LUND UNIVERSITY
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Oil and democracy

An interactive approach

Second year master thesis

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Abstract

This study investigates what effect oil has on democracy and if this effect changes when we interact oil with different regions and three different causal mechanisms. To examine this, we use a panel data model covering 156 countries between years of 1970-2014, and two different estimation techniques.

The main findings of this thesis is that there is some evidence for that oil has a negative effect on democracy in the long-run but that the results for when we interact oil with regions and the three causal effects is ambiguous at best.

Keywords: Democracy, Oil, Rentier effect, Repression effect, Modernization effect

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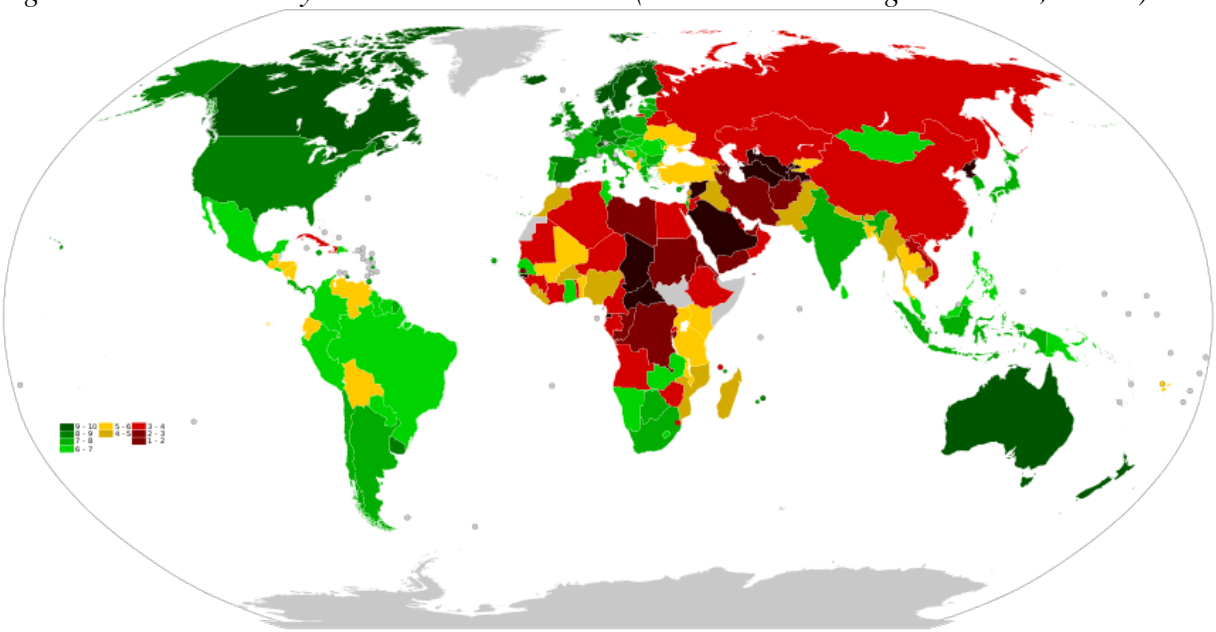
1. Introduction

"All in all, I wish we had discovered water" - Sheik Ahmed Yamani, Saudi Minister of Petroleum and Mineral Resources (1970)

Today we can confidently say that a majority of the countries that enjoy the highest standard of living and the best preconditions for further development are democratic. Despite this, according to the Economist intelligence unit (2015) only 79 out of 167 of the worlds countries live in a full or flawed democracy and people all around the world still fight and sometimes even die for the dream of democracy. From an outside perspective this should seem like complete madness, why would people have to die for democracy if it's highly likely to have major benefits for a country? This should make it obvious that we have to investigate the reasons to why and under what circumstances democracy has failed in certain countries and regions.

Figure 2: Democracy around the world (Economist intelligence unit, 2015)



Note: Greener colors indicate more democratic countries and redder indicate less democratic.

Naturally, a lack of democracy can in some cases be explained quite easily by more or less obvious factors such as unstable institutions, ethnic conflict, military rule etc. However, if we truly want to understand the real reasons behind why democracies fail in certain cases it's not enough to only look at the obvious reasons, we also have to look at the less obvious ones. One of these less obvious reasons, which can help us get a fuller picture, is to investigate the role which natural resources play. This is especially important to look at as several researchers have shown that there seems to be a positive correlation between income, which natural resources can raise both through export and through being an underlying factor for growth (cobalt in cellphones for example), and democracy (Lipset, 1993; Burkhart & Lewis-Beck, 1994). Hence, a country which has a lot of natural resources should welcome the abundance both for the increase in income as well as the increase in democracy.

However, as is common for mankind, when there are large gains to be made from something, conflict usually ensues. This has meant that in many of the countries which have been blessed with an abundance of natural resources, one can be led to believe that this "blessing" has led to an increased probability of ethnic conflict, unstable institutions, military rule etc. all which we stated were strong factors for why democracy fails. Furthermore, there are no guarantees for that the wealth which comes from natural resources will be evenly divided thus making it possible that they instead promote inequality. This shows that there's a possibility of that natural resources works in antidemocratic ways. Nonetheless, it's also important to point out that just because there's a possibility of that natural resources has antidemocratic effects this does not imply causality which is proven by that several countries has managed to rely heavily on natural resources and still have managed to maintain democracy.

Out of all the different natural resources that exist there's however one that is of particular interest to investigate due to the huge role it plays both for economic and political reasons. This natural resource is oil. Oil is important to investigate not only because of the big impact it has had until today but also since some estimates predict that there's 1.3 trillion barrels of oil still left in the ground (International Business Times,

2014), thus implying that oil is likely play a vital role in the future. Consequently, it's important for policy reasons to investigate if and through which causal mechanisms oil can explain some of the problems with democracy today. This will hopefully have policy implications as it can give indications of what will happen if a country for example becomes an oil exporter or increases its dependence on oil revenues. Based on this, this study aims to answer the following questions:

1) What role does oil play for democracy?
2) How does the role of oil on democracy change when we interact it with colonial past, different regions and with possible causal mechanisms?

This thesis main contribution is that it expands our knowledge on a subject which hasn´t been very well researched and where there doesn't exist any clear consensus. Furthermore, this thesis also looks at wider time frame than most other studies and also uses interactive terms, which is something that hasn't been tested before.

2. Theoretical framework

In this section we start by looking at what the concept of democracy actually means to get a better understanding of this complex subject. Furthermore, we look at the theory behind the resource curse. Lastly, we end with the theory on three different causal mechanisms through which oil can restrain democracy.

2.1 Democracy

Even though the concept of democracy has been around for a long time, it's still a widely contested concept, and its exact definitions and how to best measure it is a commonly discussed subject. The main reason for this uncertainty is that the people's perception of democracy isn't homogenous and that each person is likely to have their own definition of what democracy means to them. Despite this we can still assign some key aspects to what democracy is. One possible definition comes from Baylis et al (2015) which views it as mainly political concept as they write that democracy is: "A system of government in which news and interests of the population are represented and promoted through the mechanism of free and fair elections to the political institutions of government." Democracy can however also be expanded to include more individual rights as well and can for example be written as: "A form of government in which people choose leaders by voting or as organization, and a situation in which everyone is treated equally and has equal rights (Merriam-Webster, 2016)." Diamond (2004) views democracy as something which need to be viewed in even more dimensions which according to him are: 1) A political system for choosing and replacing the government through free and fair elections 2) The active participation of the people, as citizens, in politics and civic life 3) Protection of the human rights of all citizens 4) A rule of law, in which the laws and procedures apply equally to all citizens.

As we can see the main difficulty in defining democracy seems to be whether to divide democracy into simply a political concept or whether it should also include individual rights as well. This is important to recognize for further discussions.

2.2 Resource curse

During the last couple of decades different researchers have questioned the view that natural resources, where oil is one them, is inherently something good for a country's growth. Instead there have been different scholars which have argued that there exists a resource curse, meaning that natural resources can increase the probability of economic and political instability.

