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THE CURSE OF NATURAL RESOURCES, QUALITY OF INSTITUTIONS, AND ECONOMIC GROWTH: THE CASE OF MENA COUNTRIES

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by

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Submitted in Partial Fulfillment of the Requirements for the

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TITLE: THE CURSE OF NATURAL RESOURCES, QUALITY OF INSTITUTIONS, AND ECONOMIC GROWTH: THE CASE OF MENA COUNTRIES

MAJOR PROFESSOR: Dr. Scott Gilbert

There is a big debate among economists, why are the resource-rich economies growing slower than resource-poor economies? Which is making this puzzle more difficult, there are two groups of resources-rich abundance countries one group grow more than other ones. For instance, the Arabic Gulf, Nigeria, and Venezuela are growing slower than Botswanan, Norway, and Australia, but both groups are resources-rich countries. Is it the resources curse scenario? Or is it weak institutions? To study this puzzle, I have observed two groups of studies. The first group of old studies claim that the problem of low growth in resources-rich economics comes from the scenario of Dutch disease, but the second group or more recent studies strongly refuse the claim by the first group. They have debated that the problem comes from poor institutional quality. We totally agree with both groups, yet we have another scenario. The resources-rich countries suffer from Dutch diseases problem and from poor quality of institutions. We strongly criticize the most significant a series of studies by Sachs and Warner (1995, 1997a,1997b, 2001). They have debated that the Dutch Disease scenario is a possible mechanism of the resource curse, which is the labor factor and capital factor move from the manufacturing and service sectors to the natural resources sector. Thus, the negative effect of natural resources on economic growth is direct effect. We argue that there is a positive relationship between most types of natural resources (oil) and economic growth. We claim also this a positive relationship holds true even after controlling for significant variables found to be for economic growth. We are not only

debating that the main symptoms of the resources curse come from the weakness of institutional quality, but also come from Dutch disease scenario. We see that the indirect effect of natural resources on economic growth. To prove this association, we have used multiple institutions and resources. However, we set up three chapters: The first chapter discusses how natural resources (oil rents) impact institutional quality (control of corruption) in the Middle East and North Africa (MENA). We discuss that is there any possibility of interaction terms between oil rents and rule of law from one side, and between oil rents and democracy from another side to avoid high corruption in MENA countries? Our findings confirm: First, the oil rents can highly feed corruption. Second, our estimates confirm that the relationship between oil rents and corruption depends on the quality of institutions (rule of law), which oil rents avoid to feed corruption unless the mean of quality of law role is (0.33). Furthermore, our findings suggest that the autocracy is better policy in the region. In the second chapter, to approach to our goal, the main symptoms of the resource curse phenomenon in MENA. The findings confirm that the economic growth in MENA is greatly and positively influence by oil rents, but we have blamed poor institutions leading to the phenomenon of resources curse. When the weakness of institutions reaches to certain limits, oil rents will start to create a negative impact on growth. This result seems to confirm the theory of the natural resource curse and to confirm that resources-rich countries are associated with poor institutions. Moreover, the interaction terms between diversification and oil rent can promote economic growth. In the third chapter, we discuss how the interaction terms between various types of natural resources, petroleum, natural coal, and coal, and political stability influence economic growth? The findings have diagnosed there are dissimilar effects by petroleum, natural gas, and coal on economic growth.

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course of my project. I'm very grateful to them for sharing their truthful views on my project. Without their encouragement and leadership, I would be lost and never imagined finishing my dissertation.

DEDICATION

I would like to dedicate this dissertation to my father, Hussein, who passed away before I traveled to the United States. Since his death, I was motivated to improve myself and work harder to achieve my goals. He was always loving and understanding of my situation. He encouraged me to take on this journey to travel away from home and be the most successful person that I can be. He was the father that each son would like to have. His work dedication to raise me and my brothers was like a shiny star in the very dark night.

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CHAPTER 1

OIL RENTS, CORRUPTION, RULE OF LAW, AND DEMOCRACY: THE CASE OF MENA COUNTRIES

1.1. Abstract

This chapter attempts to investigate how oil rents can feed corruption in the Middle East and North Africa (MENA) countries, and how this impact depends on quality of the rule of law. We, likewise, attempt to investigate which political system is better in the MENA countries to reduce corruption. To approach this aim, we have examined for non-linear regressions by using the Random Effect model and we use panel data covering the period 1995 to 2018 and 21 countries to test this empirical prediction. Our findings confirm that: First, the oil rents can highly feed corruption in the MENA countries. Second, our estimates confirm that the relationship between oil rents and corruption depends on the quality of rule of law, resources-rich countries can avoid high corruption if the quality of law rule is higher. Furthermore, our findings suggest that autocracy is a better policy in the region. The findings are also robust across different samples, and to the use of various alternative measures of natural resources, democracy and corruption.

1.2. Introduction

There are many variations of the corruption definition but commonly it is understood as the dishonest or unethical conduct by a person having the authority to achieve personal gains or it is the misuse of public office for private gain (Rimšaitė, 2019). In 2015, according to international transparency's corruption perception index (CPI) the MENA region received a score of 61 of corruption on a 0-to-100 rescale and the global average of corruption is 57, where 0 is a very clean country, and 100 indicates a very corrupt country. At the same time, the region has

reflected the richest region with oil reserves. These indices lead us to wonder: why the MENA countries have higher corruption compared with other ones? The second wonder is that are the wars that occurred in countries like Syria, Yemen, Iraq, Libya, Sudan, and others, is that happening as a result of the presence of oil in the region? Do resources dependent countries have an authoritarian government? Hence, we are attempting to figure out how oil rents in region feed corruption. Finally, our aim is not based on political ideology to answer all these questions but instead are based on theories by the most recent literature review. However, our main goal is that studying the impact of oil rents on corruption is also relevant to understanding the economic performance of resource-rich countries. Indeed, our paper is related to the literature on the impact of natural resources on economic growth, also known as the resource curse (Arezki & Brückner, 2011).

The early studies suggest that the abundance of natural resources often contributes to slow down economic performance in resource-rich countries (Sachs & Warner, 1995; Sachs & Warner, 1997a; Sachs & Warner, 1997b; Sachs & Warner, 2001; Horváth & Zeynalov, 2016). There is multiple theories about this phenomenon. I attempt to summarize these scenarios, I observed in early 90's, the abundance of natural resources has paradoxically caused the so-called Dutch disease, which is simply labor and capital factors transfer from low rents sector to high rents sector. A most common scenario is that the factors of the manufacturing sector transfer to the natural resources sector (Sachs & Warner, 1995; Horváth & Zeynalov, 2016)`. In the last 15 years, the next scenario is that the most researchers begin to blame natural resources to deteriorates institutions and increase corruption (Mehlum, Moene, & Torvik, 2006; Boschini, Pettersson, & Roine, 2013). Ross (2000), NRGI, (2015) confirm that the oil rents support authoritarian by making authoritarian regimes more durable. He also argues abundant resources

lead to high corruption and they also help to trigger violent conflict in low-and middle-income countries, particularly when they are located in the territory of marginalized ethnic groups (Ross M. L., 2001a). The index of the Natural Resource Governance Institute shows that rich countries are not immune to resource governance problems. For instance, Australia scores low in the governance of licensing and taxation. The U.S. scores only 50 of 100 points for its policies and practices in protecting the local environment in the Gulf of Mexico. Of the 13 high-income countries in the index, 6 all in the Middle East fail to achieve either good or satisfactory composite scores. The worst-performing in this group is Saudi Arabia, which scores only 36 points. Conversely, several middle- and low-income economies do comparatively well: India, Colombia, and Brazil are in the top ten. Even many of the poorest countries in the index while failing to achieve good or satisfactory composite scores do perform well in specific subcomponents (León, 2017).

To the best of our knowledge, our analysis is valuable because we extend the previous literature in many ways. We concentrate on the MENA economics, which is the first study to investigate the impact of interaction terms between oil rents and the rule of law on corruption. We also investigate the impact of interaction terms between oil rents and democracy on corruption. As well, we divided our sample to divers' sub-sample such as Middle East countries, North African countries, high income countries, and middle-income countries. Furthermore, the period of our study from 1995-2018, considers the longest period for this subject in the MENA countries.

Our empirical results are robust for different regressions and various control variables. First, we notice that the coefficients of oil rents are positives and highly significant for all our regressions. Moreover, the finding of an interaction term between oil rents and rule of law

support our hypothesis, which is the MENA economics suffering from poor institutions, therefore these economics are not able to avoid resources curse. Finally, for a political system, interaction terms between oil rents and democracy, support the autocracy system to achieve higher oil rent in the MENA region. This finding looks surprising, but we see that it make sense due to political dissimilarities, doctrinal conflicts, party caucuses, civil wars, and external wars. Another claim is that most MENA countries have begun to transfer from autocracy and anocracy to democratic regimes, which is a new experience that does not reach their goals in the beginning.

This paper is organized as follows. The next section discusses the most significant previous literature review. The second section discuss methodology and data. The third section documents main results. The fourth section debates robustness check. The last section summarizes the results and policy implications of this paper's findings.

1.3. Literature review

There exist a number of empirical studies that have investigated the impact of oil (rents of oil, production of oil, or exports of oil) on corruption, but this the first study focuses (MENA) countries. However, as I have mentioned earlier our goal in this literature is to figure out how oil rent impact on institutional quality not only on corruption. Examples of literature have concentrated on how oil can feed corruption, Karl (2004) debates that countries dependent on oil are often characterized by corruption and exceptionally poor governance, a culture of rent-seeking, and high incidences of civil conflict and inter-state war. Another study by Bhattacharyya and Holder (2010) discussed that resource rents increase corruption only if the quality of the democratic institutions is below a certain threshold level, which is 8.5. They also observed that the resource-rich countries tend to be corrupt because resource rents encourage

their governments to engage in rent seeking. But as in the resource-rich democracies Australia and Norway, this tendency can be checked by sound democratic institutions that keep governments accountable to the people. Arezki & Brückner (2011) found that an increase in oil rents significantly increases corruption, significantly deteriorates political rights while at the same time leading to a significant improvement in civil liberties. Thus, these findings can be explained by the political elite having an incentive to extend civil liberties but reduce political rights in the presence of oil rents to evade redistribution and conflict. Lam & Wantchekon (1999); Wantchekon (1999); Ross M. L (2000) argued that resource abundance promotes the elite's allocative power. By that they mean the prevalence of non-democratic regimes in the Middle East may have as much to do with the structure of their economies than with religious, ethnic or cultural factors. Wantchekon (2003) Following the Norwegian experience, one would most suggest that the management of the petroleum funds be monitored by an independent body directly controlled by the judicial branch of government. Wantchekon (2002) investigated theoretical and empirical of the relationship between resource and authoritarianism. Thus, he argued that resources facilitate the consolidation of an already established authoritarian government, resources also generate a breakdown of democratic regimes due to a combination of incumbency advantage, political instability, and political repression (Wantchekon, 2002). A statistical meta-analysis of the oil–democracy question, which integrated the results of 29 studies and 246 empirical estimates, concluded that oil had a negative, nontrivial, and robust effect on democracy (Ahmadov, 2014).

1.4. Methodology and data

To estimate the effects of oil rents, interaction between oil rents and rule of law, and interaction between oil rents and democracy on corruption, this study utilizes the largest panel

data set that consists of 21 countries and for the period 1995–2018. This data set is an unbalanced panel since some of the countries in the sample have different number of time series observations.

