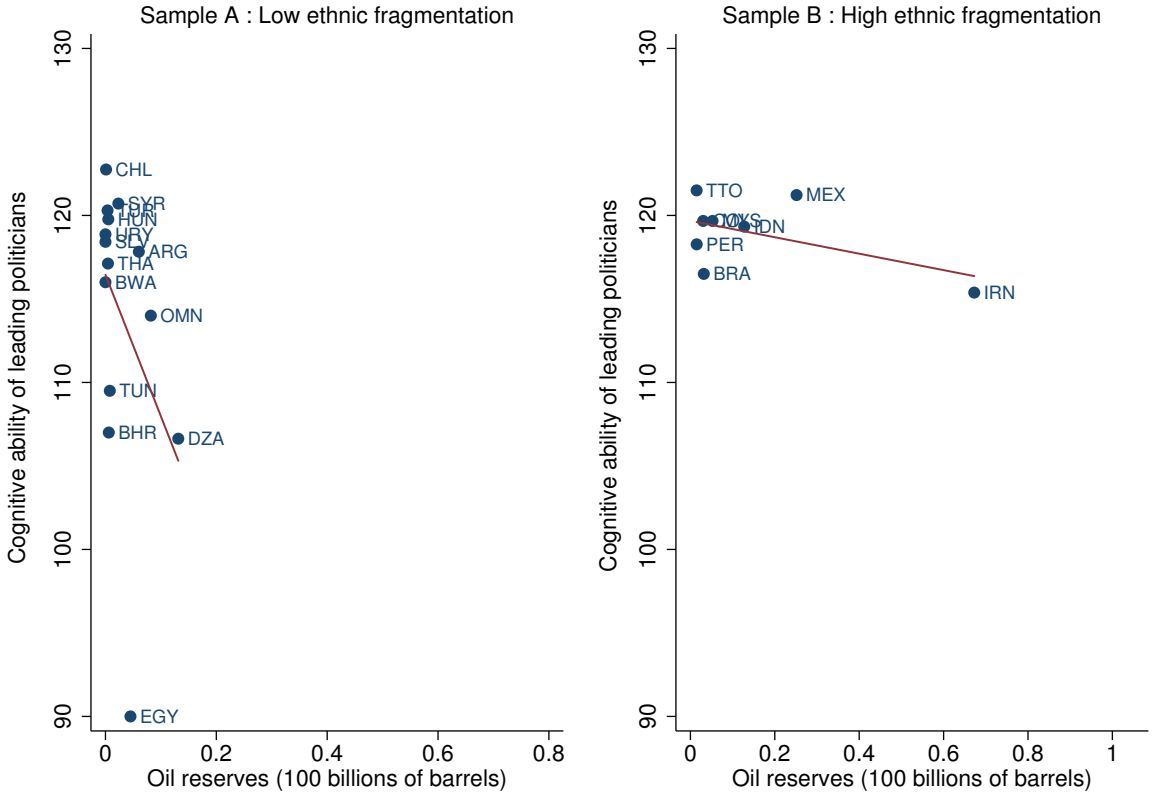
Figures

Figure 1
Average level of education of national leaders over the period 1930-2004



Notes: 2 (literate with no formal education), 3 (primary school or taught by personal tutors), 4 (secondary or trade school), 5 (special training beyond high school), 6 (College), 7 (Master degree), 8 (PhD).
Data source: Besley and Reynal-Querol (2011), author's calculations.

Figure 2
Correlation between the ability of leading politicians and oil wealth in developing countries



Notes: The data on the cognitive ability of leading politicians come from Rindermann et al (2009). They provide IQ estimates of leading politicians defined as those who have the real decisive power (mostly presidents and heads of governments) over the period 1960-2009. This cross-sectional data covers 90 countries that participate in student assessment studies. This figure shows the correlation in developing countries for which I have data on the cognitive ability of politicians and data on oil wealth. Sample A is the subsample of countries characterized by a low level of ethnic fragmentation (an index lower than 0.5). Sample B is the subsample of countries characterized by a high level of ethnic fragmentation (an index higher than 0.5). The correlation between oil wealth and the cognitive ability of leading politicians is -0.391 in Sample A, while it is -0.520 in Sample B.