One of the most well known explanations for the possibility of a resource curse is the *Dutch disease effect*. This theory argues that the revenues which comes from a large export of natural resources leads to a higher spending on non-tradeables, speculative capital inflows and higher inflation due to higher domestic spending (Sachs & Warner, 1995). As a consequence this leads to an appreciation of the real exchange rate which in turn undermines the competitiveness of the manufacturing sector. Furthermore, this also leads to an ill-diversified economy which is highly exposed to macroeconomic volatility.[1] In the long run this is theorized to change the composition of the economy to one where productivity remains low.

Somewhat similar to the theory above is the theory of crowding out. This theory implies that since the resource rich countries can sustain the economy on the extraction of oil, this crowds out other productive activities. This can also be explained as that it leads to increased rent seeking, meaning that individuals and businesses instead of aiming their attention at coming up with new and innovative products, use time and energy to try and capture the economic rents (Kronenberg, 2004). Furthermore, the government can sometimes cause an augmentation of these rents by price distortions and physical controls. This can be caused by excessive government intervention such as licenses, quotas etc. (Todaro, 2011). When it comes to oil this is especially important to consider as a government is likely to for example try and distribute a new oil finding to different actors, meaning that the incentives are high for the actors to try and seize as much rent as possible through bribes and lobbying. This can be especially harmful for the

[1] An interesting current example of this is SaudiArabia which budget depend hugely on oil and which now face a large deficit as the oil price has gone down.

manufacturing sector as if there are large economic rents to capture from oil there's no real incentive to invest in more productive sectors. Lastly, it can also lead to that other important structural investments such as investments in education might be delayed or avoided. Hence the resource rich country becomes dependent on the extraction both in the long- and short term which can be compared to a resource poor country which have to invest in more productive sectors (Auty, 1997).

The final way through which there can exist a resource curse is through corruption. Even though what corruption is and how it should be measured is (just as democracy) a complex and widely discussed matter (Shaxson, 2007) there are still several ways through which it can affect the democracy. One of these ways is through that when oil is the dominant factor of the economy this leads to a "point sourced economy" where the concentration of revenues makes it easy to appropriate it (Mavrotas et. al, 2011). This is likely to lead to an increased economic inequality as some citizens usually can make huge profits from the appropriation. The economic inequality is similar to what Robinson & Torvik (2011) argues is one of the negative effects of corruption, in that it encourages an inefficient distribution of resources and that it leads to increased rents through that resources are allocated into unproductive activities. Mehlum et. al (2006) additionally argue that this can lead to a weak rule of law which in turn can stimulate violence, rebel groups etc. all of which can be assumed to be negative for democracy.

2.3 Three causal mechanisms

Regardless of whether there exists a resource curse or not it's important to understand what the causal mechanisms between oil and authoritarian rule can be. Ross (2001) was among the first who introduced this concept through highlighting and empirically testing these three possible mechanisms. The theories are complementary but as they are important to distinguish between and will be tested in this thesis we will go through the theory behind them.

The first causal mechanism is the *Rentier Effect*. This mechanism basically says that a government can relieve social pressure for reform and greater accountability, by using the oil revenues to "buy off" its citizens. According to Beblawi and Luciani (1990) there are four characteristics of a *rentier state*, which are:
1) Rent situations predominate 2) The economy relies on a substantial external rent – and therefore does not require a strong domestic productive sector 3) Only a small proportion of the working population is actually involved in the generation of the rent. 4) The state's government is the principal recipient of the external rent. Ross (2001) argues that this effect can work in three different ways, either through 1) the taxation effect, meaning that governments can use oil revenues to lower taxes to the point where the public will not demand accountability. 2) The spending effect, where oil wealth lead to greater spending on patronage, meaning that the government can use the money to reduce dissent and 3) The group formation effect, where oil revenues allows the government to prevent the forming of groups which can demand political rights.

The second mechanism is the theory of the *Repression Effect* which as explained by Ross (2001) is quite straightforward in that a higher oil wealth leads to that the government can spend more on internal security and thus use those forces to block peoples demand for more democracy. There are two main reasons to why this might be the case where the first one is pure self interest, meaning that if an authoritarian government has a choice whether to arm itself or not it will always choose to arm itself. The second reason has less to do with self-interest and more to do with large findings in oil or other natural resources can stir up a lot of ethnic or regional conflict. Hence, a government might need a large military force to stop the possibility of conflict.

The third and final causal mechanism is the *Modernization* effect. Even though the theory isn't directly linked to resource wealth it argues that democracy is caused by social and cultural changes which in turn are caused by economic development (Lipset, 1993). Ingelhart and Welzel (2009) argue that this holds true, as democracies aren't formed out of a desire to form a government per se but rather from a mixture of social and cultural factors. They also argue that the ideal social and cultural circumstances for democracy

come from significant modernization and economic development. This economic development can doubtlessly come from oil but just as Inglehart (1997) notes: "Is the linkage between development and democracy due to wealth per se? Apparently not: if democracy automatically resulted from simply becoming wealthy, then Kuwait and Libya would be model democracies" this claim is disputed. As it could be that relationship goes both ways, meaning that modernization very well could come as a consequence of democratization it's important that we don't restrict ourselves to only looking for wealth related signs of the *Modernization effect*. We also have to widen our perspective and test for other factors which are important for social and cultural development.

3. Literature review

Here we aim to give the reader a better overview of the relatively little previous work which exists on oil and democracy. To give the reader a better overview of the presented literature we provide a summary in the end of this section.

The paper from which this thesis draws the most inspiration from and one of the first studies which looked into the relationship between oil in particular and democracy is a study by Ross (2001). This study examines the effect of oil and other natural resources both in the Middle east (which is generally considered to be the area where oil has had the most harmful effect on democracy) and in other regions. The paper uses a FGLS approach on a panel data set for 113 different countries between the years 1971-1997. Furthermore, the author uses variables as proxies for the *rentier effect*, *repression effect* and the *modernization effect*, The main findings from this approach is that oil seems to harm democracy and that this effect is greater in poor countries rather than rich ones. Furthermore, the harmful influence of oil also isn't restricted to the Middle Eastern region. Lastly, the author sees clear evidence of a *rentier effect* and some evidence for the *repression* and *modernization effect*.

Ross (2008) works as a follow-up to Ross (2001). In this paper the question of oil and democracy is extended by using more countries and a longer time frame (1960 to 2002 and 170 countries). Furthermore, the author use a pooled logit regression and adds some more variables such as public opinion and the survival of government leaders. From this the author is able to draw several conclusions among which the most noteworthy are that 1) oil has no overall affect on the survival of democracies, but that it might encourage break-down in low-income states 2) there seems to be little evidence for the tentative support for the three causal links which Ross (2001) suggested.

A similar paper to Ross (2001) is Aslaksen (2010) which looks at 156 countries between 1972 and 2002 through a pooled OLS regression framework. From this approach the authors find that levels of oil systematically predict both levels and changes in

democracy. This result holds even when both country fixed effects and alternative measures of democracy and oil abundance are used. The author additionally argues for that, since there's a high persistence of democracy and oil, the papers which doesn't find any effect oil suffers from weak instrument problem and are not informative.

Another paper which also looks into the matter of natural resources and democracy is a study by Haber and Mendaldo (2011). As they argue that most studies use a relatively short time span and that cross-country models assume random effects they instead use a different method to investigate the question. The method which they chose is a historical dataset for 168 countries between the years 1800 to 2006 where they employ a difference-in-difference method to be able to observe countries before and after they become resource-reliant. They also test whether there is a long-run relationship between resource reliance and regime type within countries over time on both country-by-country basis and across different panels. From this the authors are able to draw the conclusion that oil and mineral reliance not necessarily discourages democracy and that there is evidence for the opposite. The authors however doesn't neglect that there can be instances where an abundance of natural resources has negative effects on democracy, but these findings are hard to generalize.

Collier and Hoeffler (2008) have written a paper which looks at whether the effect of democracy on economic performance is distinctive in resource-rich societies. This is examined through that the authors build a new panel dataset on country-specific resource rents annually for the period of 1970-2001. Interestingly they find that the combination of high natural resource rents and open democratic systems has been growth reducing in developing countries. The authors therefore argue for that countries with abundant natural resources and open democratic systems have special need of strong checks and balances.