Random effect

There is no widely agreed upon proper regression model for the analysis of corruption due to the lack of strong theoretical framework for corruption (Seldadyo & Haan, 2006; G.Elbahnasawy, 2014; Kanyam, Kostandini, & Ferreira, 2017). We see that the most of researchers have used the Random Effects model (FE) to analyze panel data on corruption. Furthermore, The Hausman test suggest that the Random Effect model is appreciated. In this case, Random effects (RE) is preferred under the null hypothesis due to higher efficiency, while under the alternative Fixed effects (FE) is at least as consistent and thus preferred. We followed multiple literatures to add control variables, see for example (Seldadyo & Haan, 2006; G.Elbahnasawy, 2014). The following baseline (RE) panel data model is estimated.

$$Corruption_{i,t} = \alpha + \beta 1 Oil_{i,t} + \beta 2 ROL_{i,t} + \beta 3 (POP15\_65)_{i,t} + \beta 5 Openness_{i,t} + \beta 6\ Internet_{i,t} + \beta 7\ (Mobile100)_{i,t} + \beta 8\ GDP_{i,t} + \beta 9\ Inflation_{i,t} + \mu i + £t + \varepsilon_{i,t}$$

μ_i captures unobservable time-invariant country-specific effect and accounts for any country-specific effect that is not included in the regression. *£t* denotes year fixed effects which control for unobserved confounding factors constant across countries but evolving over time. $\varepsilon_{i,t}$ the time-varying error term. μ_i assumed to be random and independent of $\varepsilon_{i,t}$ *and* $\mu i \sim IID$ $(0, \sigma\mu 2)$ *and* $\varepsilon i \sim IIDv$ $(0, \sigma\varepsilon 2)$.

Where *Corruption i,t is* Corruption Perception Index (CPI), t refers to corruption in country i in year t. There are two indices are used to study corruption in countries Control of Corruption Index (CPI), and Control of Corruption (COC). we use both of them (CPI) and

(COC) to analyze this study. (CPI) defines corruption as the misuse of public power for private gain. In other word, the CPI is limited in scope, capturing perceptions of the extent of corruption in the public sector, from the perspective of business people and country experts (International, 2019). Surveys used to compile the index include questions relating to (for example) bribery of public officials. The validity of the index (CPI) is changing in different countries and depends on the number of information sources that are used to assess the level of corruption. Measuring (CPI) for each year is based on the information associated to both that specific year and the year before it. The Index scores countries and territories on a scale from (0) highly corrupt to (100) very clean. Hence, to make interpretation easier, we rescale index from (-10) highly corruption to (0) very clean. It is significant to note that in order to evaluate corruption in each country, the related score should be considered; the reason is that a country's CPI-based rank can change simply because new countries enter the index or others may drop out.

(CCI) is an aggregation of different indicators that measure the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as capture of state by elites and private interests. This index ranges from -2.5 (for very poor performance) to +2.5 (for excellent performance). We rescale both (CPI) and (COC) by multiplying them by negative one, to make them easy to interpret.

The major variable in our study is oil rents in equation (1). To measure oil rents, this study uses oil rents as a percent of GDP, obtained from the World Bank (WB). The oil rents are also known as the difference between the value of crude oil production at world prices and total costs of production. As well, we used another measurement for oil, petroleum and other liquids, which is obtained from U.S. Energy Information Administration. It defines as annual of total energy production from petroleum and other liquids. According to the World Development

Indicators (WDI), (WB). In 2011, on average, oil rents constitute 80% of total natural resources rents across sample countries (Farhadi, Islam, & Moslehi, Economic freedom and productivity growth in resource-rich economies, 2015).

The Rule of Law (ROL) ranges from -2.5 (bad) to 2.5 (good). It suggests as among the strongest candidates for corruption determinants. It reduces the probability that corruption occurs and it also captures the quality of institutions. In other words, a good rule of law means there is a lower corruption rate which suggests that no one is above the law. (G.Elbahnasawy, 2014; Kanyam, Kostandini, & Ferreira, 2017; Amin & Soh, 2019).

Another significant determinant for corruption is the size of the population. Economic theory suggests the advantages and disadvantages of a large country. For instance, the costs in monitoring and punishing corrupt politicians and bureaucrats implies lower corruption in larger countries. Congestion or administrative costs may also escalate with country size. Further, greater diversity in the larger countries implies that such countries may find it harder to reach a consensus on growth-enhancing anti-corruption reforms (Amin & Soh, 2019). We chose a variable of the total population between the ages of 15 to 64. The population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.

There are multiple of studies indicate there is a strongest relationship between the trade openness of a country and the lower levels of domestic corruption (Torrez, 2002; Amin & Soh, 2019). The openness index considers one of the strongest candidates for corruption determinants.

There are a growing number of ideas, which are claimed new technologies, like the internet and mobile, have been used for fight corruption. These technologies can be used as promoting the voice mechanisms to hold local leaders accountable, used also to facilitate the reporting of corruption, used to promote transparency in operations by providing information to

service users (Chêne, 2011). In our study, we use the internet adoption as control variable, which is measured by the number of internet users per 100 populations in our study, which is obtained from (WB). Recently, there are numerous of studies claimed that the internet has significant effect to fight corruption. Example of these studies are (Lio, Liu, & Ou, 2011; G.Elbahnasawy, 2014; Bhattacherjee & Shrivastava, 2018). G.Elbahnasawy (2014) found that e-government is a powerful tool in reducing corruption by telecommunation infrasturcture and the scop and quality of online service, which strengthend by greater internet adoption. In the last decade, the internet plays important role to fight corruption in the MENA countries, Arab spring, which is a series of anti-government protests, uprisings, and armed rebellions that spread across much of the Arab world. A major slogan of the demonstrators in the Arab world was combated corruption.

Like the internet, there are multiple studies, claim the mobile phone can be instrumental in detecting corruption. In Zimbabwe, for instance, a corrupt public official was recorded soliciting a bribe, while in India, the Central Bureau of Investigation launched a campaign urging citizens to report corruption via SMS with the view to building a database of officials to be monitored (Chêne, 2011). However, our Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service using cellular technology, which provides access to the public switched telephone network. The indicator is derived by dividing the number of mobile phone subscribers by total population and multiplying by 100.

GDP per capita annual growth is the most consistent finding of empirical studies on corruption. Recently, corruption level has played an influential role in determining income per-capita (Amin & Soh, 2019). Inflation, as measured by the consumer price index, reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly (Amin & Soh, 2019).

To show how the interaction term between oil rents and rule of law influence corruption. We will determine the following equation:

$$Corruption_{i,t} = \alpha + \beta 1 Oil_{i,t} + \beta 2 ROL_{i,t} + \beta 3\ (Oil*ROL)_{i,t} + \beta 4 (POP15\_65)_{i,t} + \beta 5 Openness_{i,t} + \beta 6\ Internet_{i,t} + \beta 7\ (Mobile100)_{i,t} + \beta 8\ GDP_{i,t} + \beta 9\ Inflation_{i,t} + \mu i + £_t + \varepsilon_{i,t}$$

Another interaction term is the interaction term between oil rents and democracy. We use Polity2 index as proxy for democracy. Polity2 is a score captures political regime authority range from -10 to +10.Range from (-10 to -1) autocracies, and (1 to +10) democracies (Marshall and Jaggers). We will determine the following equation:

$$Corruption_{i,t} = \alpha + \beta 1 Oil_{i,t} + \beta 2 ROL_{i,t} + \beta 3\ (Oil*Democracy)_{i,t} + \beta 4 (POP15\_65)_{i,t} + \beta 5 Openness_{i,t} + \beta 6\ Internet_{i,t} + \beta 7\ (Mobile100)_{i,t} + \beta 8\ GDP_{i,t} + \beta 9\ Inflation_{i,t} + \mu_i + £_t + \varepsilon_{i,t}$$

1.5. Main results

The Table (1) presents the summary statistics for all variables included in the empirical study, covering 21 oil-abundant the MENA countries. As can be readily seen from this data, (COC) has an average of (0.196), a maximum value of (1.664), reflecting that there are large regional differences in corruption. Furthermore, the average of oil rents is 20.42665 and its maximum value is 67.5278, indicating that most of the MENA oil exporters are heavily dependent on oil export revenues. Whilst, the average rule of law index of -.1729901, a maximum value of 1.629644, and a minimum value of-2.278996. In fact, the maximum value of rule of law reflect values of rule of law in two countries, Israel and Malta, but actually the level of rule of law is lower than this value in exporter oil countries, that confirms that the reign as a whole performs poorly in terms of their rule of law. Furthermore, this poor rule of law is blamed for today's growth in the region. While, polity2 index has a mean value of -4.121951, reflecting that the region as a whole performs anocracy system.

Table (1): Summary of Main Variables (1995 -2018)

Variable	Observations	Mean	Std. Dev.	Min	Max
COC	420	.1960102	.7621846	-1.843301	1.663725
polity2	410	-4.121951	5.180342	-10	7
Oil	373	20.42665	17.65118	.0004279	67.5278
ROL	420	-.1729901	.8156136	-2.278996	1.629644
ROL x Oil	309	-6.918954	24.96711	-117.1579	33.63094
polity2xOil	355	-119.5513	153.012	-542.6021	271.9859
Variable	Observations	Mean	Std. Dev.	Min	Max
COC	219	.5675445	.472677	-.7865694	1.62668
polity2	206	-2.116505	4.509721	-9	7
Oil	175	16.29438	18.11768	.0006785	67.5278
ROL	219	-.5729723	.5772909	-2.278996	1.247308
ROL x Oil	147	-18.86279	26.77506	-117.1579	.4795972
polity2 x Oil	162	-36.24717	117.2844	-472.6946	271.9859
Variable	Observations	Mean	Std. Dev.	Min	Max
COC	161	-.5440284	.4803394	-1.843301	1.399408
polity2	162	-6.438272	5.327698	-10	6
Oil	161	24.08868	17.40915	.0004279	61.23135
ROL	161	.6069296	.4309017	-1.218958	1.629644
ROL x Oil	133	9.930947	9.705367	-6.407806	33.63094
polity2 x Oil	161	-206.6199	149.1515	-542.6021	.0325041
Variable	Observations	Mean	Std. Dev.	Min	Max
COC	294	.0257483	.811682	-1.843301	1.663725
polity2	277	-4.873646	5.501178	-10	6
Oil	258	22.99772	17.2414	.0004279	64.07807
ROL	294	.0039857	.8535204	-1.990628	1.629644
ROL x Oil	214	-3.749614	26.00381	-117.1579	33.63094
polity2 x Oil	247	-149.6979	156.9371	-542.6021	271.9859
Variable	Observations	Mean	Std. Dev.	Min	Max
COC	122	.601811	.4137336	-.3699424	1.626812
polity2	133	-2.556391	4.027206	-9	7
Oil	115	14.65852	17.26289	.0029524	67.5278
ROL	122	-.5906919	.5193974	-2.278996	.2325185
ROL x Oil	95	-14.05831	20.87751	-72.69509	.4795972
polity2 x Oil	108	-50.60501	118.0614	-472.6946	61.34869

Results for each of the six regressions are presented in the Appendix (A1); the MENA oil exporters' corruption is greatly and positively influenced by oil rents. In fact, the positive signs are not surprising signs in the MENA region because the region has stricken by violent conflicts

and dictatorships. The corruption remains endemic in the Arab states; therefore, it is no surprise that 19 of 21 Arab states score below 50 in Index (CPI), 2017, which captures levels of corruption in the public sector. Our findings were consistent with other paper that tested for world such as (Bhattacharyya & Hodler), and with our hypothesis. We claim that these findings are correct for diverse control variables.