Tables

Table 1
Oil shocks and the selection of a national leader with a Graduate level of education

Dependent variable: Graduate level of education	(1)	(2)	(3)	(4)	(5)	(6)
Oil reserve × Δln(Oil Price)	-0.343**	-0.427**	-0.411***	-0.464***	-0.410***	-0.499***
	(0.157)	(0.179)	(0.153)	(0.168)	(0.153)	(0.158)
Democracy			0.018***	0.022***	0.019***	0.021***
			(0.004)	(0.005)	(0.004)	(0.005)
GDP per capita (Log)					0.005	-0.285***
					(0.075)	(0.108)
Country specific trends	No	Yes	No	Yes	No	Yes
Observations	713	713	713	713	713	713
Countries	111	111	111	111	111	111

Notes: The effect of oil price shocks (Oil reserve × Δln(Oil Price)) on the probability of selecting a national leader with a graduate level of education. The dependent variable is a dummy taking the value of 1 when a given leader has at least a Master degree (education categories 7 and 8) and 0 otherwise. National leaders are included only the first time that they are selected. Oil reserve is the difference between the cumulative discoveries and cumulative productions expressed in millions of barrels per 100 000 persons. I take the average oil reserve at the country level to capture oil abundance. Δln(Oil Price) is the change in the natural log of real oil prices (in 1990 USD) between the year of selection and the year before. The level of democracy is measured by the Polity2 index. All specifications include year dummies and country fixed effects. Clustered Standard errors at the country level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2
Oil endowment and the selection of educated national leaders

Dependent variable: Graduate level of education	(1)	(2)	(3)	(4)	(5)	(6)
Oil initial endowment × Δln(Oil Price)	-0.278*	-0.310**	-0.323**	-0.356**	-0.323**	-0.381***
	(0.142)	(0.158)	(0.134)	(0.142)	(0.135)	(0.124)
Democracy			0.018***	0.022***	0.019***	0.022***
			(0.004)	(0.005)	(0.004)	(0.005)
GDP per capita (Log)					0.008	-0.286***
					(0.075)	(0.108)
Country specific trends	No	Yes	No	Yes	No	Yes
Observations	713	713	713	713	713	713
Countries	111	111	111	111	111	111

Notes: The effect of oil price shocks (Oil initial endowment × Δln(Oil Price)) on the probability of selecting a national leader with a graduate level of education. The dependent variable is a dummy taking the value of 1 when a given leader has at least a Master degree (education categories 7 and 8) and 0 otherwise. National leaders are included only the first time that they are selected. Initial oil endowment is estimated by geologists based on extensive studies of the exogenous geological characteristics of the countries in hundred of millions of barrels. Initial oil endowment captures oil abundance. Δln(Oil Price) is the change in the natural log of real oil prices (in 1990 USD) between the year of selection and the year before. The level of democracy is measured by the Polity2 index. All specifications include year dummies and country fixed effects. Clustered Standard errors at the country level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3
Nominal oil prices and the selection of a national leader with a Graduate level of education

Dependent variable: Graduate level of education	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Oil reserve $\times \Delta^{+}$ln(Nominal Oil Price)	-0.375**	-0.352***	-0.457***	-0.407***	-0.456***	-0.413***						
	(0.162)	(0.128)	(0.159)	(0.129)	(0.157)	(0.129)						
Oil reserve $\times \Delta^{-}$ln(Nominal Oil Price)	0.389	-0.595	0.450	-0.556	0.449	-0.664						
	(0.877)	(1.105)	(0.814)	(0.932)	(0.812)	(0.899)						
Oil reserve $\times \Delta$ln(Nominal Oil Price)							-0.300*	-0.379**	-0.367**	-0.423**	-0.366**	-0.440***
							(0.154)	(0.181)	(0.147)	(0.168)	(0.147)	(0.162)
Democracy			0.019***	0.022***	0.019***	0.021***			0.018***	0.022***	0.019***	0.021***
			(0.004)	(0.005)	(0.004)	(0.005)			(0.004)	(0.005)	(0.004)	(0.005)
GDP per capita (Log)					0.006	-0.277**					0.007	-0.276**
					(0.075)	(0.108)					(0.075)	(0.108)
Country specific trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	713	713	713	713	713	713	713	713	713	713	713	713
Countries	111	111	111	111	111	111	111	111	111	111	111	111