A paper which uses a bit different approach is a paper by Tsui (2006). This paper uses a unique dataset which can explore variations in the timing and size of oil discoveries to see what impact oil wealth has on democracy. From this, the authors find that discovering oil significantly decreases a country's 30 year change in democracy. Furthermore, the

authors estimate that discovering 100 billion barrels pushes a country's democracy level 30 percentage points below trend which is a result that holds even when the Middle East is excluded.

In a study by Oskarsson and Ottosen (2010) they try to reexamine other authors previous findings. Through a similar approach as previous authors but where they instead use time-series cross-sectional data from 132 countries between 1977-2006 and two different measurements for democracy (Polity index and Freedom house) the authors comes to the conclusion that the relationship between oil and democracy is at best half-full. They do find some evidence in support of the resource curse when democracy is restricted to political rights but the effects of the resource dependence weren't stable when they look at more specific time periods. As a final note, the authors also strongly argue for that it's still to early to be certain of the relationship between oil and democracy.

Wright (2011) expands the question of oil and democracy to include aid as well. This is examined through looking at government spending which can work as an avenue through which aid and oil can influence democratization. The author uses 200 regimes in 105 countries from 1961-2008 and measures democratization as a binary variable, which marks a change in the group of ruling elite, denoted as alteration in power. From this the author finds that oil revenues increase government spending during times of crisis, thus helping autocratic regimes stay in power. When it comes to aid dependency it instead increases spending cuts hence it offsets the potential democratic effects which can come as a result of the crisis.

There are very few papers which looks more into the effect of oil in specific countries. One of these papers is written by Treisman (2010) which, as it is often considered to be a prime example of the *resource curse*, looks into Russia. Through looking at several different possible causal mechanisms such as fiscal bargains, repression and modernization the author shows that there's little evidence for that the fear of that as long as the oil price is high (which it was at the time) would lead to a lack of democracy for a long time ahead. Additionally, the author argue that since Russia has highly educated

people, an urbanized population and an industrialized economy it's unlikely to fall into resource dependence.

As one we can see there are a couple of different ways in which one can choose to investigate the effect of oil on democracy. The method chosen for this thesis and how it for example includes interactive variables can be found in the next section.

Table 1: Summary of presented literature

Study	Purpose	Data and Method	Main Conclusion/Findings
Ross (2001)	1) Does oil affect democracy? 2) Does the effect work through three causal mechanisms?	Pooled panel data for 113 countries, 1971-1997	Oil is bad for democracy and particularly in poor countries. Clear evidence of a rentier effect and some evidence for a repression and modernization effect.
Ross (2008)	Does the result of Ross (2001) hold up?	Pooled logit regression for 170 countries, 1960-2002	Oil has no effect on survival of democracy, might encourage break-down in low-income countries. Little support for the three causal links argued by Ross (2001)
Aslaksen (2010)	Does oil affect democracy?	Pooled OLS regression for 156 countries between 1972-2002	Levels of oil systematically predict both levels and changes in democracy
Haber & Mendaldo (2011)	Does natural resources affect democracy?	Diff-in-diff for when countries became resource reliant. 168 countries between 1800-2006	No direct negative effect of natural resources on democracy
Collier & Hoeffler (2008)	Is the effect of democracy on economic performance distinctive in resource-rich societies?	Panel dataset for 1970-2001	Combination of abundant natural resource rents and open democratic systems has growth reducing effects
Tsui (2006)	Does the size and timing of oil discoveries have any impact on democracy?	Pooled dataset which explores variations in timing and size	Oil significantly decreases countries 30 year change in democracy
Oskarsson & Ottosen (2010)	Does oil affect democracy?	Pooled time-series cross-section dataset for 132 countries 1972-2006	Some evidence for resource curse when democracy is restricted to political rights but effects aren't stable for specific time periods
Wright (2011)	Does oil and aid affect democracy differently?	Binary time series, cross-section probit model 200 regimes in 105 countries between 1961-2008	Oil revenues increases government spending during times of crisis. Aid dependency increases spending cuts hence it offsets the potential democratic effects
Treisman (2010)	What are the effects of oil in Russia?	Different data from Russia	Little evidence of that high oil price would imply lack of democracy

4. Data and Method

In this section we begin by presenting how the data is collected and how we produce our variables. We then present how we analyze our results statistically.

4.1 Data Collection

The empirical analysis of this thesis is based on a panel data set which mainly comes from two main sources, the World Bank and the Polity IV project. Other than those sources some other variables, such as the percentage of the population which is Muslim and the dummy for OECD, comes from sources such as the CIA Factbook and the OECD.

When it comes to both the time frame and the number of countries we have chosen to work with as many as possible, meaning that we explore data between the years of 1970-2014 for 156 countries. It could've been interesting to include even more countries but as our dependent variable, *Democracy*, only provides information about countries with a population larger than 500 000, countries below that number were excluded. For some countries and for some variables there are missing observations but we still believe that we have a sufficient number of observations to be able to draw inference.[2]

4.2 Variable construction

4.2.1 Dependent variable

The dependent variable in this case is called *Democracy* and comes from the Polity Index. There are other indexes, such as the Freedom House index, which could've been used instead but the Polity Index was preferred as it covers a wide range of democratic aspects for many different countries and is commonly used in previous research, The Polity Index has changed over the years but the latest version is called Polity IV (which

[2] To see which countries that were used and how the variables are defined exactly can be seen in appendix 8.1 and 8.2

also has converted all old measurement in to the latest one) and gives coded annual information on the democracy level for all independent states with greater than 500,000 total population. The index gives each country a score which range from -10 to +10 based on three different aspects: Presence of institutions, institutionalized constraints and guarantee of civil liberties. The score can then be categorized into three different categories. A country is counted as an autocracy if the value if it has a score between -10 and -6 and it's counted as anocracy if it has a score between -5 to 5.[3] Consequently, if a country want to be counted as a democracy it has to have a value between 6 to 10.

4.2.2 Oil Variable

As we could see from the literature review there are a couple of ways in which different authors have tried to measure and examine the effects of oil. In this paper we will however use the World Bank measurement which they call Oil rents. Oil rents can be defined as the difference between the value of the crude oil production at world prices and the total costs of production. This is then measured as percentage of GDP, which means that we can interpret the measure as that it measures how big a part the oil production plays in the economy. We denote this measurement as *Oil*. A possible way which was considered was to use the dependence of oil as a dummy variable for each country which reach a certain threshold, for example thirty percent. However, as this measure is less flexible and isn't believed to provide us with the full range of how oil matters to a country this measurement wasn't chosen.

4.2.3 Interactive variables

As one of the main purposes of this thesis is to not only test how oil affects democracy but to also see what happens when we interact oil with colonial past, regions and the three casual mechanisms, we will here present which variables we use as interactive ones.

[3] The definition of an autocracy is: "A system of government by one person with absolute power." The definition of an anocracy is: " A political system which is neither fully democratic nor fully autocratic, often being vulnerable to political instability" (Oxford Dictionary, 2016).

To begin with it's of interest to see whether there are any historical or regional effects and we thus interact *Oil* with three different regional variables. As it was the biggest colonial power and can be argued to have been the one which had the biggest impact on its colonies, the first one of these variables is a dummy for if a country was a British Colony. This is represented by *BritishColony*. Furthermore, we also test for whether the country is located in Sub-Saharan Africa or in the Middle East as those are the regions which can be believed to have been the most effected and most heavily reliant on natural resources. These are denoted *SSA* and *MiddleEast* respectively.

To test for the *rentier effect* we interact Oil with three different variables of which the first two ones are *GovConsum* and *Taxrevenue*. These are chosen as they offer a good view on how big a role the state has in a country. *GovConsum* can in short be said to include the government expenditures as a percentage of GDP and *TaxRevenue* measures how big the tax revenues are for the government as a percentage of GDP. Thirdly we include a variable for the institutional quality of a country to see whether better institutions for example can lead, through for example greater accountability which is a part of the *rentier effect*, to that the government takes better care of it's oil resources.