1.5.1. Interaction term between oil rents and rule of law

In order to test for our hypothesis and to foster our understanding of the positive impact of oil rents on corruption, it is useful to investigate for interaction term between oil rents and rule of law. We hypothesized however a poor quality of rule of law in the MENA countries cause a high corruption, but a good enough quality of institutions can reduce corruption. We have used our interaction term and we used rule of law as proxy for quality of institution in the MENA countries. In appendix (A2), we found that the impact of oil rent is a positive and highly significant, the strength of the resources curse is positive for all the specifications. The interaction term has a negative and significant at 5% and 10%, indicating that better institution may reduce corruption. To test for the marginal effect of oil rents on corruption depends on quality of institution as follows:

$$\frac{(\partial Corruption)}{(\partial Oil\ Rents)} = 0.00186 - 0.00575(-0.173) * (Min) = \ 0.0027$$

$$\frac{(\partial Corruption)}{(\partial Oil\ Rents)} = 0.00186 - 0.00575(1.63) * (Max) = \ -0.00634$$

The oil rents have a positive impact on corruption, but the impact diminish as rule of law improve. Since we know the law rule range (-2.5 to 2.5), and the mean value in the MENA countries is (-0.173), but the threshold should be $\frac{0.00186}{0.00575} = 0.32$ in the MENA countries. We observed the following hypothesis: the oil curse is weaker when the rule of law is higher. The

rule of law thus is the key to understanding the oil curse: when quality of law rule is bad, oil rents abundance is cursed; when the law rule is good, oil rents abundance is a blessing.

1.5.2. Interaction term between oil rents and democracy

In Appendix (A3), we have included an interaction term between democracy score (polity2) and oil rents, and the interaction term turns out statistically significant. The interaction sign has the non-excepted sign. Furthermore, the magnitude of oil rents is positive and the magnitude of the interaction terms are negative. Our findings, however, lead us to one result that autocracy is better regime in the MENA countries. Not in all cases that the democracy system provides better service for economic growth, in general, it is expected that the democratic system will support the countries to grow faster (Wibisono, 2015). Remember that these findings indicate how changes in oil rents correspond to changes in corruption for various groups of MENA countries.

The effect of oil rents on corruption for countries with the lowest level of democracy is given by 0.0164 (direct effect) + 0.00155(indirect effect) (-2.6) (average level of democracy) = 0.0182. Our approach is different than the approach that reached by Bhattacharyya and Hodler (2010), I used a similar measurement of democracy, but I used different measures of oil rent and different regions. However, they have reached to an argument that countries with higher levels of democracy are less susceptible to the corrupting influence of oil, with an estimated interaction coefficient of 0.0026, significant at 1% (results are not shown).

We found that our interaction terms are quantitatively big and statistically significant. Hence, we found evidence that cross-country differences in democratic institutions significantly affect the marginal impact that oil rents have on corruption (Aslaksen, 2010; Bhattacharyya & Hodler). Perhaps, while it may be surprising given the findings of the empirical institutions'

literature, it emphasizes political institutions as key determinants for long-run economic development (Arezki & Brückner, 2011), the easiest understanding of these results is that oil rents have a statistically significant average effect on corruption. We also document that these results are strong with controlling for trade openness, mobile, internet, population, GDP per capita (annual growth), and inflation.

1.6. Robustness check

To check for robustness, we run only for total sample in the MENA region, and for various control variables. All our regressions confirm that the coefficients of interaction terms between oil rents and rule of law are negative and statically significant at 5% level. As well, our findings confirm that with maximum value of rule of law in appendix (A1), the curse of positive coefficient of oil rents on corruption switch to negative coefficient, also suggesting the MENA countries have low quality of institutions. In appendix (A5) columns (1, 2, 3, 4, 5, 6), we see that the coefficients of interaction terms are (-0.00543, -0.00607, -0.00554, -0.00488, -0.00569,-0.00575) respectively.

From other side, we test for interaction term between oil rents and democracy. Once more, we regress only for total sample in the MENA region, and for different control variables. The results confirm that autocracy system is better system in the MENA countries. From our findings however you can see in appendix (A6) and columns (1, 2, 3, 4, 5, and 6), that the interaction terms are (0.00419, 0.00033, -0.0013, 0.0012, 0.0017, 0.00155) respectively, that suggesting democracy is not better system in the MENA countries.

1.7. Discussion

Our findings, therefore, confirm that the commonly held belief that oil rents are associated with higher corruption. We agree with the hypothesis that oil rents are a direct threat to quality of institutions, especially in the MENA countries. From the policy perspective, it is hence not the case that investors have to fear that windfalls from oil rents are a threat to their investment projects because oil rents make civil conflict more frequently. Instead, what policy makers should be aware of and concerned about is that oil rents significantly increase corruption, which bears a substantial welfare loss due to the misallocation of resources and the costs associated with secrecy.

To better understanding a positive impact of oil rents on corruption, it is useful to investigate the interaction term between oil rents and rule of law. We are examining our hypothesis, which is a poor-quality law rule and democratic institutions cause high corruption, but a good enough quality of institutions can eliminate corruption. Our findings however were not surprising for interaction term between oil rents and rule of law, but it was surprising for political system. First, the oil rents have a positive impact on corruption, but the impact diminish as rule of law improve. In other words, our estimates confirm that the relationship between oil rents and corruption depends on the quality of rule of law, resources-rich countries can avoid high corruption if the quality of law rule is higher. As well, we found that the autocracy system is a better regime in MENA countries.

Finally, studying the impact of oil rents on corruption is also relevant to understanding the economic performance of resource-rich countries. Indeed, our paper is related to the literature of the impact of natural resources on economic growth, also known as the resource curse.

CHAPTER 2

THE CURSE OF NATURAL RESOURCES, QUALITY OF INSTITUTIONS, AND ECONOMIC GROWTH: THE CASE OF MENA COUNTRIES

2.1. Abstract

This study attempts to show what extent the Middle East North Africa (MENA) countries' natural resources, quality of institutions (QI), and diversification can be linked to economic growth. Using panel data analysis over the period 1996-2018, to test for linear and non-linear impact of oil rents on economic growth, to examine the main symptoms of the resource curse phenomenon in the MENA countries by using two systems: Generalized Method of Moments (GMM) estimator and fixed effects FE models. The findings indicate that growth is greatly and positively influenced by natural resources, but we are still seeing that these countries are not developed. In fact, that is not surprising because most of these countries are import dependent with large import bills and huge debt service burden. In other words, the cash inflow comes from oil rents, they are not going to develop infrastructure in these countries, but they go most of them for wages. The findings also indicate that the MENA countries suffer from weak institutions and Dutch disease, leading to reduced economic growth. From another side, the findings also show that diversification (DIV) has frustrated by oil rents because the MENA countries rely on natural resources, which encouraging rent-seeking activities, but the multiplicative interaction terms between (QI) and oil rents indicate that the combined effect of these two variables is unproductive factors to promote economic growth.

2.2. Introduction

There is no consensus about the number of countries in the MENA region. We However followed definition of World Bank (WD), it defines 21 countries; Djibouti, Yemen, Egypt,

Lebanon, Syria, West Bank and Gaza, Jordan, Israel, Iraq, Morocco, Algeria, Tunisia, Libya, Saudi Arabia, Kuwait, Bahrain, Oman, United Arab Emirates (UAE), Qatar, and Iran. The (MENA) region has been endowed with the largest amount of natural resources, oil, with resource discoveries taken place since the first half of the 20th century (Shehabi, 2019). The region holds close to half of global oil reserves and a quarter of natural gas reserves. It controls almost a third of oil production and fourteenth percent of natural gas production (Diop, Marotta, & Melo, 2012). Mills and Alhashemi (2018) debate an abundance of natural resources can exacerbate instability, like the case in my country (Iraq). Ross (2001) shows how access to oil rents has boosted authoritarian regimes in many of these countries, in addition to narrowing the economic base as a result of Dutch disease, named for the impacts of a gas discovery in that country in the 1960s, as currency appreciation makes imports cheaper and exports not denominated in dollars more expensive. For these significant issues, we need to test and answer multiple questions such that why do natural resources curse in most of the MENA countries and blessing in other countries such as Norway, Botswana, and Australia? Are MENA countries able to diversify their economies under their weak QI? Do natural resources have a direct or indirect effect on economic growth?

In the 80's, the most of studies have observed countries that depend heavily on their natural resources, tend to suffer from many of macroeconomic problems such as less investment, equality, political right. Similarly, they suffer from high corruption compare to the other countries that rely less on natural resources, turn on to decrease in economic growth (Gylfason, 2006). Thus, this called the phenomenon of Dutch Disease, which refers to the problem that can be caused by the increased exploitation of natural resources, which lead to a decline in the other sectors of the economy. In the MENA countries, Labor and capital factors transfer from non-oil

sectors to the oil sector, and at the same time vast amount of foreign currency entrance in economy led to appreciation of the domestic currency (ULUSOY & TAŞ, 2017). Thun, they cause the decline in growth in manufacturing sector (RomanHorváth & Zeynalov, 2016).

In general, natural resources can cause numerous problems for economic growth in the short run, the previous studies have mentioned that natural resources can reduce growth through the following channels: develop currency appreciation, loss of international competitiveness for exports, boost in real wages, increase imports of luxury goods, drop in tax revenue, and increase income inequality. Likewise, in the long run, more unemployment, worse fiscal budget, more manufacturing sector diminishing, more service sector declining, more current account deficit, and more corruption, less trade and foreign investment, less domestic investment, less political liberty, less education, and less financial depth (Gylfason, 2006).

The great debate for recourse curse theory is started by Sach and Warners (1995), and Richard Auty (2001), who say that natural resource abund0ance decreases economic growth. Later on, other studies have provided a brief review of the literature that reports the connection between QI and economic growth with reference to the resource curse, they address the impact of natural resources on economic growth through institutions (Karabegović, 2009). In the 90's, ULUSOY & TAŞ (2017) claim that the quality and efficiency of institutions in resource rich countries had changed government behaviors. Researches in this period show that weak institutions negatively affect growth and development and vice versa. The New Institutional Economy School has led us to understand the improvement process of societies better by adding institutions and property rights into the analysis. The studies carried out have revealed that there is an increase in welfare in those societies where entrepreneurs feel that both they and their investments are safe and in which laws and rules are applied; on the other hand, there is

weakness in the development of those societies where agreements are weak or lacking (Haydaroglu, 2015).

Main differences of this study, from other studies is that the most natural resources studies deal with association between natural resources and economic growth, or link between natural resources, government indicators, and economic growth, while our study focuses not only on these variables, but also on new proxies for (QI) such as political rights and civil liberties, and their interaction effect on economic growth are also studied. Second, to best of our knowledge, this first study has linked between diversification and its interaction term with natural resources, institutional quality, and economic growth. Findings have reached by this study. First, we did not agree with findings by Sachs and Warner (1995), Sala-i-Martin (1997), who showed that the empirical evidence of a natural resource curse had the negative impact of natural resources on economic growth, but our empirical results are strongly positive and significant. As well as our findings are consistent with classical theory, which assumed an abundance of natural resources is a blessing for economic growth. Second, we observe that the coefficient of interaction term (between oil rent and diversification) is positive. This finding indicates that diversification has a significant impact on reducing the resource curse.

The remainder of the paper proceeds as follows. The next section reviews the relevant literature. Section 3 is our data. Section 4 analyzes the econometric model and methodology. Section 5 discusses our main results. Section 6 concludes the results.