Notes: The effect of oil price shocks (Oil reserve $\times \Delta$ln(Nominal Oil Price)) on the probability of selecting a national leader with a graduate level of education. The dependent variable is a dummy taking the value of 1 when a given leader has at least a Master degree (education categories 7 and 8) and 0 otherwise. National leaders are included only the first time that they are selected. Oil reserve is the difference between the cumulative discoveries and cumulative productions expressed in millions of barrels per 100 000 persons. I take the average oil reserve at the country level to capture oil abundance. Δln(Nominal Oil Price) is the change in the natural log of nominal oil prices ($ price of the day) between the year of selection and the year before. The level of democracy is measured by the Polity2 index. Δ^{+}ln(Nominal Oil Price) and Δ^{-}ln(Nominal Oil Price) are respectively the positive change and the negative change in the natural log of nominal oil prices. Once interacted with oil reserves, they respectively capture positive and negative oil price shocks. All specifications include year dummies and country fixed effects. Clustered Standard errors at the country level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4
Power struggle and the selection of a national leader of Graduate level of education

Dependent variable:	Military leader						Graduate level (excluding coup leaders)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Oil reserve × Δln(Oil Price)	-0.362***	-0.305**	-0.229**	-0.241**	-0.244**	-0.243**	-0.313**	-0.399**	-0.360**	-0.439***	-0.366**	-0.498***
	(0.137)	(0.149)	(0.112)	(0.123)	(0.110)	(0.118)	(0.140)	(0.163)	(0.148)	(0.149)	(0.145)	(0.156)
Democracy			-0.036***	-0.041***	-0.037***	-0.041***			0.015***	0.022***	0.015***	0.021***
			(0.005)	(0.006)	(0.005)	(0.006)			(0.005)	(0.007)	(0.006)	(0.007)
GDP per capita (Log)					-0.077	-0.018					-0.029	-0.297**
					(0.062)	(0.138)					(0.092)	(0.128)
Country specific trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	706	706	706	706	706	706	620	620	620	620	620	620
Countries	111	111	111	111	111	111	109	109	109	109	109	109

Notes: Notes: The effect of oil price shocks (Oil reserve × Δln(Oil Price)) on the probability of selecting a former military in columns (1)-(6). The dependent variable is a dummy =1 if the selected national leader is a former military professional and 0 otherwise. In columns (7)-(12), baselines estimates in Table 1 are shown for a subsample excluding all coup leadres. The dependent variable in columns (7)-(12) is a dummy taking the value of 1 when a given leader has at least a Master degree (education categories 7 and 8) and 0 otherwise. National leaders are included only the first time that they are selected. Oil reserve is the difference between the cumulative discoveries and cumulative productions expressed in millions of barrels per 100 000 persons. I take the average oil reserve at the country level to capture oil abundance. Δln(Oil Price) is the change in the natural log of real oil prices (in 1990 USD) between the year of selection and the year before. The level of democracy is measured by the Polity2 index. All specifications include year dummies and country fixed effects. Clustered Standard errors at the country level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5
Country education, leaders' profession and the selection of a national leader

Dependent variable: Graduate level of education	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Oil reserve × Δln(Oil Price)	-0.407**	-0.390***	-0.406**	-0.387***	-0.408**	-0.421***	-0.408***	-0.469***	-0.492***	-0.571***	-0.421***	-0.499***
	(0.165)	(0.150)	(0.167)	(0.150)	(0.169)	(0.137)	(0.151)	(0.157)	(0.152)	(0.164)	(0.152)	(0.158)
Average year of education(over 25)	0.028	0.046	0.017	0.005	0.012	0.007						
	(0.038)	(0.090)	(0.037)	(0.096)	(0.038)	(0.094)						
Democracy			0.021***	0.021***	0.021***	0.021***	0.016***	0.019***	0.007**	0.009**	0.018***	0.022***
			(0.005)	(0.007)	(0.006)	(0.006)	(0.004)	(0.005)	(0.003)	(0.004)	(0.004)	(0.005)
GDP per capita (Log)					0.034	-0.270	-0.005	-0.288***	-0.041	-0.287***	-0.018	-0.280**
					(0.089)	(0.168)	(0.078)	(0.100)	(0.073)	(0.101)	(0.076)	(0.110)
Lawyers							0.147**	0.181***				
							(0.058)	(0.063)				
military									-0.305***	-0.302***		
									(0.047)	(0.048)		
Professors and Scientists											0.029	0.018
											(0.053)	(0.064)
Country specific trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	497	497	497	497	497	497	706	706	706	706	706	706
Countries	92	92	92	92	92	92	111	111	111	111	111	111