The second causal mechanism is the *repression effect*. As the military is likely to be the most common way in which a government represses its people we thus interact *Oil* with two different measurements of how much the government spends on the military. These ones are *Militaryexpenditure* and *Militarycentralgove*. As one variable measures the military expenditure as a percent of governments expenditure and the other measures military expenditure as percent of total GDP we can get a sense of how much the military both dominates the budget and the overall economy.

Lastly, we also want to test whether there can be a *modernization effect*. As this is an effect which can be hard to measure (especially as it can be a social and cultural process and since it's hard to objectively say what is actually modern) we include several different variables. Two of the first ones are *Primaryfemale* and *Secondaryfemale* which just as it sounds measure the enrollment rate of girls which in many cases have been a

good sign of that a country is modernizing. As there's reasons to believe that people both live longer and that more people live in cities the more modern a country becomes, we interact oil with both *lifeexpectancy*, measuring the average lifeexpectancy, and *Urbanpopulation* which measures the percentage of people living in an urban environment. Lastly, as a relatively new yet vital driver of social and cultural development nowadays is the internet, the variable *Internet* measures how many internet user there are per 100 people in each country.

4.2.4 Control variables

Even though we are mainly interested in investigating the effect of oil we also have to include some other variables which might have an effect on democracy. All the controls have been used in previous research.

The first of our independent variables is *Democracy* meaning that it's the dependent variable lagged. According to Ross (2001), there are three reasons for lagging where the first reason is that lagged variable captures country-specific historical or cultural features which might otherwise be missed by other right-hand-side variables. Secondly, this helps to turn the equation into a change model and thirdly it also helps us with potential serial correlation.

As it seems like many of the countries which have suffered from conflict and low democracy also have had lots minerals, hence implying that it could be one reason for the *resource curse,* our second control variable is *Minerals* which is measured in the same way as the *Oil* variable. The third control variable which we include is the variable *logGDPpercaptita* due to that there is reason to believe that there's a high correlation between income and democracy. As research has suggested that countries with a large Muslim population are less democratic and since many of the most oil rich countries are mainly Muslim, we include *Islam* as a variable. It would've been preferable if we could get data for our all years of our chosen time frame but as this wasn't available for many countries and peoples religion is believed to be fairly constant, we instead construct a

dummy variable where the threshold is when the Muslim population reaches over 50% in 2014. Furthermore, even though there are different reasons for why it could be, it's likely that countries that are more advanced industrialized states also are more democratic. We thus use if a country is a member of *OECD* as a dummy variable.

4.3 Estimation technique

After collecting the data which we need we test our results econometrically. This is done through the construction of panel data set. The advantages with the panel approach is that it, compared to cross-sectional or time series, often provides more accurate i.e more efficient estimates even though the sample size is the same (Verbeek, 2012). As it's been done in previous studies and since the effects of oil it can be expected to take some time before they are visible, we lag all our control variables with either one or five years. When it comes to the interactive variables however, the oil variables are lagged with five years and the interactive variable is lagged with one year. In brief our baseline model can thus in general forms be described as[4]:

$$Democracy_{ct} = C + \beta_1 Oil_{ct-n} + \sum \beta_j Control\ variables_{ct-n} + \varepsilon_{it} \quad \textbf{(1)}$$

When we instead test our interactive terms it can be described as below and as one can see the only differences between our different models is thus that we interact the oil variable with the variables for the different effects:

$$Democracy_{ct} = C + \beta_1 Oil_{ct-5} * \beta_2 Interactive\ term_{ct-1} + \sum \beta_j Controlvariables_{ct-n} + \varepsilon_{it} \quad \textbf{(2)}$$

When it comes to all regressions the subscript c denotes each individual country and t denotes time. B_n is the coefficient and should be interpreted *Ceterus paribus*, implying

[4] To avoid confusion it can be good to note that in the actual regressions *Oil* isn't actually β_1 but instead β_2 as lagged *Democracy* for graphical reasons is the first variable in the regression.

that a change in one variable should be interpreted when all other variables are held constant. It's important to point out however that when we use interactive terms the interpretation of the variables changes. For example, a positive value for the effect of the interaction term implies that the higher the percentage of *Oil*, the greater the effect of *interactive term* on democracy term was. Likewise, if we have a higher interactive term, the more positive is the effect of *Oil* on democracy. Furthermore, when using interactive variables one should usually also include the interacted variables as separate variables in the regression (Williams, 2015).

In a panel data set like the one which is used in this thesis there might be many different characteristics among the countries. This means that the panel data often can suffer from group-wise heteroscedastic and serially correlated residuals (Aristovnik, 2006), implying that the error term is non-spherical. As an ordinary OLS doesn't take heterogeneity into account other estimation techniques has to be performed. To deal with this problem the chosen estimation technique in this paper the two largely follows other papers as it both uses a pooled time-series cross-sectional data set with a year fixed effect, and also a Generalized Least Squares (GLS) model. To use two different estimation techniques has several advantages, one being that even though a pooled regression with a time fixed effects absorbs all time-specific variation (which makes sense for our regression as the dependence on oil for example can depend on the oil price which can be assumed to vary over time), we can still have problems with heteroskedasticity. This is also confirmed when looking at the tests in appendix 8.4. Even though this can be solved by using robust standard errors, GLS is still likely to solve this in a better way as authors have found that GLS is optimal for panel data (Aristovnik, 2006).

The advantage of GLS is that it instead of applying robust standard errors to combat autocorrelation and heteroscedasticity, allows the model coefficients to be different across individuals. In our case this means that the error variance is allowed to differ across countries. The GLS does this by producing weights which are inversely proportional to their covariance matrices (Verbeek, 2012). However, since our variance-covariance matrix of errors is unknown we instead use Feasible Generalized Squares

(FGLS) which solves this by estimating the unknown matrix from the sample to provide consistent estimates (Verbeek, 2012).

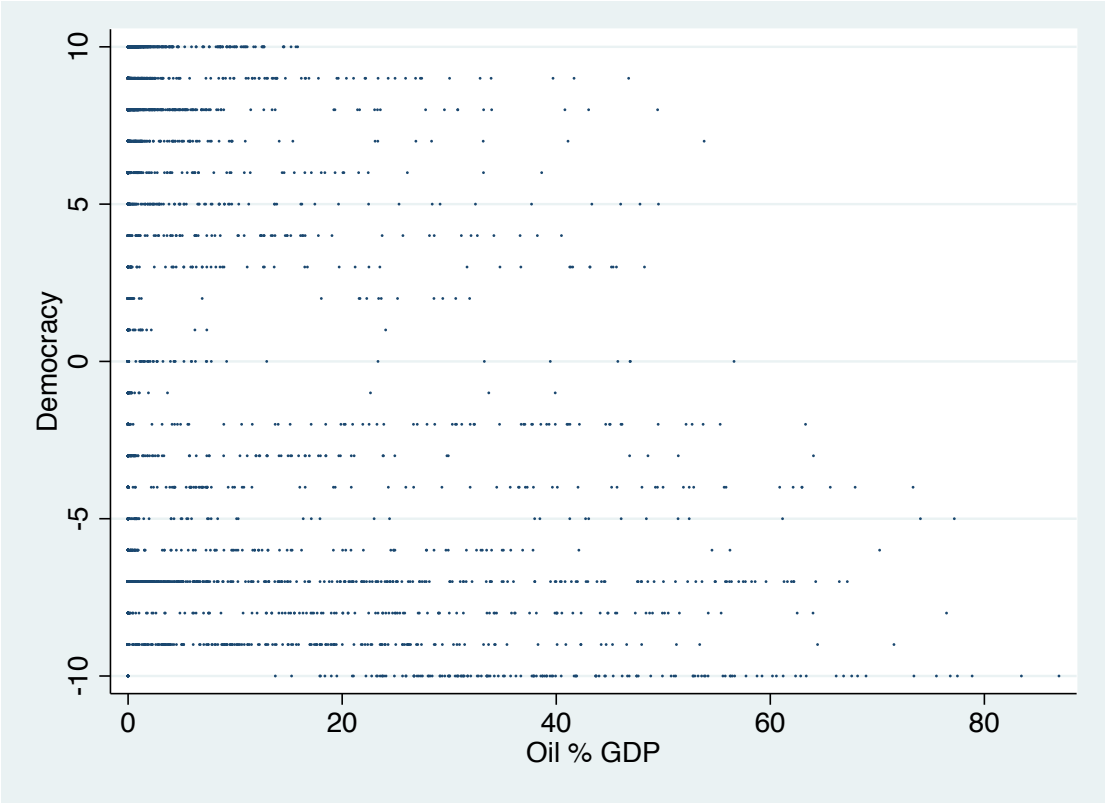
An approach that was considered was to also use a fixed effects model as this has been is preferred when there's correlation between individual unobserved heterogeneity and some of the explanatory variables, and when we want to analyze the impact of variables which vary over time (Verbeek, 2012). However, as there are some variables which varies little or remain the same during the whole period (such as the variable for Islam and OECD) this approach was disregarded. Additionally, an IV approach was also considered as it's not entirely unlikely that *Democracy* and *Oil* are affecting each other, meaning that it can hard to determine whether it's the oil income which drives democracy or whether it's the democracy which makes a country extract more oil (for example through populist but democratically elected leaders who want to have as much oil income as possible to be able to giver more promises). This would mean that we would try and come up with an instrument which would solve that our OLS estimator is biased and inconsistent through correlation in the error term (Verbeek, 2012). However, as the endogeneity between *Democracy* and *Oil* is considered to be weak at best and since it's not obvious that an IV approach would solve this, the IV approach was also disregarded.