2.3. Literature review

In this section we will briefly discuss the relevant literature that focuses on the relation between natural resources, economic growth, (QI), and (DIV). We start with more significant studies by Sachs and Warner's study (1995). It is the first significant and systematic one

regarding economic problems, concerning natural resources. They observed that economies with a high ratio of natural resource exports to GDP have slower economic growth from 1970 to 1990 than the world average. As well, they (1997a, b, see also 1999) asserted that natural resource abundant countries tended to have a larger service sectors and smaller manufacturing sectors than resource-poor economies. There is also evidence that natural resource abundant countries tended to have slower growth in exports of manufactures than did resource poor-economies (Sachs & Warner, 1999). Sala-i-Martin's (1997), the goal of his "two million regressions" paper was to test every variable that was found to matter for economic growth. He also observes significant 22 variables on economic growth such as natural resources having negative impact. On the other word, he confirmed the same findings that reached by Sachs and Warner. Auty (2000) also studied 70 developing countries and found that in resource-rich countries corporate institutional weakness was spotted and due to limited (DIV) in manufactured goods led to constrained economic growth in these countries. In 2001, two studies observed, Auty, 2001; Gylfason (2001a), a shift of both labor and capital from the manufacturing sector to the resource sector and the non-tradable sector. The manufacturing sector may also be harmed through wage increases. If the booming natural resource sector has significant rents, resource firms are able to raise wages to attract an increasing number of employees. This forces the manufacturing sector to bid for employees by offering higher wages, putting it at a competitive disadvantage. A booming resource sector also implies increased competition for capital (Gylfason, 2001a). Gylfason and Zoega (2006) demonstrate an additional indirect effect of natural resources on growth through civil liberties. Finally, civil liberties have also been used as a proxy for the (QI) (Gylfason and Zoega, 2006), which has been argued to be an important determinant of the effect of natural resources (Mehlum et al., 2006). ULUSOY and TAŞ (2017) analyze the relation

between institutions on cross-country economic development in Natural Resource Rich countries and OECD countries. The paper emphasizes the effects of economic freedom that interacts with total resource rents on total factor productivity, covering 30 Natural Resource Rich, 34 OECD countries in dynamic panel data for the period of 2000-2013. Findings suggest that as economic freedom increases along with resource rents, total factor productivity increases for natural resource-rich countries. The results are mixed for OECD countries. Furthermore, they observe that the coefficients of total resource rents appeared to be significantly positive in the OECD countries but negative in natural resource-rich countries. The negative effects of natural resources rent on total productivity growth are consistent with the resource curse hypothesis.

Now, we will briefly discuss the relevant literature that focuses natural resources in MENA. For instance, Matallah and Matallah (2016) confirmed the robust relationship between oil rent and growth, they have diagnosed resource curse in 11 MENA oil exporters' countries. They also show that governance is a key ingredient in the diversification recipe, while, oil rents frustrate economic diversification by encouraging rent-seeking activities. The multiplicative interaction term between governance index and oil rents indicates that the combined effect of these two variables is powerful in promoting diversification. Another study have used a sample of 16 (MENA) countries over the sample period 1995-2005, the paper analyzes determinants of institutional quality based on six separate governance indices. The determinants under consideration include measures of economic freedom by the Cato Institute and the Heritage Foundation, indicators of policy quality, real per capita GDP, risk rating, and the degree of openness. Five measures of institutional quality increase real GDP growth significantly across MENA countries. In contrast, institutional quality has a negative impact on the growth of private credit and private investment. Further, the combined evidence does not suggest that improvement

in institutional quality is a major factor in attracting FDI flows to MENA countries (Kandil, 2009).

2.4. Data, variables, and methodology

We collect our data from multiple sources that utilizes a strong balanced panel data. Our data involved 17 MENA countries and covered period 1995-2018. We have dropped four from MENA countries due to lack of dataset, Syria, Libya, Malta, and Yemen. The dependent variable is GDP per capita (Thousands of US$) from World Bank (WB). The main variables in our regressions are the ratio of oil rents to GDP, petroleum production, diversification, and quality of intuitions. We were not able to include the time period prior to 1995 in our study due to the unavailability of (QI). According to World Development indicators (WDI), (WB). In 2011, on average, oil rents constitute 80% of total natural resources rents across sample countries (Farhadi, Islam, & Mosleh, 2015).

To approach our hypotheses, we use two estimated models and they include the generalized method of moments (GMM) and Fixed Effect (FE). (GMM) is developed for dynamic models of panel data. The most previous studies face the problem of endogeneity, measurement errors and omitted variables. Panel data solves omitted variables problem by considering country specific and time-specific effects. (GMM) estimation method helps overcome the problems of endogeneity problem. Serial correlations based on the GMM residuals are tested by Aurellona-Bond and over identifying restrictions are tested by Sargan tests (ULUSOY & TAŞ, 2017). Arellano and Bond (1991) include all possible instrument variables in (GMM). The deficiency of this difference equation is that it does not include country specific effects. Arellano and Bover (1995) first developed system GMM estimation method, which

considers the difference and level equations together and considered to be more effective (ULUSOY & TAŞ, 2017).

We have used the fixed-effect model after we run a Hausman test, hence, the results suggested that the fixed effects model is the appropriate one. The Hausman chi-square test statistic is statistically significant at the 1% level, then the null hypothesis is rejected in favor of the alternative hypothesis. We have used in this study different sets of equations, by adding diversification variable as an independent variable, to test the effect of diversification variables in resources-rich countries, we have also used different variables of resources like oil rents and petroleum production, the case of MENA countries. However, we proceed with an estimate the following baseline FE model:

$$GDP_{i,t} = \alpha + \beta_1 ATEP_{i,t} + \beta_2 Oil_{i,t} + \beta_3\, petroleum_{i,t} + \beta_4\, NR + \beta_5 DIV_{i,t} + \beta_6 IND_{it} + \beta_7\, AGR + \beta_8 SER + \mu i + \varepsilon i,t \quad ....(1)$$

μi captures unobservable time-invariant country-specific effect and accounts for any country-specific effect that is not included in the regression. Characteristics. εi,t the time-varying error term. μi assumed to be random and independent of $\varepsilon i,t,\ and\ \mu i \sim IID\ (0, \sigma\mu 2)\ and\ \varepsilon i \sim IIDv\ (0, \sigma\varepsilon 2)$.

Where (GDPpc i,t) is gross domestic product divided by mid-year population (current US$). TEPA is an annual total energy production. Oil is oil rents as a percentage of GDP. Petroleum i,t is petroleum production in Billion Barrels Per Year (BBY). NR are natural resources as a percentage of GDP. (DIV) is product concentration and diversification indices of exports and imports. IND is value-added per worker of industry. AGR is value-added per worker of agriculture. SER is value-added per worker of service.

The dependent variable is GDP per capita as a current U.S. dollar, which is obtained from the World Bank's World development indicators. It's calculated by dividing GDP on the total population when GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. However, we have rescaled it by dividing one thousand.

The main variables in the above regression are ATEP, oil rents, petroleum, and diversification. For ATEP and petroleum variables have collected from U.S. Energy Information Administration (EIA). Other indicators of natural resources are oil rents and natural resources, which have collected from the World Bank's World development indicators. Oil rents are referred to as the difference between the value of natural gas production at world prices and total costs of production. Natural resources are a sum of oil rents, natural gas rents, coal, mineral, and forest rents.

Normally, literatures, which have studied natural resources subject, include other sectors like manufacturing sector, service sector, and etc. However, because of lack data in MENA region, our study involved three control variables, which are value added per worker {for Industry (IND), Agriculture (AGR), and Service (SER)}. They are measurement of labor productivity, value added per unit of input. Value added denotes the net output of a sector after adding up all outputs and subtracting intermediate inputs.

$$GDP_{i,t} = \beta 0 + \beta_2 ATEP + \beta_3 DIV + \beta_4 DIVxATEP + \beta_5 IND_{it} + \beta_6 AGR + \beta_7 SER + \mu_i + \varepsilon_{i,t} \ldots.(2)$$

Eq (2), the panel model is extended by adding interaction term, each time interacts diversification variable by different varieties of natural resources variables. ATEP x DIV is an

interaction term between annual total energy production and diversification. DIV x OIL is an interaction term between oil rents and diversification. Petroleum x DIV is an interaction term between petroleum and diversification. NR x DIV is an interaction term between natural resources and diversification.

Another hypothesis, this study aims to test that the quality of institution is another scenario to slow economic performance in MENA economics. We however build econometric models, by adding interaction term between different variables of natural resources and government effectiveness. ATEP x GE is an interaction term between annual total energy production and government effectiveness. OIL x GE is an interaction term between oil rents and government effectiveness. Petroleum x GE is an interaction term between petroleum and government effectiveness. NR x GE is an interaction term between natural resources and government effectiveness. We proceed with an estimate the following baseline FE model:

$$GDP_{i,t} = \beta 0 + \beta_1 ATEP + \beta_2 GE + \beta_3 (ATEP \; x \; GE) + \beta_4 DIV + \beta_5 IND_{it} + \beta_6 AGR + \beta_7 SER + \mu_i + \varepsilon_{i,t}$$

Where GE is government effectiveness, which is used to represent the vector of institutional variables in each country, this indicator ranges from -2.5 (bad) to 2.5 (good).

To robust check, we use a quality of institution indicator, which is regulatory quality. We proceed with an estimate with the following baseline FE model:

$$GDP_{i,t} = \beta 0 + \beta_1 ATEP + \beta_2 GE + \beta_3 (ATEP \; x \; GE) + \beta_4 DIV + \beta_5 IND_{it} + \beta_6 AGR + \beta_7 SER + \mu_i + \varepsilon_{i,t}$$

Where RQ is regulatory quality, which is used to represent the vector of institutional variables in each country, this indicator ranges from -2.5 (bad) to 2.5 (good).

2.5. Main results

2.5.1. Summary of main variables

The table (1) presents summary of main variables in our study, GDP per capita has a mean value (12837.84) US$, and a maximum value (85076.15) US$, reflecting that there are certainly large regional differences in GDP per capita, which is one of the mechanisms that the theory of the "Dutch Disease" predicts inequality income, the income from oil and other natural resources produces negative economic consequence due to the workers leave manufacturing for higher-paying jobs in other sectors. Furthermore, the mean of natural resources and oil rents are 19.5855 and 20.42665 respectively, and its maximum value 68.77825 and 67.5278 respectively, indicating that the most MENA oil exporters are heavily dependent on oil export revenues. For diversification variable, its mean is -180 and its maximum value -25, reflecting the MEAN economics suffer from poor diversification because natural resources are not leave room for diversification. While COC, PS, ROL, GE, QR, and VA have a mean value of respectively, reflecting that the region as a whole perform poorly in terms of their intuitions, this result confirm the past theory, which is countries spend long time under socialism, often show lower institutional quality (RomanHorváth & Zeynalov, 2016).

The table (1): Summary of Main Variables (1995 -2018)

Variable	Obs	Mean	SD	Min	Max
GDP per cap (current US $)	465	12837.84	15537.62	285.5696	85076.15
Natural Resources	419	19.58552	18.04544	.0008756	68.77825
Oil	373	20.42665	17.65118	.0004279	67.5278
petroleum	360	3.749981	5.366559	.005	25.497
DIV	499	-180.4629	57.58528	-259	-25
COC	420	-.1960102	.7621846	-1.663725	1.843301
GE	420	-.2046367	.8380949	-3.002496	1.509872
PS	420	-.5203223	1.073516	-3.180798	1.599426
RQ	420	-.2196329	.8641128	-2.274461	1.431291
ROL	420	-.1729901	.8156136	-2.278996	1.629644
VA	420	-.8408668	.7317774	-2.050344	1.372729
Services	328	21885.64	15856.29	1851.634	67908.26
Agriculture	364	13381.78	17100.43	836.858	94914.99
Industry	333	47611.61	54725.62	5625.111	214615.7

2.5.2. Diversification and natural resources, and economic growth.

The appendix (B1) reports the findings of two dissimilar estimates, the first one is GMM model and the second one is FE model. Nevertheless, we will emphasis only on FE estimation in this study. We also use four different measurements of resources, which are annual total energy production, oil rents, natural resources, and petroleum production, all these variables indicate to robust positive association between oil rents and economic growth in the MENA region. Our findings are consistent with classical theory, which assumed there is a positive relationship between natural resources and economic growth. On the other hand, we are strongly contradicted with resource curse hypothesis and results found by Sachs and Warner (1995) and confirmed by Sala-i- Martin (1997), such as natural resources having negative effect on economic growth.