Notes: The effect of oil price shocks (Oil reserve × Δln(Oil Price)) on the probability of selecting a national leader with a graduate level of education. The dependent variable is a dummy taking the value of 1 when a given leader has at least a Master degree (education categories 7 and 8) and 0 otherwise. National leaders are included only the first time that they are selected. Oil reserve is the difference between the cumulative discoveries and cumulative productions expressed in millions of barrels per 100 000 persons. I take the average oil reserve at the country level to capture oil abundance. Δln(Oil Price) is the change in the natural log of real oil prices (in 1990 USD) between the year of selection and the year before. Average year of education (over 25) is the average year of education of the population over 25 years old. All specifications include year dummies and country fixed effects. The level of democracy is measured by the Polity2 index. All specifications include year dummies and country fixed effects. Columns (1)-(6) control for the level of education in the country. Columns (7)-(12) control for professional background of leaders. Clustered Standard errors at the country level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6
Constitution, electoral rule and the leadership curse

Dependent variable: Graduate level of education	Pdent		Parl		Prop	
	(1)	(2)	(3)	(4)	(5)	(6)
Oil reserve × Δln(Oil Price)	-0.440*	-0.964**	-0.706	-1.954	-0.916*	-1.417***
	(0.266)	(0.407)	(2.226)	(2.772)	(0.519)	(0.489)
Democracy	0.027***	0.038***	0.020*	0.030**	0.024*	0.062**
	(0.008)	(0.010)	(0.012)	(0.015)	(0.013)	(0.026)
GDP per capita (Log)	0.119	-0.203	-0.024	-0.364	0.009	2.122***
	(0.132)	(0.385)	(0.173)	(0.428)	(0.240)	(0.797)
Country specific trends	No	Yes	No	Yes	No	Yes
Observations	210	210	204	204	166	166
Countries	71	71	24	24	49	49

Notes: The effect of oil price shocks (Oil reserve × Δln(Oil Price)) on the probability of selecting a national leader with a graduate level of education. Columns (1)-(2), (3)-(4) and (5)-(6) show respectively estimates for the subsample of countries under a presidential regime, a parliamentary regime and a proportional voting rule. Pdent = Presidential, Parl=Parliamentary and Prop=Proportional voting rule. All specifications include year dummies and country fixed effects. The dependent variable is a dummy taking the value of 1 when a given leader has at least a Master degree (education categories 7 and 8) and 0 otherwise. National leaders are included only the first time that they are selected. Oil reserve is the difference between the cumulative discoveries and cumulative productions expressed in millions of barrels per 100 000 persons. I take the average oil reserve at the country level to capture oil abundance. Δln(Oil Price) is the change in the natural log of real oil prices (in 1990 USD) between the year of selection and the year before. The level of democracy is measured by the Polity2 index. All specifications include year dummies and country fixed effects. Clustered Standard errors at the country level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8
Developing countries versus High income countries

Dependent variable: Graduate level of education	Developing countries						High income countries					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Oil reserve × Δln(Oil Price)	-0.259*	-0.333**	-0.321**	-0.350**	-0.307**	-0.390***	-1.887	-0.412	-1.791	-0.228	-1.644	-0.194
	(0.137)	(0.156)	(0.133)	(0.145)	(0.138)	(0.132)	(1.561)	(1.889)	(1.629)	(2.071)	(1.562)	(2.179)
Democracy			0.020***	0.021***	0.021***	0.021***			0.007	0.030*	0.008	0.030*
			(0.005)	(0.005)	(0.004)	(0.005)			(0.011)	(0.018)	(0.010)	(0.017)
GDP per capita (Log)					0.136**	-0.365***					-0.075	0.085
					(0.062)	(0.116)					(0.150)	(0.457)
Country specific trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	545	545	545	545	545	545	168	168	168	168	168	168
Countries	92	92	92	92	92	92	19	19	19	19	19	19

Notes: The effect of oil price shocks (Oil reserve × Δln(Oil Price)) on the probability of selecting a national leader with a graduate level of education. The dependent variable is a dummy taking the value of 1 when a given leader has at least a Master degree (education categories 7 and 8) and 0 otherwise. National leaders are included only the first time that they are selected. Oil reserve is the difference between the cumulative discoveries and cumulative productions expressed in millions of barrels per 100 000 persons. I take the average oil reserve at the country level to capture oil abundance. Δln(Oil Price) is the change in the natural log of real oil prices (in 1990 USD) between the year of selection and the year before. The level of democracy is measured by the Polity2 index. Countries are considered as developing countries if they have a Gross National Income (GNI) per capita less than 12,736 USD in the year 2004 or in the year 2000s if the data in 2004 were not available. This classification follows the World bank classification of high income countries as countries with a GNI per capita at least of 12,736 USD. All specifications include year dummies and country fixed effects. Clustered Standard errors at the country level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9
Developing countries : High ethnic fragmentation versus low ethnic fragmentation