5. Results and discussion

In this section we reveal our results and discuss how they should be interpreted. We begin by giving a graphical description of our two main variables and then proceed by presenting the result from our baseline regression. Furthermore, we go deeper into the subject by presenting the obtained results from our interactive variables. Lastly, we discuss our findings.

5.1 Scatter Plot

Figure 1: Scatter plot, Democracy and Oil rents as percentage of GDP.



In order to give the reader a better overview of how the relationship between oil and democracy looks like we've chosen to include a scatter plot. From this we can for example see that there doesn't seem to be a lot of countries with a very high dependence on oil, for example over 50%, which score high on the democracy index. However, with that said it's also important to point out that there are several countries which have scored high on the democracy index but which still have a relatively high percentage of oil to

GDP. From just looking at the scatter plot one could be led to believe that oil seems to have a positive effect when it comes in healthy doses but that it can affect democracy in a negative way when there's too much of it.

5.1 Baseline results and regional effects

In this section we present the results from our initial estimations where we lag our independent variables with one or five years respectively. As mentioned in 4.3 we use both a pooled panel data model with a year fixed effects and an FGLS.

Table 2: Baseline regressions

Model	**(1)** Pooled	**(1)** FGLS	**(2)** Pooled	**(2)** FGLS
Democracy (-5)	0.471***	0.646***		
	(0.0331)	(0.00990)		
Democracy (-1)			0.927***	0.927***
			(0.00898)	(0.00482)
Oil (-5)	-0.00572	-0.0173***		
	(0.0132)	(0.00517)		
Oil (-1)			-0.00330	-0.00330
			(0.00257)	(0.00244)
Minerals (-5)	0.0344	0.0196		
	(0.0579)	(0.0180)		
Minerals (-1)			0.00138	0.00138
			(0.0110)	(0.00845)
logGDPPerCapita (-5)	-7.12e-05***	-4.93e-05***		
	(1.35e-05)	(5.58e-06)		
logGDPPerCapita (-1)			-1.24e-05***	-1.24e-05***
			(4.69e-06)	(2.72e-06)
Islam	-2.836***	-1.969***	-0.453***	-0.453***
	(0.518)	(0.144)	(0.0961)	(0.0693)
OECD	5.051***	3.525***	0.765***	0.765***
	(0.601)	(0.172)	(0.153)	(0.0883)
Constant	-3.269***	-4.153***	-4.972***	-4.972***
	(0.774)	(0.394)	(1.231)	(0.243)
Observations	5,382	5,382	5,507	5,507
Number of Countries	156	156	156	156

*Notes: The dependent variable is Democracy. All pooled regressions uses robust standard errors which are found in the parenthesis. All numbers next to the independent variables denotes numbers of years lagged. *** p<0.01, ** p<0.05, *p<0.1*

When looking at both model (1) and (2) it's interesting to note that oil seems have a negative effect in the FGLS model and when it's lagged by five years. This becomes especially interesting when we see that, even though the sign is negative, the significance disappears for the one year lag. Hence, it possible to draw the conclusion of that oil seems to be affecting democracy negatively in the long-run. It's also interesting to note that for all specifications, the minerals variable isn't significant, thus providing evidence for that it's only oil which seems to affect democracy in a bad way in the long run. It's also noteworthy that both the dummies for *Islam* and *OECD* are significant and have a very strong coefficient hence implying that both in the short- and long run it's negative to be a Muslim country but positive to be a member of OECD. The strong significance and large coefficient is something which remains fairly static throughout all our regressions. As this also goes for the *minerals* and *logGDPpercapita*, which surprisingly was negative in our regression consequently implying that a higher income leads to lower democracy, we will not comment further on them. As a final note we can see that the coefficients are very similar for both the pooled and the FGLS model when only lagging it by one year. However, as the standard errors are smaller for the FGLS model, it's more likely that this one should be preferred.

5.2 British colony and regions

As the results which are lagged by five years were the most interesting we continue with them to see if and how those results change when we interact them with different variables. The first one of these interaction variables is if a country was a British country and belonged to a certain region.[5]

[5] As mentioned in 4.3 we also include the variable which we interacted with oil in the regression. However, as our main interest is the combination of *oil* and the interactive variable we will not comment on the interacted variable.

Table 3: Colonial and regional interaction

Model	**(3)** Pooled	**(3)** FGLS	**(4)** Pooled	**(4)** FGLS	**(5)** Pooled	**(5)** FGLS
Democracy (-5)	0.457***	0.631***	0.457***	0.627***	0.475***	0.644***
	(0.0328)	(0.00995)	(0.0341)	(0.0101)	(0.0331)	(0.00989)
Oil (-5)	-0.0172	-0.0252***	-0.00825	-0.0219***	0.00445	-0.000931
	(0.0115)	(0.00539)	(0.0145)	(0.00658)	(0.0203)	(0.00644)
Minerals (-5)	0.0333	0.0217	0.0462	0.0364**	0.0330	0.0178
	(0.0547)	(0.0179)	(0.0555)	(0.0180)	(0.0583)	(0.0180)
logGDPPerCapita (-5)	-7.11e-05***	-4.66e-05***	-7.55e-05***	-5.51e-05***	-6.83e-05***	-4.41e-05***
	(1.35e-05)	(5.55e-06)	(1.34e-05)	(5.61e-06)	(1.36e-05)	(5.67e-06)
Islam	-2.724***	-1.907***	-3.053***	-2.137***	-2.514***	-1.681***
	(0.504)	(0.144)	(0.593)	(0.151)	(0.605)	(0.157)
OECD	5.271***	3.694***	4.562***	3.261***	5.055***	3.539***
	(0.594)	(0.172)	(0.615)	(0.173)	(0.610)	(0.172)
Britishcolony	1.175*	0.896***				
	(0.665)	(0.162)				
SSA			-1.700***	-1.246***		
			(0.570)	(0.147)		
MiddleEast					-0.795	-0.584**
					(1.142)	(0.283)
OilBritishcolony	0.123	0.0810***				
	(0.0804)	(0.0159)				
OilSSA			-0.00301	0.000806		
			(0.0278)	(0.0105)		
OilMiddleEast					-0.0161	-0.0277**
					(0.0280)	(0.0112)
Constant	-3.472***	-4.328***	-2.514***	-3.537***	-3.351***	-4.269***
	(0.762)	(0.392)	(0.854)	(0.397)	(0.777)	(0.394)
Observations	5,382	5,382	5,382	5,382	5,382	5,382
Number of Countries	156	156	156	156	156	156

*Notes: The dependent variable is Democracy. All pooled regressions uses robust standard errors which are found in the parenthesis. All numbers next to the independent variables denotes numbers of years lagged. *** p<0.01, ** p<0.05, *p<0.1*

What's interesting to note here is the difference in sign depending on the different regions which we look at. If a country has been a British colony the effect of oil is suddenly positive and highly significant in the FGLS model whilst if a Middle Eastern country the effect oil is still significant but negative to democracy. A bit surprisingly is however that the interaction variable for Sub-Saharan Africa, where one could be led to believe that there would clear signs of that oil has had negative consequences, shows no significance and both a positive and negative sign and. Despite this, from looking at the results it's still easy to come to the conclusion of that the institutions which exists in the countries matters. It's for example likely that former British colonies inherited both British institutions and British democracy thus ensuring that the revenues from oil could be

distributed more efficiently and in a more democratic manner. Even though it provides us with an indication of that the institution matter, it's also important to point out that one should be carful when comparing our results as there can be other factors (geography, history etc), which aren't tested here.