The coefficients of diversification and industry are negative and highly significant coefficients with unexpected signs, and this can be explained by the fact that the natural resources sector leaves no room for investing in the other non-resources sectors (Matallah & Matallah, 2016). As I am one of ME's citizens, I know that many MENA countries look up the

diversification of economy, but they are failing to achieve that aim, in fact, it is not only in the MENA countries, but there are other countries, are considered politically better stability, but they are still failing to implement economic diversification. For instance, after several years of implementing different policies, strategies and programs for economic diversification, the depth and spatial distribution of private sector activities in Botswana remain narrow and shallow (Conteh, 2008).

We show also that the positive association between natural resources and economic growth. In fact, these findings are not surprising because there are evidence of Norway. The Norway experience shows that efficient and farsighted management of oil rents is clearly possible, and it makes a country grow faster.

Sachs and Warner (1997a, b) have mentioned that there is a supportive evidence of natural resource abundant countries tended to have a larger service sectors and smaller manufacturing sectors than resource-poor economies, our findings also support these facts.

The Dutch disease tends to reduce the level of total exports or bias the composition of exports away from those kinds of high-tech or high-value-added manufacturing and service exports that may be particularly good for growth over time. Exports of capital i.e., inward foreign direct investment (FDI) may also suffer in the same way. The mechanism is essentially the same. In other words, natural capital tends to crowd out foreign capital, broadly speaking (Gylfason, 2006). Other study indicate that higher oil rents countries lead to poor diversification by Matallah and Matallah (2016). In the same column, our regression indicates a negative and significant effect at 1% of diversification on economic growth, and since the negative coefficients indicate higher diversification (Osakwe, Santos-Paulino, & Dogan, 2018).

2.5.3. Interaction term of diversification and resources.

In appendix (B2), we turn to the first contribution in this literature by adding new variables (DIV and its interaction term with different variable of natural resources) for our regressions to test whether the (DIV) variable can help to promote economic growth. The diversification variable is negative and highly significant, this reflects to a Dutch disease problem due to the resources sector that has frustrated diversification in the MENA countries. The resources sectors encourage seeking a piece of the resource pie instead of engaging in productive activities, and they are strong enough to keep the doors locked in front of diversification strategies (Matallah & Matallah, 2016).

The interaction terms are negative and highly significant. Thus, that is not consistent with hypothesis of economic diversification, which state that economic diversification contributes positively to economic performance. However, to test for marginal effect of resources on economic growth depends on diversification as follows:

$$\frac{d(growth)}{d(natural\ resources\ )} = -0.957 - 0.00125\ (-180.5)(\text{mean of diversification}) = -0.731$$

$$\frac{d(growth)}{d(natural\ resources\ )} = -0.957 - 0.00125(-25)(\text{maxiumam of diversification}) = -0.075$$

We see that the resource curse is weaker where there is a higher level of (DIV). The coefficients of oil rent, petroleum, and resources are -0.106, -1.637, and -0.0800 when we take the total effects of interaction terms, the total effect become positives (-0.106 + 0.00161 = 0.185> -0.106), (-1.637 + 2.274= 0.637 > -1.637), and (-0.0800+2.55 = 2.19>-0.0800). Statistically, we can observe that (DIV) can help to avoid Dutch disease problem, but the findings of total effect of interaction terms with maximum value of diversification are negative (-0.075, -0.066, -0.132, -0.094), which means better diversification lead to slow economic growth. These findings contradicted our hypothesis, which is better diversification leads to an increase in

economic growth. It seems a scenario of weak institutional quality is better to explain the problem of slow down economic growth in resource-rich countries.

2.5.4. The interaction term of government effectiveness and resources.

To test for our hypotheses, which is the resources curse in the MENA countries does not only come from the Dutch disease story, but also comes from poor institutional quality, we then assume a good enough quality of institution may help to avoid resources curse, we, however, use government effectiveness as a proxy for quality of institution. Our findings indicate that the resources are highly significant for all types of resources and interaction terms are also significant. At first sight, it seems there is no problem with quality of institution, but when we test for the total effect, we find that the poor quality of institutions slows economic growth and good institutions accelerate economic growth. The marginal effect of resources on economic growth depends on quality of institutions as follows:

$$\frac{d(growth)}{d(natural\ resources\ )} = 0.727 + 0.214\ (-0.205)(\text{mean of GE}) = 0.683$$

$$\frac{d(growth)}{d(natural\ resources\ )} = 0.726 + 0.214(1.51)(\text{maxiumum of GE}) = 1.049$$

The total effect of interaction terms (TEPA x GE), (Oil x GE), (Petroleum x GE), and (Resources x GE) are (0.683, 0.234, 0.182, 0.220) with a mean value of government effectiveness respectively. The total effect of interaction terms (TEPA x GE), (Oil x GE), (Petroleum x GE), and (Resources x GE) are (1.049, 0.806, 1.880, 0.750) with maximum value, respectively. However, the findings confirm our hypothesis, which is a bad institution slows economic growth and good institutions accelerates economic growth.

2.6.1. The interaction term of regulation quality and resources.

In appendix (B4), another interaction term of an institution is regulation quality with various types of resources, which found all interaction terms significant. As well, all types of resources have remained highly significant in regressions. The findings have also confirmed our hypothesis, which found that a bad institution slows economic growth and good institutions accelerates economic growth. The total effect of interaction terms (TEPA x RQ), (Oil x RQ), (Petroleum x RQ), and (Resources x RQ) are (0.626, 0.226, 1.034, 0.216) with a mean value of regulation quality, respectively. The total effect of interaction terms (TEPA x RQ), (Oil x RQ), (Petroleum x RQ), and (Resources x RQ) are (0.648, 0.587, 1.814, 0.502) with maximum value of regulation quality, respectively.

2.6. Robustness checks

For robustness checks, we combined all our interaction terms in one regression. By this, I mean that we added interaction terms of petroleum and diversification together with interaction terms of petroleum with quality of institutions. We have used only the production of petroleum as a proxy for natural resources because the region heavily depends on oil revenue. Thus, we started to add for each regression one new extra variable. We can see that through the appendix (B5).

However, let us begin to analyze the interaction term between the production of petroleum and diversification. The findings are still negative and significant, which means diversification strategy still not help as a tool to avoid Dutch disease problems in MENA economics. The findings for all regressions are matched with previous findings. However, we claim that our findings are robust for different regressions and different combinations of variables.

On the other hand, we also used a different set of variables for interaction term between production of petroleum and quality of institutions. The findings have confirmed that our previous findings are correct and robust, which means the weak institutions in MENA countries reduce economic growth coming by the production of petroleum. Finally, we were not able to add more variable to our regression because lack of data set in MENA countries. Adding new variables reduce number of observations.

2.7. Conclusion and discussion

We examine how natural resource, (DIV), and the (QI) influence economic growth in the MENA countries using panel data estimator over the 1995-2018. We have hypothesized that the (QI) essentially determines whether natural resource abundance is a blessing or a curse. We used governance institutions to test our hypothesis such as (Government Effectiveness, Regulatory Quality, Rule of Law, Political Stability and Absence of Violence), they can achieve superior results in economic growth and social development. However, our hypothesis is supported by our findings and our data, the role of institutions is slow economic growth, and the Dutch disease story is confirmed in economics. The theory of "Dutch Disease" predicts that oil and other natural resources produce negative economic growth consequences through several channels. First, inequality income, which suggests that workers leave manufacturing for higher-paying jobs in other sectors, which is confirmed by our findings. Second, our findings show that the productivity of other sectors (manufacture sector) is negative and significant because of both phenomenon of rent-seeking and the Dutch disease. They are not a unique feature of resource economies, but it does appear to have a particularly strong effect on them and to produce institutional weaknesses. We report that while resource-rich countries in MENA have maintained high levels of income per capita, they have performed poorly when going beyond the assessment

based on standard income level measures. They have experienced relatively low and non-inclusive economic growth, as well as high levels of macroeconomic volatility. The quality of the provision of public goods and services remains an important source of concerns. Looking forward, we argue that the success of economic reforms in MENA rests on the ability of those countries to invest boldly in building appropriate and strong institutions as well as high levels of human capacity in public administrations.

On the other hand, we have argued that diversification is helpful for economic growth and reduces the risk of experiencing the resource curse. Furthermore, our study also reached to other conclusions such as natural resources themselves are not the root of the problems facing many oil-exporting economies in short run, but the weakness in equality of institutions in MENA economics are the problem, with better institutions, real per capita income will be higher. For instance, there are five oil exporters witnessed positive GDP growth during the oil price collapse in the 1980s. Those countries are Oman, Indonesia, Norway, Malaysia, and Canada. Their examples demonstrate that strong economic institutions can help weather the storm of low commodity prices.

CHAPTER 3

INVESTIGATING IMPACT OF USING PETROLEUM, NATURAL GAS, AND COAL ON ECONOMIC GROWTH: INTERNATIONAL EVIDENCE

3.1. Abstract

We have hypothesized that various types of natural resources have different impacts on economic growth. We also claim that petroleum is more likely to cause problems than other natural resources such as internal conflicts and external war, leading to reduce the revenue of petroleum in petroleum-rich countries. This potential problem can partially, however, be solved by enhancing the institutional quality and achieving social justice in the distribution of wealth. The traditional resource curse hypothesis, symptoms of Dutch disease, also has diagnosed in our findings. The findings show that Petroleum and natural gas production have a positive and highly significant impact on economic growth, but coal production has a negative and highly significant impact on economic growth. The interaction terms of petroleum production with political stability, and natural gas production with political stability are positive and highly significant, which seems there is not any problem with the production of petroleum and natural gas on economic growth, but our findings indicate that the weak institutions diminish economic growth in petroleum-natural gas-rich countries, and good institutions increase economic growth. The interaction term between coal production and political stability is also positive and highly significant, and still, the hypothesis of good institution works with coal to reduce the curse of coal production.

3.2. Introduction

We continue to answer a major puzzle in economic development, international evidence, why are the resource-rich economies growing slower than resource-poor economies?

Theoretically and empirically, there is strong evidence that countries with abundant resources have had lower growth compared to their resource-poor counterparts. On the same time, we can not reject the significant role that natural resources have played for some countries on the term of economic growth. For instance, in Latin America countries, Sachs and Warner (1995) found that the economy of resource-dependent countries in booming period do not run in the faster growth rate than the prior boom period. Our major question, however, is different in this chapter. Why different literatures come to such different results? The natural resource trap: How much does quality of institutions helps various types of natural resources, international evidence? In other words, which role can interaction terms between various type of natural resources and political stability play in resources-rich countries?