Dependent variable: Graduate level of education	High ethnic fragmentation						Low ethnic fragmentation					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Oil reserve × Δln(Oil Price)	-0.609***	-0.695***	-0.743***	-0.754***	-0.720***	-0.741***	0.266	0.263	0.422**	0.590	0.441**	0.156
	(0.183)	(0.212)	(0.152)	(0.198)	(0.155)	(0.186)	(0.209)	(0.407)	(0.207)	(0.368)	(0.216)	(0.392)
Democracy			0.024***	0.022***	0.025***	0.022***			0.017**	0.029***	0.017**	0.027***
			(0.005)	(0.005)	(0.005)	(0.006)			(0.008)	(0.009)	(0.008)	(0.009)
GDP per capita (Log)					0.098	-0.179					0.027	-0.402*
					(0.084)	(0.163)					(0.122)	(0.233)
Country specific trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	283	283	283	283	283	283	262	262	262	262	262	262
Countries	57	57	57	57	57	57	35	35	35	35	35	35

Notes: The effect of oil price shocks (Oil reserve × Δln(Oil Price)) on the probability of selecting a national leader with a graduate level of education. The dependent variable is a dummy taking the value of 1 when a given leader has at least a Master degree (education categories 7 and 8) and 0 otherwise. National leaders are included only the first time that they are selected. Oil reserve is the difference between the cumulative discoveries and cumulative productions expressed in millions of barrels per 100 000 persons. I take the average oil reserve at the country level to capture oil abundance. Δln(Oil Price) is the change in the natural log of real oil prices (in 1990 USD) between the year of selection and the year before. The level of democracy is measured by the Polity2 index. A country is considered to be characterized by a high ethnic fragmentation if the index of ethnic fragmentation is at least of 0.5 and considered as characterized by a low ethnic fragmentation otherwise (the data are taken from Reynal-Querol and Montalvo, 2005). All specifications include year dummies and country fixed effects. Clustered Standard errors at the country level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7
Autocracies and the leadership curse

Dependent variable: Graduate level of education	(1)	(2)	(3)	(4)
Oil reserve × Δln(Oil Price)	-0.446**	-0.486***	-0.446**	-0.489***
	(0.198)	(0.176)	(0.199)	(0.171)
Oil reserve × Δln(Oil Price) × Autocracy	-0.151	-0.252	-0.155	-0.424
	(0.462)	(0.516)	(0.459)	(0.381)
Autocracy	-0.324***	-0.269***	-0.324***	-0.261***
	(0.067)	(0.071)	(0.067)	(0.069)
Oil reserve × Autocracy	-0.034	-0.242	-0.028	-0.290
	(0.220)	(0.335)	(0.217)	(0.327)
Δln(Oil Price) × Autocracy	0.048	0.009	0.049	-0.006
	(0.183)	(0.201)	(0.182)	(0.194)
GDP per capita (Log)			-0.019	-0.471***
			(0.070)	(0.142)
Country specific trends	No	Yes	No	Yes
Observations	582	582	582	582
Countries	110	110	110	110

Notes: The effect of oil price shocks (Oil reserve × Δln(Oil Price)) on the probability of selecting a national leader with a graduate level of education. The dependent variable is a dummy taking the value of 1 when a given leader has at least a Master degree (education categories 7 and 8) and 0 otherwise. National leaders are included only the first time that they are selected. Oil reserve is the difference between the cumulative discoveries and cumulative productions expressed in millions of barrels per 100 000 persons. I take the average oil reserve at the country level to capture oil abundance. Δln(Oil Price) is the change in the natural log of real oil prices (in 1990 USD) between the year of selection and the year before. Autocracy is a dummy variable taking a value of 1 if in a given year a country is classified as such according to Magaloni et al (2013) and 0 otherwise. All specifications include year dummies and country fixed effects. Clustered Standard errors at the country level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10
Leadership curse - Mineral wealth