5.3 The rentier effect

Table 4: Rentier effect

Model	**(6)** Pooled	**(6)** FGLS	**(7)** Pooled	**(7)** FGLS	**(8)** Pooled	**(8)** FGLS
Democracy (-5)	0.496***	0.663***	0.401***	0.684***	0.194**	0.664***
	(0.0336)	(0.00986)	(0.0565)	(0.0133)	(0.0852)	(0.0314)
Oil (-5)	-0.0237	-0.0249**	-0.103***	-0.0737***	0.0714	0.000161
	(0.0215)	(0.0123)	(0.0236)	(0.0119)	(0.0998)	(0.0834)
Minerals (-5)	-0.0153	-0.0189	-0.0103	0.0622**	0.0653	0.0714**
	(0.0463)	(0.0200)	(0.0479)	(0.0276)	(0.0570)	(0.0296)
logGDPPerCapita (-5)	-8.05e-05***	-5.88e-05***	-1.49e-05	-8.01e-06	-0.000185	9.56e-05
	(1.37e-05)	(5.79e-06)	(1.03e-05)	(6.23e-06)	(0.000420)	(0.000276)
Islam	-2.779***	-1.941***	-2.904***	-1.595***	-2.140*	-0.294
	(0.504)	(0.144)	(0.694)	(0.188)	(1.110)	(0.316)
OECD	4.843***	3.488***	2.820***	0.969***	8.303**	7.326***
	(0.586)	(0.171)	(0.457)	(0.194)	(3.352)	(1.379)
GovConsum (-1)	0.00558	-0.0154				
	(0.0266)	(0.00950)				
Taxrevenue (-1)			0.0414**	0.0313***		
			(0.0198)	(0.00861)		
Institutional (-1)					1.022*	0.911***
					(0.574)	(0.283)
OilGovConsum	5.77e-05	-5.30e-05				
	(0.000950)	(0.000651)				
OilTaxrevenue			0.00118	0.000829		
			(0.00143)	(0.000735)		
OilInstitutional					-0.0407	-0.0140
					(0.0423)	(0.0330)
Constant	-3.487***	-4.139***	-6.628***	-10.49***	-7.164***	-8.057***
	(0.914)	(0.431)	(1.135)	(1.924)	(1.820)	(0.937)
Observations	5,004	5,004	2,065	2,065	569	569
Number of Countries	156	156	128	128	83	83

*Notes: The dependent variable is Democracy. All pooled regressions uses robust standard errors which are found in the parenthesis. All numbers next to the independent variables denotes numbers of years lagged. *** p<0.01, ** p<0.05, *p<0.1*

Our next regressions tests whether there seems to be evidence for the *rentier effect*. As can be seen from table 4 above there seems to be no indications for that there exists a

rentier effect as none of the models show any significance. This should be seen as surprising considering that for example Ross (2001) found evidence for this kind of effect. An interesting and somewhat contradicting result to the possible conclusion we found in 5.2, meaning that institutions matter, is that the sign for the interaction term of *institutions* and *Oil* is negative. This is interesting as one would be lead to believe that a combination of better institutions and oil should lead to more democracy.

5.4 The repression effect

Table 5: Repression effect

Model	**(9)**	**(9)**	**(10)**	**(10)**
	Pooled	FGLS	Pooled	FGLS
Democracy (-5)	0.335***	0.697***	0.430***	0.718***
	(0.0362)	(0.0113)	(0.0534)	(0.0137)
Oil (-5)	-0.0390**	-0.0439***	-0.0847***	-0.0549***
	(0.0165)	(0.00623)	(0.0160)	(0.00699)
Minerals (-5)	0.0511	0.0659***	-0.0514	0.0255
	(0.0409)	(0.0234)	(0.0412)	(0.0273)
logGDPPerCapita (-5)	-5.60e-05***	-2.50e-05***	-1.41e-05	-7.00e-06
	(1.21e-05)	(6.12e-06)	(1.03e-05)	(5.77e-06)
Islam	-3.524***	-1.493***	-2.950***	-1.553***
	(0.661)	(0.156)	(0.680)	(0.184)
OECD	4.972***	1.954***	2.664***	0.852***
	(0.509)	(0.193)	(0.450)	(0.185)
Militaryexp (-1)	2.32e-06***	2.74e-06*		
	(2.46e-07)	(1.63e-06)		
Militarycentralgove (-1)			-8.30e-07***	-9.22e-07
			(1.65e-07)	(1.92e-06)
OilMilitaryexpenditure	-1.36e-06***	-1.25e-06*		
	(9.80e-08)	(7.01e-07)		
OilMilitarycentralgove			5.44e-07***	6.57e-07
			(1.05e-07)	(1.17e-06)
Constant	-2.712***	-4.882***	-6.053***	-10.34***
	(0.770)	(0.345)	(1.243)	(1.782)
Observations	3,328	3,328	1,899	1,899
Number of Countries	155	155	126	126

*Notes: The dependent variable is Democracy. All pooled regressions uses robust standard errors which are found in the parenthesis. All numbers next to the independent variables denotes numbers of years lagged. *** p<0.01, ** p<0.05, *p<0.1*

When it comes to the repression effect we get interesting, yet contradicting results. When we in model 9 interact oil with military expenditure as a percentage of the government budget we observe a very small but negative effect in both the pooled and the FGLS model. Interestingly, we get completely opposite result when we instead in model 10 use the measurement of military part of total GDP, as we get a very small but yet positive results which is significant at least in the pooled model. This could be an indication of that when there's more military force in play in the country and oil remains constant we also see a small improvement in democracy. This goes well with what Ross (2001) argued in that oil can stir up a lot of conflict, thus implying that more military force is needed. However, Ross (2001) argued for that this would lead to less democracy and here we see the opposite. Nevertheless as our results are so contradicting they should be interpreted with care.

5.5 The modernization effect

The last effect which we test for is the modernization effect. As we test several modernization effects they're divided into two different parts. The first of these results as specified in model 11 and 12 can be seen in below.