Since the last three decades, rich-oil nations have been twice as likely to have a civil war compared with non-rich-oil nations. An abundance of resources regionalism can exacerbate instability and social fragmentation. Tensions can transform these countries into fertile ground for extended conflict, especially in the event of political shocks such as civil war, regime change, popular uprisings, partition, or foreign invasion, examples of these countries, Iraq, Libya, the Democratic Republic of the Congo, Angola, and the Niger Delta. Likewise, the oil-rich nations have been observed to be objectives of international conflict such as with Iraq's invasion of Iran and Kuwait ((NRGI), 2015). We, therefore, debate that different types of resources have various influence, hence, the rich-oil nations do this at a greater rate than non-rich-oil nations.

In the last two decades, we have observed that the academic literatures reviews have been analyzed the curse of natural resources by using two scenarios: first is a pure economic theory and a second one is political theory. These literature reviews did not reach to one agreement about the effect of natural resources. For example, Havranek, Horvath, and Zeynalov (2016)

found the last a few decades of empirical research that the effect of natural resources on economic growth have produced 43 econometric studies reporting 605 regressions estimates of the effect. Approximately 40% of these estimates are negative and statistically significant, 40% are insignificant, and approximately 20% are positive and statistically significant (based on the conventional 5% significance level). Base on the above statements, we argue the countries that produce more petroleum and natural gas, the relation will be positive between natural resources and economic growth, and the countries produce more coal, the relation will be negative between natural resources and economic growth.

Sachs and Warner (1995) mark that natural resources abundant economies tend to grow slower than economies without substantial resources. For instance, growth losers, such as Nigeria, Zambia, Sierra Leone, Angola, Saudi Arabia, Iraq, and Venezuela, which are all resource-rich countries, while the Asian tigers: Korea, Taiwan, Hong Kong and Singapore, which are all resource-poor countries. On average resource abundant countries lag behind countries with less resources. Yet we should not jump to the conclusion that all resource rich countries are cursed. There are several resources-rich countries growth winners such as Botswana, Canada, Australia, and Norway (Mehlum, Moene, & Torvik, 2006).

Several literatures have over the last decade argued that the natural resource environment influences different aspects of institutional quality. Bhattacharyya and Hodler (2009) study how natural resources can feed corruption and how this depends on the quality of the democratic institutions. They found that resource rents are positively associated with corruption only in countries for which the net democracy score polity2 is 8.5 or less. This study does not distinguish between different natural resources and rely primarily on the log per capita rent from energy, minerals and forestry. When country dummies are included, the effect of natural resources on

corruption and the interaction term between democracy and natural resources becomes insignificant, implying that the results are mainly due to cross□country variation. However, it is not surprising given that the explanatory variables change only slowly over time, and that the time dimension of their data matrix is much smaller relative to the cross□section dimension. However, our study shows that it can be reverted and turned into a blessing through the choice of appropriate policies and institutions.

Our study differs from other studies. In this study, we claim that different types of resources have different effects on economic performance, specifically, we see that petroleum is more likely to make bigger problems in economic than other types of resources. We can give evidence from the Middle East and North Africa (MENA), the region holds close to half of global oil reserves and a quarter of natural gas reserves, but according to University of Oxford, Our World Data, the region has the most war and conflict in the last decades. It controls almost a third of petroleum production and fourteenth percent of natural gas production. To investigate the theory behind these problems, we used three types of natural resources, petroleum, natural gas, and coal, to figure out their various effects on economic growth. To the best of our knowledge, none of the previous literature reviews have distinguished between the effects of these types of resources on economic growth, hence, that is why dissimilar types of literature come to different findings.

Our empirical findings highlight that petroleum production, natural gas production have positive and highly significant impact on growth of GDP per capita, but coal production has a negative and highly significant effect on economic growth. With linear regression, the institutional variables like, political stability and government effectiveness, were found to have positive and significant impacts on per capita GDP growth, at 5% and 1% level respectively, but

political stability has turned to negative or positive non-significant with nonlinear regressions. Another evidence that the average for all institutions shows negative signs. Alluding to the direction of the previous results that the qualities of institutions on these countries could not provide the needed support for putting these countries on the path of growth and if there is any growth path experienced over the years, the institutions would not be able to sustain it. Furthermore, interaction terms are powerful tool increase economic growth that needs to be recognized by policymakers. These findings are quite robust to different model specifications.

In order to address our hypotheses, this study is organized in the following way: in the next section, the relevant literature is reviewed. Then, the fourth section discusses the methodology and data. The fifth section represented the empirical results. Finally, section six concluded our study.

3.3. Literature review

We observed that several studies investigate the role of institutional quality to reduce resource curse if institutional quality is su□ciently high, but they did not distinguish between different types of resources. However, we will address some of the studies that argue the economic growth is influenced by resources differently, as a result of different types of natural resources that is why we see some studies argue the natural resources are a curse and other studies debate blessing. For instance, Boschini et al (2007) have tested for four types of natural resources: exports of precious metals, exports of Ores and metals, production of mineral, and the production of gold, silver, and diamonds. They have hypothesized the effect of natural resources on economic growth improves with institutional quality. Their findings show the impact of natural resources on economic growth to be non-monotonic in institutional quality, and

increasingly so for certain types of resources. If countries are rich in diamonds and precious metals, these effects both positive and negative are larger.

Mehlum, Moene and Torvik (2006) discuss countries rich in natural resources constitute both growth losers and growth winners. Natural resources push aggregate income down when institutions are grabber friendly. When institutions are producer friendly, more resources raise income, therefore, the main reason is differences in the quality of institutions.

Bhattacharyya and Holder (2010) illustrate how resources can feed corruption and how this impact depends on the quality of the democratic institutions. Theoretically and empirically, they prove resource wealth lead to an increase in corruption if the quality of the democratic institutions is relatively poor, but not others. Their estimates confirm that the relationship between resource rents and corruption depends on the quality of the democratic institutions.

Sachs and Warner (1995) discussed that economies with rich in resources wealth have tended to grow less rapidly than natural-resource-scarce economies and they have mention this negative association holds true even after controlling for variables found to be important for economic growth.

Another study is motivated by the relatively recent and inconclusive debate on resource funds and on their role in the addressing of the "resource curse". The estimation results suggest that resource funds may be associated with governance and institutional quality improvements. The analysis complements the debate on the tools of addressing the "resource curse" and on the determinants of governance and institutional quality (Tsani, 2013).

3.4. Methodology and data

To examine the relationship between production of different types of natural resource, petroleum, natural gas, and coal, quality of institution, and economic growth. This study utilizes

the largest Cross-Section set that consists of 190 countries and territories. The countries are included in the sample are listed in Appendix C5. It is covered the period 1996-2018. We were not able to include the time period prior to 1995 in our study due to the unavailability of quality of institutions indices. This data set is an unbalanced since some of the countries in the sample have different number of time series observations. We also ran multiple regressions; the first model test how the production of petroleum, natural gas, and coal influence on economic growth, direct effect. The second model measures how the effect of interaction terms between petroleum production and quality of institutions on economic growth. The third model examine the impact of interaction term between coal production and political stability. The final model is interaction between natural gas production and political stability, to figure out how every type of natural resources influence on economic growth. All regressions are estimated using Cross-Section Method.

$$GDPpc_{i,t} = \alpha + \beta_1 petroleum_{i,t} + \beta_2 Coal_{i,t} + \beta_3 Gas_{i,t} + \beta_4 \Sigma X_{i,t} + \varepsilon_{i,t} \ldots (1)$$

Where (*GDPpc i,t*) is gross domestic product divided by midyear population (current US$). $Petroleum_{i,t}$ is petroleum production in Billion Barrels Per Year (BBY). $Coal_{i,t}$ *is* coal production and its measurement by Million Metric Tons (MMT). $Gas_{i,t}$ is natural gas production and its measurement by billion cubic feet of natural gas (BCF). $\Sigma X_{i,t}$ all the common variables that are used as control variables in the literature of economic growth and natural resources, which have claimed to be important in explaining cross-country quality of institution. εi,t is an error term. The list of additional variables includes Manufacturing, agriculture, services, and foreign direct investment.

The dependent variable is GDP per capita as a current U.S. dollar, which is obtain from the World Bank's World development indicators. It calculated by divided GDP on total

population when GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

The three key variables in regressions above are petroleum, natural gas, and gas rents. For petroleum and natural gas variables have collected from U.S. Energy Information Administration (EIA). Another indicator of natural gas has collected from the World Bank's World development indicators, which is referred as the difference between the value of natural gas production at world prices and total costs of production, which is as we have mentioned earlier that it expresses as a percent of GDP.

Regarding the controls variables to include in the model, there is no universally agreed-upon theoretical or empirical model of the causes of economic growth in resource-rich countries, but we will state among the strongest candidates for economic growth determinants: manufacturing, agriculture, service sectors measured by value added mothed and in current U.S. dollars. We rescale these variables by dividing them on billion, to make them easy to interpret. They have collected from the World Bank's (WDI). Manufacturing sector refers to industries belonging to the International Standard Industrial Classification (ISIC) divisions 15-37. Agriculture corresponds to (ISIC) divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Services correspond to (ISIC) divisions 50-99. They include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services. Also included are imputed bank service charges and import duties.

The manufacturing value add variable has used by other literatures as an independent variables; (Sachs & Warner, 1999; Matallah & Matallah, 2016; Moyo & Jeke, 2019)Moyo & Jeke (2019) debate the manufacturing value has a positive effect on economic growth, but our findings may be different from this outcome because we include the manufacturing sector as a control variable with natural resources sector in regression, the scenario of Dutch disease. Sachs and Warner (2001) have stated why the extremely resources-rich countries such as the oil states in the Gulf countries, Nigeria, Mexico, and Venezuela, have not experienced sustained rapid economic growth. They see that natural resources destroy growth for other sectors such as manufacturing and services sectors due to Dutch disease scenario. Thus, the manufacturing and service sectors show a negative effect on economic performance. We expect the manufacturing value will be extremely small or negative effect in our regressions.

The related literatures that have mentioned investment sector as control variable. We use (FDI), net inflows (balance of payment, current US$), as proxy for investment sector, which is defined by World Bank, the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. We rescale these variables by dividing them on billion. This series shows total net FDI. A significant endogenous relationship between FDI and economic growth is identified from the mid-1980s onwards. However, (Li & Liu, 2005) debated that FDI not only directly promotes economic growth by itself but also indirectly does so via its interaction terms. The interaction of FDI with human capital exerts a strong positive effect on economic growth in developing countries. Other studies argue investment sector is one of significant determinants of economic growth (Nguyen, 2011). Based on the above statements we

expect a positive association between Investment and economic growth.

Another indicator is tariff has also been popularized in the literature as a major determinant of economic growth. We use tariff as proxy for trade openness, however, it is defined as the unweighted average of effectively applied rates for all products subject to tariffs calculated for all traded goods. Trade openness variable uses as control variables by many other literatures such as (Nguyen, 2011; Horváth & Zeynalov, 2016).

Political Stability and Absence of Violence/Terrorism (PSAV) can also be a major determinant of economic growth. It uses as proxy for institution quality in our model, its perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. It leads to the stability of country, hence, turn to economic performance, it ranges from -2.5 (bad) political stability to 2.5 (good) political stability. Furthermore, many of Oil-rich countries are existed in areas suffering from political instability or conflict. Is there a like between oil abundant and war? For instance, in Middle East, countries are such as Sudan, Iran, Iraq, Saudi Arabia, United Arab Emirates, and Kuwait. In another continents, For example, African continent like Nigeria, Libya, and Algeria. In American continent like Venezuela. The oil-rich countries are not only suffering from external war, but also suffering from internal war, we can see from table (1). For instance, the conflicts between center of Iraqi government and region of northern Iraq have been long time about Kirkuk province because this province is extremely rich with oil reserves.