Dependent variable: Graduate level of education	(1)	(2)	(3)	(4)	(5)	(6)
Mineral rents (% GDP) × Δln(Mineral Price Index)	-0.048	-0.847***	-0.151	-0.817***	-0.212	-0.784***
	(0.434)	(0.304)	(0.411)	(0.286)	(0.391)	(0.288)
Δln(Mineral Price Index)	-0.862	2.430	0.628	3.369*	0.827	3.347*
	(2.342)	(2.156)	(2.430)	(1.995)	(2.316)	(1.994)
Democracy			0.023***	0.024***	0.023***	0.024***
			(0.005)	(0.006)	(0.005)	(0.006)
GDP per capita (Log)					0.077	-0.300*
					(0.083)	(0.175)
Country specific trends	No	Yes	No	Yes	No	Yes
Observations	512	512	512	512	512	512
Countries	110	110	110	110	110	110

Notes: The effect of mineral price shocks (Mineral rents (% GDP) × Δln(Mineral Price Index)) on the probability of selecting a national leader with a graduate level of education. The dependent variable is a dummy taking the value of 1 when a given leader has at least a Master degree (education categories 7 and 8) and 0 otherwise. National leaders are included only the first time that they are selected. Mineral rents (% GDP) is the share of mineral rents as percentage of GDP. I take the average mineral rent at the country level to capture mineral resource abundance. Δln(Mineral Price Index) is the change in the natural log of the weighted average of real mineral prices between the year of selection and the year before (as described in 2). Minerals included are: bauxite, copper, gold, iron, lead, nickel, phosphate, silver, tin and zinc. Clustered Standard errors at the country level in parentheses. This index is country-specific. The level of democracy is measured by the Polity2 index. Note also that the data on mineral rent are available starting in 1960, reducing the sample size. I lose also one country for which there were not available data on mineral rents (Somalia). All specifications include year dummies and country fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 11
Leadership curse - A horse race between Mineral and Oil wealths

Dependent variable: Graduate level of education	(1)	(2)	(3)	(4)	(5)	(6)
Oil reserve $\times$ Δln(Oil Price)	-0.471***	-0.412***	-0.490***	-0.416***	-0.487***	-0.471***
	(0.159)	(0.132)	(0.162)	(0.128)	(0.167)	(0.125)
Mineral rents (% GDP) $\times$ Δln(Mineral Price Index)	-0.040	-0.846***	-0.143	-0.816***	-0.203	-0.778***
	(0.440)	(0.304)	(0.417)	(0.287)	(0.398)	(0.290)
Δln(Mineral Price Index)	-0.952	2.328	0.543	3.267*	0.738	3.229
	(2.344)	(2.144)	(2.433)	(1.980)	(2.318)	(1.979)
Democracy			0.023***	0.024***	0.023***	0.024***
			(0.005)	(0.006)	(0.005)	(0.006)
GDP per capita (Log)					0.075	-0.341*
					(0.084)	(0.176)
Country specific trends	No	Yes	No	Yes	No	Yes
Observations	512	512	512	512	512	512
Countries	110	110	110	110	110	110

Notes: The effect of of oil price shocks (Oil reserve $\times$ Δln(Oil Price)) and mineral price shocks (Mineral rents (% GDP) $\times$ Δln(Mineral Price Index)) on the probability of selecting a national leader with a graduate level of education. The dependent variable is a dummy taking the value of 1 when a given leader has at least a Master degree (education categories 7 and 8) and 0 otherwise. National leaders are included only the first time that they are selected. Oil reserve is the difference between the cumulative discoveries and cumulative productions expressed in millions of barrels per 100 000 persons. I take the average oil reserve at the country level to capture oil abundance. Δln(Oil Price) is the change in the natural log of real oil prices (in 1990 USD) between the year of selection and the year before. Mineral rents (% GDP) is the share of mineral rents as percentage of GDP. I take the average mineral rent at the country level to capture mineral resource abundance. Δln(Mineral Price Index) is the change in the natural log of the weighted average of real mineral prices between the year of selection and the year before (as described in 2). Minerals included are: bauxite, copper, gold, iron, lead, nickel, phosphate, silver, tin and zinc. Clustered Standard errors at the country level in parentheses. This index is country-specific. The level of democracy is measured by the Polity2 index. Note also that the data on mineral rent are available starting in 1960, reducing the sample size. I lose also one country for which there were not available data on mineral rents (Somalia). All specifications include year dummies and country fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.