Table 6: First modernization effects

Model	**(11)** Pooled	**(11)** FGLS	**(12)** Pooled	**(12)** FGLS
Democracy (-5)	0.470***	0.662***	0.428***	0.619***
	(0.0350)	(0.0105)	(0.0377)	(0.0119)
Oil (-5)	0.102**	0.0670***	0.0278	0.00612
	(0.0521)	(0.0186)	(0.0211)	(0.0105)
Minerals (-5)	0.0533	0.0359*	0.0723	0.0427*
	(0.0593)	(0.0192)	(0.0599)	(0.0218)
logGDPPerCapita (-5)	-5.50e-05***	-2.86e-05***	-7.03e-05***	-4.65e-05***
	(1.23e-05)	(6.19e-06)	(1.22e-05)	(6.29e-06)
Islam	-2.423***	-1.402***	-2.506***	-1.583***
	(0.533)	(0.168)	(0.587)	(0.172)
OECD	4.364***	2.621***	3.513***	1.746***
	(0.566)	(0.183)	(0.702)	(0.205)
Primaryfemale (-1)	0.0273***	0.0250***		
	(0.00835)	(0.00300)		
Secondaryfemale (-1)			0.0343***	0.0343***
			(0.00883)	(0.00288)
OilPrimaryfemale	-0.00131***	-0.00107***		
	(0.000496)	(0.000189)		
OilSecondaryfemale			-0.00101***	-0.000909***
			(0.000375)	(0.000172)
Constant	-5.848***	-6.296***	-6.485***	-7.152***
	(1.402)	(0.673)	(1.187)	(0.675)
Observations	4,45	4,45	3,682	3,682
Number of Countries	151	151	150	150

*Notes: The dependent variable is Democracy. All pooled regressions uses robust standard errors which are found in the parenthesis. All numbers next to the independent variables denotes numbers of years lagged. *** p<0.01, ** p<0.05, *p<0.1*

Out of all the results in this the thesis these ones are probably the most interesting and opposite to what one would assume initially. To begin with we see that the interactive variable for both *OilPrimaryfemale* and *OilSecondaryfemale* is negative and highly significant thus giving us reason to believe that the combination of oil and a high enrollment rate isn't as beneficiary as one could believe. It would be interesting to investigate more deeply into why this could be. One speculative yet possible reason could be that if oil rents increases and the female primary and secondary enrollment remains constant the effect of the increases in oil still is negative for democracy.

Table 7: Second modernization effects

Model	**(13)** Pooled	**(13)** FGLS	**(14)** Pooled	**(14)** FGLS	**(15)** Pooled	**(15)** FGLS
Democracy (-5)	0.442***	0.609***	0.445***	0.622***	0.463***	0.737***
	(0.0346)	(0.0102)	(0.0336)	(0.0101)	(0.0407)	(0.0113)
Oil (-5)	0.173*	0.123***	0.0673*	0.0461***	-0.0421**	-0.0400***
	(0.0920)	(0.0315)	(0.0358)	(0.0132)	(0.0171)	(0.00656)
Minerals (-5)	0.0365	0.0276	0.0233	0.00599	0.0547	0.0518**
	(0.0555)	(0.0178)	(0.0565)	(0.0179)	(0.0395)	(0.0209)
logGDPPerCapita (-5)	-7.72e-05***	-6.08e-05***	-7.70e-05***	-5.78e-05***	-3.78e-05***	-2.47e-05***
	(1.34e-05)	(5.69e-06)	(1.33e-05)	(5.75e-06)	(1.26e-05)	(7.17e-06)
Islam	-2.610***	-1.798***	-2.791***	-1.877***	-2.778***	-1.234***
	(0.548)	(0.146)	(0.539)	(0.144)	(0.589)	(0.151)
OECD	4.052***	2.768***	4.252***	2.890***	4.070***	1.867***
	(0.653)	(0.180)	(0.651)	(0.182)	(0.467)	(0.193)
Lifeexpectancy (-1)	0.100***	0.0902***				
	(0.0261)	(0.00730)				
Urbanpopulation (-1)			0.0383***	0.0321***		
			(0.0120)	(0.00325)		
Internet (-1)					-0.00806	-0.00150
					(0.00617)	(0.00445)
OilLifeexpectancy	-0.00298**	-0.00241***				
	(0.00142)	(0.000502)				
OilUrban			-0.00144***	-0.00131***		
			(0.000519)	(0.000204)		
OilInternet					0.000182	0.000227
					(0.000315)	(0.000247)
Constant	-9.909***	-9.987***	-4.985***	-5.489***	-2.947***	-4.554***
	(1.669)	(0.612)	(0.929)	(0.416)	(0.833)	(0.333)
Observations	5,382	5,382	5,379	5,379	3,131	3,131
Number of Countries	156	156	155	155	155	155

*Notes: The dependent variable is Democracy. All pooled regressions uses robust standard errors which are found in the parenthesis. All numbers next to the independent variables denotes numbers of years lagged. *** p<0.01, ** p<0.05, *p<0.1*

When looking at the results above we see the same surprising results as when we looked at female primary and secondary enrollment in that we get negative and significant effect for two of the interactive variables. Hence one can also here come to the conclusion that the combination of oil and a higher level of modernization doesn't seem to have a positive effect on democracy.

5.6 Further discussion

Overall our results are interesting as it broadens and further complicates the picture of the different properties of oil and what the effect of oil actually is on democracy. For example, some previous studies seem to at least acknowledge that there's a somewhat negative yet unspecified effect of oil on democracy in the long-run. This is also implied by our results as we get significance in the FGLS model where Oil is lagged by five year. One possible conclusion from a result like that is that the effects from for example the *Dutch disease* takes some time before the results shows up. This goes in line with what Tsui (2006) found, meaning that oil significantly decreases countries long-term change in democracy. Even though this might seem like a plausible conclusion to draw, our results also give very ambiguous results for the three different causal mechanisms and how they interact with oil. When interacted with oil we for example see very little evidence for that there exists a *rentier effect*. There are several reasons to question why this effect might not be as relevant as before, such as that what Beblawi and Luciani (1990) argued were the attributes of a rentier state, doesn't hold up anymore. It's for example not completely unlikely that globalization, which can has meant that a country can no longer afford to be completely reliant on just one good, has made rent seeking, which the authors argue occurs in a *rentier state*, smaller and harder to obtain.

When it comes to our other two causal mechanisms it's very interesting to note how in particular the modernization effect provides us with an opposite result to what one could expect. However, it's interesting to see that even though we don't see any significance, the sign of *Oil* interacted with *Internet* is positive. This might be an indication of that one of the main drivers of democracy in a modernization sense comes from the access to

information, rather than just the mere fact that people for example are living longer. Furthermore, the negative sign of life expectancy might be seen as a consequence of that a lot of countries nowadays have a high life expectancy and it's therefore not as much of a driver of democracy as it might have been earlier. Even though more research has to be done on if and how these causal mechanisms work, we see clear evidence for that the there's might be reason to question the ways through which a possible resource curse works. Furthermore, our ambiguous results raises the question of whether the theories of *resource curse* or the *Dutch disease effect*, which both are easy "go-to" explanation for failing democracies, actually is our best and only explanation for failing democracies. This reasoning is further accentuated by that the significance and sign of Islam and OECD is constant regardless of specification. Even though they should be interpreted with care, as there obviously are several reasons for this result, we will acknowledge that this indicates that it can be equally as important to look deeper into how and why these variables affect democracy.

As a final point on the results, it's important to point out that even though this thesis has used a good and credible measurement for democracy there are still, just as discussed in 2.1, many different definitions of democracy and that the definitions does matter for what results we will get. It would for example be interesting to see whether we would get similar results to Oskarsson and Ottosen (2010) if we exclusively limited our definition of democracy to for example political rights. It should also not be forgotten that our measurement uses a singular approach to what democracy is, meaning that it doesn't allow for any variations between countries on what the meaning of democracy is. It's not completely unlikely that democracy and meaning and importance of democracy is different in a country such as Qatar, compared to for example Sweden.

When it comes to robustness it's interesting to note that there are differences in the significance between the pooled models with a time fixed effect and the FGLS model. As we in almost all cases get lower standard errors in the FGLS model however this definitely gives rise to the suspicion of that pooled estimator might not be the best. This is important to note as several other papers have used a pooled approach, hence there are

reason to question their result and it would be interesting to see how it would've changed if they had used FGLS instead. On a final note one should also be aware of that it can be tricky to really understand what the results from interactive variables actually tell us. Hence, we should interpret the variables with care. Despite this, it's still believed that an interactive approach gives us a sense of what happens when we interact variables and showcases that the causal effect of oil on democracy might not be as obvious as one can be led to believe.

6. Conclusion

In this paper we have examined the effects of oil on democracy. As a second research question we also investigated the effect of interacting oil with both if a country was a British colony or if it's located in two specific regions, and three possible causal mechanisms. In order to answer these questions we collected data for 156 countries between the years of 1970-2014 and tested the data through both a pooled panel data set with a time fixed effects and through an FGLS approach.