Thus, the value and demand for fuel, especially petroleum, allows conflicts in these areas to have an impact on the global economy. On the other hand, the developed world's increasing demand for oil, and its search for "supply security," can exacerbate existing conflicts.

Table (1): Civil Conflicts in Oil-rich Countries.

countries	Date	Resources
Angola	1975-2002	Oil, diamonds
Colombia	1984-present	Oil, gold, coca
Democratic Republic of Congo	1997	Oil
Ivory Coast	2002-2007	Oil, coffee, cocoa
Liberia	1989-1996	Oil, timber, diamonds, iron, cocoa, coffee, rubber, gold
Morocco	1975-1991	Oil, Phosphates
Nigeria	1967-1970	Oil
Russia (Chechnya)	1994-1996	Oil
Sudan	1983-2011	Oil
Iraq	20th-present	Oil
Libya	Present	Oil

Sources: Eikendal, J. (2014). The Resource curse further approached. Resource.

The second regression include interaction term between petroleum production and political stability, to test the effect of quality of political stability to correct path of petroleum on economic growth. For this relation, we have proceeded with an estimate the following Cross-Section model:

$$GDP\ pc_{i,t} = \alpha + \beta 1\ petroleum_{i,t} + \beta 2 PSAV + \beta 3(petroleum\ x\ PSAV)_{i,t} + \beta 4 \Sigma X_{i,t} + \varepsilon_{i,t} \ldots\ldots\ldots (2)$$

Where *petroleum x PSAV is* interaction term between petroleum production and political stability.

The third regression includes an interaction term between coal production and political stability, to test the ability of quality of political stability to correct the path of coal on economic growth. Likewise, to test our hypothesis, which is various types of natural resources have different influences on economic growth. For this relation, we have proceeded with an estimate the following Cross-Section model:

$$GDP\ pc_{i,t} = \alpha + \beta_1 natural\ gas_{i,t} + \beta_2 PSAV_{i,t} + \beta_3 (natural\ gas\ x\ PSAV)_{i,t} + \beta_4 \Sigma X + \varepsilon_{i,t} \ldots . (3)$$

Where *natural gas x PSAV is* interaction term between natural gas production and political stability.

The fourth regression includes an interaction term between natural gas production and political stability. For this relation, we have proceeded with an estimate the following Cross-Section model:

$$GDP\ pc_{i,t} = \alpha + \beta_1 natural\ gas_{i,t} + \beta_2 PSAV_{i,t} + \beta_3 (natural\ gas\ x\ PSAV)_{i,t} + \beta_4 \Sigma X + \varepsilon_{i,t} \ldots.(4)$$

Where *coal x PSAV is* interaction term between coal production and political stability.

3.5. Empirical results

2.5.1. Summary of main variables

The table (2) presents summary of main variables in our study, GDP per capita has a mean value (12018.2) US$, and a maximum value (118823.6) US$, reflecting that there are certainly large differences in GDP per capita over the world, which is one of the mechanisms that the theory of the "Dutch Disease" predicts inequality income, the income from oil and other natural resources produces negative economic consequence due to the workers leave manufacturing for higher-paying jobs in other sectors. Furthermore, the mean of petroleum is (0.9468128), and their minimum and maximum values are (0) and (25.497) respectively, I have looked for a dataset, there are a lot of countries which do not have petroleum. Petroleum production is likely not helping the economy to engross much occupation, thus the welfare created from the petroleum industry is not well distributed to all citizens. Similarity for natural gas I have looked for a dataset, there are a lot of countries which do not have natural gas. While PS, ROL, and VA have mean values (-0.0527828, -0.0433259, -0.0539385) and maximum values (1.760102, 2.100273, 1.800992) respectively, reflecting that the most of countries suffer from poor intuitions.

Table (2): Summary of Main Variables (1996 -2018)

Variable	Observations	Mean	Std. Dev.	Min	Max
GDP pc US$	3,721	12018.2	17640.08	111.9272	118823.6
Petroleum	3,430	.9468128	2.965934	0	25.497
Natural Gas	3,389	.6068312	2.469548	0	28.289
Coal	3,394	.7704534	5.289875	0	88.513
PSAV	3,747	-.0527828	.9778492	-3.180798	1.760102
Rule of Law	3,782	-.0433259	.9837363	-2.338622	2.100273
VA	3,769	-.0539385	.9868734	-2.313395	1.800992

3.5.2. The effect of different types of natural resources (petroleum, natural gas, and coal) on economic growth

We begin our analysis by estimating our previous equation (1) that measures the impact of petroleum on economic growth. In the table (2), the findings indicated that the effect of petroleum is positive and highly significant for all specifications, our findings suggest that our approach contrasts with of (Selim & Zaki, 2014; Farzanegan & Thum, 2017), from the first look, it seems that there is no impact of petroleum on economic growth, but we are still arguing the major idea is that the petroleum is not harming economic growth by its self, but it harms negatively economic growth or indirect effect through several channels as we can see from the findings. First, the classical theory has assumed that the manufacturing sector, agriculture sector, service sector, investment sector, and trade openness have positive effect on economic growth, but our findings show that there are negative and highly significant association between three sectors (agriculture sector, service sector, and trade openness) and economic growth. It is not surprising, these findings confirm the hypotheses of Dutch disease and rent-seeking, which capital and labor factors transfer to the petroleum sector to look for high wages and rents. In other words, natural resources sectors leave no room for non-natural sectors. After we controlled for quality of institutions in regressions (7) and (8), rule of law and political stability, respectively, the contorting did not change the direction of sign of agriculture, service, and trade

openness sectors, obtained in the previous results which point inability of the institutional framework in these countries to reverse resource curse. Also, table (1) showed and confirmed the negative sign for the mean of institutional quality.

Another channel we see that the petroleum leads to a deterioration of institutional quality, in turn lowering economic growth, however, we will discuss this channel in the next table. As well, natural gas variable shows positive association between natural gas and economic growth, but the coefficient was insignificant.

On the other hand, the coefficients of coal variables are positive and statistically significant at 1% for all specifications, which is affirmed our hypothesis that the different types of natural resources have a different impact on economic growth. However, coal mining is associated with places that suffer from high poverty and weaker long-term economic growth. It has also provided needed jobs in isolated communities. The rents have provided by the coal industry are lower than rents have provided by oil and gas industries because coal is used less than oil and gas, but coal-rich countries are still paying attention to coal mining without other sectors such as manufacturing and services sectors.

3.5.3. The interaction term between petroleum and political stability, and between gas and political stability, and their impact on economic growth.

To test for our hypotheses, which is the curse of petroleum exists in our sample and the role of political stability in countries with abundant petroleum, and to analyze the impact of political stability on the association between petroleum and economic growth, an interaction term between political stability and petroleum added to the regressions. The findings are presented in the appendix (C2), the appendix shows that the interaction terms have positive signs and a highly significant effect on growth and petroleum coefficient also show positive signs. It

seems there is no curse, which means that petroleum abundance actually contributes to growth. In fact, there is one problem, we can see from total effect. Table (1) shows that the average value of political stability is (-0.05) when we take the average value of political stability, the total effect value of petroleum is (1.088), but the partial value of petroleum is (1.143). Thun, the partial value of petroleum greater than the total effect value of petroleum with average value. On the other hand, the maximum value of political stability is (1.76), when we take the maximum value of political stability, the total effect value of petroleum is (3.074). Thun, the partial value of petroleum smaller than the total effect with maximum value. We think that is the best explanation and answer to our research question, which is why resource-rich countries like Norway and Botswana grow faster than the MENA countries, Nigeria, and Venezuela. Botswana, with 40% of GDP stemming from diamonds, has had the world's highest growth rate since 1965. Many studies argued that it is related to attribute this remarkable performance to the good institutions of Botswana. (Among African countries Botswana has the best score on the Groningen Corruption Perception Index.) Another example is Norway – one of Europe's poorest countries in 1900, but now one of its richest. The growth was led by natural resources such as timber, fish and hydroelectric power and more recently oil and natural gas. Norway is considered to be one of the least corrupt countries in the world (Mehlum, Moene, & Torvik, 2006). Finally, if political stability ranges more than zero, good institutions, petroleum could accelerate economic growth, but if it ranges less than zero, bad institutions, petroleum could diminish economic growth. From our results, we understand that our findings provide strong support to the conditional resource curse hypothesis. To investigate the overall effect of petroleum and the role of political stability on economic growth, we are following equations, values come from my regression (7):

$$\frac{d(growth)}{d(petroleum)} = 1.143 - 1.097 * (-0.05)(average\ of\ political\ stability) = 1.088$$

$$\frac{d(growth)}{d(petroleum)} = 1.143 - 1.097 * (1.76)(maximum\ of\ political\ stability) = 3.074$$

3.5.3. The interaction term between coal and political stability and its impact on economic growth.

Turn to interaction term between coal and political stability, in order to figure out the differences between the effects of various types of natural resources on economic growth, the findings indicate that the partial value of coal production is consistent with the theory of natural resources curse because all coefficients of coal production are negative and highly significant. Likewise, the interaction terms are positive and highly significant for five classifications of regressions. In regression (7), the opposite of findings by (Eregha & Mesagan, 2016), the controlling for government effectiveness variables in the regression changed the significant impact of interaction coefficient term and coal production coefficient which is point to the capacity of the institutional framework in these countries to reverse resource curse. To investigate the overall effect of petroleum and the role of political stability on economic growth, we are following equations, values come from my regression (7):

$$\frac{d(growth)}{d(Coal\ production)} = -0.275 + 0.0876 * -(0.05)(average\ of\ political\ stability) = -0.270$$

$$\frac{d(growth)}{d(Coal\ production)} = -0.215 + 0.0876 * (1.76)(maximum\ of\ political\ stability) = -0.121$$

The above equations show that if political stability reaches 2.5, the marginal effect of coal production turns positive effect on growth. However, the resources-rich coal countries diagnostic with hypothesis of weak institution.

3.6. Conclusion and discussion

The natural resources subject has remained a long-time of a subject of debate in the literature. Are the natural resources curse or blessing for countries? Most of literatures come to different findings like the scenario of Dutch disease, or scenario of weak quality of institution, or even some literatures found natural resources blessing for countries. The main question, therefore, we have asked in this chapter is that why are several literatures coming to different outcomes about the effect of natural resources on economic growth? To answer this question, we used three different types of natural resources: Petroleum, Natural gas, and Coal. We also applied a cross-section estimator for a sample of 190 countries and territories covering the period 1996–2018. By employing models with linear and nonlinear interaction terms between various types of resources and political stability index, a contingent e□ect of resource on economic growth was established. Institutional quality has been found to mitigate the negative impact of resources on economic growth.

This study contributes to the resource curse literature by empirically investigating how dissimilar types of natural resources affect economic growth. The findings confirm our hypothesis, which is various types of natural resources have different effects on economic growth. Petroleum and natural gas production have a positive and highly significant impact on economic growth, but coal production has a negative and highly significant impact on economic growth. The scenario behind the different signs is the production and price of resources. Our argument is that all resources make lazy countries, but some resources can support economics more than other ones. In our key variables, petroleum and natural gas are more variable than coal. The total production and price of petroleum and natural gas are greater than the production of coal in the world as we see in table (1). As a result of that, the big funds come from petroleum

and natural gas production, thus, support economic of countries rich with petroleum and natural gas. Contrary, the production of coal is also making countries lazy. At the same time, it is cheaper than petroleum and natural gas that is why the results show the positive sign of petroleum and natural gas production and the negative sign of coal production.