In our baseline results we find some evidence for that oil affects democracy negatively in the long run. We also find some evidence for that countries which have been a British colony fare better off when interacted with oil and that countries which are located in Middle East are affected negatively. When it comes to the three causal mechanisms our interaction variables show no sign of a *rentier effect*, ambiguous signs of a *repression effect* and contradictory results to what one could believe for the *modernization effect*. From this there are reasonable reasons to believe that oil affects democracy negatively, however we have to question whether the three causal mechanisms work as previously believed.

To improve democracy around the world remains a vital yet complex question for countries all around the world. Unfortunately, this thesis doesn't make the question of how oil affects democracy any easier as a general conclusion seems to be that the links between oil and democracy might not be as obvious as one can assume. However, our results also imply that there's seems to at least be some sort of effect from oil on democracy. This ambiguous result definitely doesn't make it easier for the researcher, politician or private citizens who tries to understand what the effects of oil will be for the society in which he or she lives in. Hence, it can therefore be important to move the further research from *if* oil affects democracy to *under what circumstances* oil works and this is also where the author believes that future research should focus. A possible way to do this is to do more country-specific research and focus more on the countries which have succeeded in having oil as a big part of the economy but which still have managed

to have a high level of democracy. Equally important can also be to investigate the countries which haven't been affected by the most obvious causes (civil war, unstable institutions etc.) but where oil still seems to have had a negative effect on the country.

As a final note, the results if anything shows that there isn't a one size fits all when it comes to the effects of oil on democracy. Instead, the effects might differ for different countries in different regions and under different circumstances. What the effects are in specific countries and under what circumstances oil can improve democracy will be up to further research to try and determine.

7. References

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8. Appendix

8.1 Variable description

Table 8: Variable summary

Variable	Description	Measure	Source
Democracy	Democracy index for a country	Computed by subtracting another measurement, the AUTOC score from the DEMOC score. Makes a score between -10 to 10	Center for Systemic Peace
Oil Rents	Oil rents are the difference between the value of crude oil production at world prices and total costs of production.	Oil rents (% of GDP)	World Bank
Mineral Rents	Mineral rents are the difference between the value of production for a stock of minerals at world prices and their total costs of production. Minerals can include tin, gold, lead, zinc, iron, copper etc.	Mineral rents (% of GDP)	World Bank
logGDPpercapita	GDP per capita is gross domestic product divided by midyear population. Data are in current U.S. dollars.	GDP per capita (current US$)	World Bank
Islam	Variable for whether a country has over 50% Muslim population	1 for over 50% Islam, 0 if not	CIA Factbook
OECD	Variable for whether a country is a member of OECD or not	1 for OECD member, 0 if not	OECD
BritishColony	Variable for whether a country was a British colony	1 for colony, 0 if not	BBC
SSA	Variable for whether a country is located in Sub-Saharan Africa	1 for SSA 0, if not	World Bank
MiddleEast	Variable for whether a country is located in Middle East	1 for Middle east, 0 if not	World Bank
GovConsum	General government final consumption expenditure	General government final consumption expenditure (% of GDP)	World Bank
Taxrevenue	Tax revenue refers to compulsory transfers to the central government	Tax revenue (% of GDP)	World Bank
Institutional quality	Transparency, accountability, and corruption in the public sector	CPIA transparency, accountability, and corruption in the public sector rating (1=low to 6=high)	World Bank
Militaryexpenditure	Military expenditures which includes all current and capital expenditures on the armed forces	Military expenditure (% of central government expenditure)	World Bank
Militarycentralgov	Military expenditures which includes all current and capital expenditures on the armed forces	Military expenditure (% of GDP)	World Bank
Femaleprimary	Gross enrollment ratio in primary school regardless of age for all females	School enrollment, primary, female (% gross)	World Bank
Femalesecondary	Gross enrollment ratio in secondary school regardless of age for all females	School enrollment, secondary, female (% gross)	World Bank
Lifeexpectancy	Life expectancy at birth	Weighted average of Life expectancy at birth, total (years)	World Bank
Urbanpopulation	Urban population	Urban population (% of total)	World Bank
Internet	People who have used the Internet (from any location) in the last 12 months via for example computer, cell phone, digital TV etc.	Internet users (per 100 people)	World Bank

8.2 Descriptive statistics

Table 9: Descriptive

Variable	Obs	Mean	Std. Dev.	Min	Max
Democracy	6309	1.207164	7.409293	-10	10
Oilrents	5777	5.394487	12.35642	0	86.96922
Mineralrents	6076	1.03034	3.284009	0	44.64385
GDPPerCapita	6085	6846.076	12589.86	57.63511	116612.9
Islam	7152	.2764262	.4472613	0	1
OECD	7152	.1887584	.3913439	0	1
Britishcolony	7152	.1510067	.3580805	0	1
SSA	7152	.2638423	.4407456	0	1
MiddleEast	7152	.1006711	.3009138	0	1
GovConsum	5766	16.19659	7.96739	0	156.5315
Taxrevenue	2186	16.61938	8.03297	.0858148	95.16069
Institutional quality	607	2.768534	.6243531	1	4.5
Militaryexpenditure	3640	2624.208	86379.64	0	4382244
Militarycentralgov	2010	18291.44	581051.6	0	2.50e+07
Primaryfemale	5250	90.71799	26.7498	0	177.7248
Secondaryfemale	2357	30.85415	9.609939	1.3	66.1
Lifeexpectancy	7113	64.13714	11.05409	19.26551	83.5878
Urbanpopulation	7087	50.42539	23.88027	2.845	100
Internet	3473	17.0492	24.56453	0	96.3

8.3 Selected countries

List of Countries

Afghanistan	Dominican Republic	Latvia	Russian Federation
Albania	Ecuador	Lebanon	Rwanda
Algeria	Egypt, Arab Rep.	Lesotho	Saudi Arabia
Angola	El Salvador	Liberia	Senegal
Argentina	Equatorial Guinea	Libya	Serbia
Armenia	Eritrea	Lithuania	Sierra Leone
Australia	Estonia	Luxembourg	Singapore
Austria	Ethiopia	Macedonia, FYR	Slovak Republic
Azerbaijan	Fiji	Madagascar	Slovenia
Bahrain	Finland	Malawi	Somalia
Bangladesh	France	Malaysia	South Africa
Belarus	Gabon	Mali	Spain
Belgium	Gambia, The	Mauritania	Sri Lanka
Benin	Georgia	Mauritius	Sudan
Bhutan	Germany	Mexico	Suriname
Bolivia	Ghana	Moldova	Swaziland
Botswana	Greece	Mongolia	Sweden
Brazil	Guatemala	Montenegro	Switzerland
Bulgaria	Guinea	Morocco	Syrian Arab Republic
Burkina Faso	Guinea-Bissau	Mozambique	Tajikistan
Burundi	Haiti	Myanmar	Tanzania
Cabo Verde	Honduras	Namibia	Thailand
Cambodia	Hungary	Nepal	Timor-Leste
Cameroon	India	Netherlands	Togo
Canada	Indonesia	New Zealand	Trinidad and Tobago
Central African Republic	Iran, Islamic Rep.	Nicaragua	Tunisia
Chad	Iraq	Niger	Turkey
Chile	Ireland	Nigeria	Turkmenistan
China	Israel	Norway	Uganda
Colombia	Italy	Oman	Ukraine
Congo, Dem. Rep.	Jamaica	Pakistan	United Arab Emirates
Congo, Rep.	Japan	Panama	United Kingdom
Cote d'Ivoire	Jordan	Paraguay	United States
Country Name	Kazakhstan	Peru	Uruguay
Croatia	Kenya	Philippines	Uzbekistan
Cuba	Korea, Rep.	Poland	Venezuela, RB
Cyprus	Kosovo	Portugal	Vietnam
Czech Republic	Kuwait	Puerto Rico	Yemen, Rep.
Denmark	Kyrgyz Republic	Qatar	Zambia
Djibouti	Lao PDR	Romania	Zimbabwe

8.4 Tests

Table 10

	Chi-squared statistic	Prob.
Heteroskedasticity test for pooled model	119.86	0.0003

Table 11

	F-statistic	Prob.
Wooldrige test for autocorrelation	274.154	0.00000