For non-linear empirical investigate, the findings indicate that interaction terms of petroleum production with political stability, and natural gas production with political stability are positive and highly significant, which seems there is not any problem with the production of petroleum and natural gas on economic growth, after we look for marginal effects of petroleum and natural gas, we found that the weak institutions diminish economic growth in petroleum-natural gas-rich countries, but good institution increase economic growth in petroleum-natural gas-rich countries, even though we found a partial effect of petroleum and natural gas positive and highly significant, we still blame weak quality of institutions to reduce economic growth in these countries. We argue that the weakness in quality of institutions in MENA countries, Nigeria, and Venezuela prevents accelerating economic growth in these countries, but good institutions in Norway, Botswana, and Australia led to accelerate their economic growth. On the other hand, the interaction term between coal production and political stability is positive and highly significant, and still, the hypothesis of good institution works with coal resources, which means a good enough quality of institutions works to eliminate the curse of coal production in coal-rich countries.

In order to incentive economic growth and obtain more revenue from natural resources, rich natural resources countries should adopt appropriate policy measures to improve their quality of institutions, political stability, and government effectiveness. The findings of this literature confirm political stability and government effectiveness have a significant role, to

enable the gains from resources revenue to translate into growth for the various economies under consideration. In conclusion, some of the channels of natural resource curse have investigated in the literature.

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APPENDIX A

APPENDIX (A1): THE PARTIAL ASSOCIATION BETWEEN OIL AND CORRUPTION

Independent Variable	All (1)	Middle-income	High-income	North Africa	Middle East
Oil	0.00470	0.0222***	0.0124***	0.00943**	0.0190***
	(1.77)	(15.58)	(5.55)	(2.85)	(8.30)
Trade	−0.00239	−0.00644***	0.00292*	−0.00353*	−0.000154
	(−1.90)	(−8.00)	(2.01)	(−2.24)	(−0.08)
Mobile100	0.00260***	0.00236**	0.00342**	0.00322***	0.00311**
	(3.92)	(2.82)	(2.72)	(3.47)	(2.74)
Internet	−0.000570	−0.00152	−0.00177	−0.000266	−0.000446
	(−0.42)	(−0.77)	(−0.70)	(−0.15)	(−0.16)
pop1564	−0.0204**	−0.0129*	−0.0304***	−0.0261**	−0.0666***
	(−2.80)	(−2.57)	(−4.65)	(−3.17)	(−4.29)
GDPpc	−0.00245	−0.00121	−0.0190*	−0.00440	−0.00218
	(−0.90)	(−0.44)	(−2.21)	(−0.96)	(−0.63)
Inflation	−0.00151	−0.0101***	−0.00318	−0.00135	−0.00774*
	(−0.80)	(−4.57)	(−0.94)	(−0.55)	(−2.30)
_cons	1.386**	1.424***	0.768*	1.496**	4.412***
	(3.08)	(4.38)	(2.11)	(2.93)	(5.03)
N	280	144	127	188	92

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0. Corruption is a dependent variable

APPENDIX (A2): THE EFFECT OF INTERACTION TERM BETWEEN RULE OF LAW AND OIL ON CORRUPTION

Independent Variable	All	Middle-income	High-income	North Africa	Middle East
ROL x Oil	-0.00575**	-0.00390**	-0.00569*	-0.00436**	-0.00503*
	(-2.82)	(-1.28)	(-0.68)	(-1.69)	(-1.04)
Oil	0.00186	0.00503	0.00601	0.00263	0.00462
	(0.88)	(1.58)	(1.19)	(1.02)	(1.05)
ROL	-0.557***	-0.417***	-0.750***	-0.647***	-0.393***
	(-7.46)	(-5.28)	(-3.35)	(-6.16)	(-4.28)
Trade	-0.00251*	-0.00348***	-0.000810	-0.00275*	0.00157
	(-2.40)	(-3.64)	(-0.55)	(-2.23)	(0.86)
Mobile100	0.00152**	0.00143*	0.00232*	0.00231**	0.00222*
	(2.59)	(2.10)	(1.97)	(2.94)	(2.45)
Internet	-0.000166	-0.00203	-0.000187	-0.000166	-0.000715
	(-0.14)	(-1.26)	(-0.09)	(-0.11)	(-0.31)
pop1564	-0.00825	-0.00493	-0.0163*	-0.0123	-0.0614***
	(-1.40)	(-0.94)	(-2.49)	(-1.95)	(-4.67)
GDPpcap	-0.00276	-0.00209	-0.0108	-0.00577	-0.000108
	(-1.14)	(-0.93)	(-1.44)	(-1.43)	(-0.04)
Inflation	-0.00178	-0.00686***	0.0000908	-0.000291	-0.00395
	(-1.10)	(-3.80)	(0.03)	(-0.14)	(-1.46)
_cons	0.631	0.746*	0.768	0.763*	3.958***
	(1.76)	(2.46)	(1.69)	(1.99)	(5.47)
N	280	144	127	188	92

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

APPENDIX (A3): THE EFFECT OF INTERACTION TERM BETWEEN POLITY2 AND OIL ON CORRUPTION

Independent Variable	All	Middle-income	High-income	North Africa	Middle East)
Polity2 x Oil	0.00155***	0.000330*	0.00232*	0.00458***	0.000233*
	(3.52)	(1.10)	(2.36)	(13.74)	(0.52)
polity2	-0.0345***	-0.0112	-0.0796***	-0.119***	-0.00490
	(-3.42)	(-1.45)	(-6.77)	(-12.21)	(-0.60)
Oil	0.0164***	0.0206***	0.0169*	0.0249***	0.0188***
	(4.67)	(12.27)	(2.43)	(10.11)	(5.92)
Trade	-0.00437***	-0.00706***	-0.00279	-0.00855***	-0.00194
	(-3.36)	(-9.03)	(-1.79)	(-7.80)	(-0.95)
Mobile100	0.00328***	0.00162*	0.00562***	0.00464***	0.00150
	(4.52)	(2.21)	(4.99)	(4.30)	(1.74)
Internet	-0.000375	0.000574	-0.00163	-0.00150	0.00280
	(-0.26)	(0.33)	(-0.76)	(-0.69)	(1.26)
pop1564	-0.0326***	-0.0117*	-0.0472***	-0.0488***	-0.0522**
	(-4.62)	(-2.27)	(-7.91)	(-9.47)	(-3.24)
GDPpcap	-0.00743	0.00401	-0.0172*	-0.00603	0.00296
	(-1.45)	(0.67)	(-2.36)	(-0.84)	(0.34)
Inflation	-0.000386	-0.00714***	0.00346	0.00719**	-0.00255
	(-0.19)	(-3.38)	(1.15)	(2.61)	(-0.95)
_cons	2.075***	1.341***	2.162***	3.052***	3.577***
	(4.98)	(3.84)	(5.89)	(10.27)	(4.02)
N	268	132	127	182	86

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.00

APPENDIX (A4): THE EFFECT OF INTERACTION TERM BETWEEN RULE OF LAW AND OIL ON CORRUPTION

Independent variable	Regression (1)	regression (2)	regression (3)	regression (4)	regression (5)	regression (6)
ROL x Oil	-0.00543**	-0.00607**	-0.00554**	-0.00488*	-0.00569**	-0.00575**
	(-2.66)	(-3.05)	(-2.79)	(-2.45)	(-2.81)	(-2.82)
Oil	0.000308	0.000692	0.0000490	0.000602	0.000822	0.00186
	(-0.16)	(0.38)	(-0.03)	(0.33)	(0.44)	(0.88)
ROL	-0.603***	-0.582***	-0.619***	-0.609***	-0.565***	-0.557***
	(-8.06)	(-7.96)	(-8.54)	(-8.41)	(-7.63)	(-7.46)
Trade	-0.000818	-0.00251*	-0.00272**	-0.00229*	-0.00247*	-0.00251*
	(-0.86)	(-2.45)	(-2.71)	(-2.23)	(-2.38)	(-2.40)
Mobile100		0.00113***	0.00148**	0.00174**	0.00161**	0.00152**
		(3.62)	(2.68)	(3.05)	(2.76)	(2.59)
Internet			-0.00112	-0.000487	-0.000194	-0.000166
			(-0.97)	(-0.41)	(-0.16)	(-0.14)
pop1564				-0.0103	-0.00838	-0.00825
				(-1.81)	(-1.43)	(-1.40)
GDPpcap					-0.00276	-0.00276
					(-1.14)	(-1.14)
Inflation						-0.00178
						(-1.10)
_cons	0.0819	0.115	0.155	0.755*	0.640	0.631
	(0.81)	(1.18)	(1.63)	(2.20)	(1.81)	(1.76)
N	286	286	283	283	280	280

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

APPENDIX (A5): THE EFFECT OF INTERACTION TERM BETWEEN POLITY2 AND OIL ON CORRUPTION

Independent variable	Regression (1)	regression (2)	regression (3)	regression (4)	regression (5)	regression (6)
Polity2 x Oil	0.000419*	0.000329*	0.00129**	0.00124**	0.00167***	0.00155***
	(-0.83)	(0.68)	(2.80)	(2.75)	(3.89)	(3.52)
Oil	0.000190	0.00765	0.0135***	0.0140***	0.0170***	0.0164***
	(0.05)	(1.95)	(3.63)	(3.85)	(5.01)	(4.67)
polity2	-0.00465	-0.0141	-0.0212*	-0.0310**	-0.0364***	-0.0345***
	(-0.46)	(-1.41)	(-2.08)	(-3.06)	(-3.66)	(-3.42)
Trade	-0.00102	-0.00430***	-0.00573***	-0.00404**	-0.00450***	-0.00437***
	(-0.85)	(-3.29)	(-4.35)	(-3.07)	(-3.48)	(-3.36)
Mobile100		0.00143***	0.00237***	0.00323***	0.00336***	0.00328***
		(3.87)	(3.29)	(4.51)	(4.63)	(4.52)
Internet			-0.00244	-0.000419	-0.000429	-0.000375
			(-1.67)	(-0.29)	(-0.29)	(-0.26)
pop1564				-0.0319***	-0.0338***	-0.0326***
				(-4.46)	(-4.84)	(-4.62)
GDPpcap					-0.00715	-0.00743
					(-1.38)	(-1.45)
Inflation						-0.000386
						(-0.19)
_cons	0.0967	0.154	0.233	2.028***	2.148***	2.075***
	(0.57)	(1.07)	(1.74)	(4.76)	(5.22)	(4.98)
N	273	273	271	271	268	268

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.00

APPENDIX B

APPENDIX (B1): THE PARTIAL ASSOCIATION BETWEEN DIVARICATION AND DIFFERENT RESOURCES VARIABLES ON GDP PER CAPITA (THOUSAND US$)

	FE (1)	FE (2)	FE (3)	FE (4)	GMM (5)	GMM (6)	GMM (7)	GMM (8)
DIV	−0.0563**	−0.0612***	−0.0764***	−0.0597***	−0.0330**	−0.0232*	−0.0331**	−0.0190*
	(−3.14)	(−3.96)	(−4.44)	(−4.41)	(−2.80)	(−2.05)	(−2.84)	(−1.95)
Industry	−0.0781***	−0.134***	−0.0765***	−0.132***	−0.0000272*	−0.0155*	0.00227*	−0.0174*
	(−4.39)	(−8.59)	(−4.18)	(−8.84)	(−0.00)	(−1.44)	(0.21)	(−1.65)
Services	0.0510	0.185**	0.0560	0.180***	0.0128*	0.0554*	0.00657*	0.0606*
	(0.83)	(3.29)	(0.90)	(3.38)	(0.37)	(1.70)	(0.19)	(1.92)
Agriculture	0.329***	0.324***	0.330***	0.321***	0.0732**	0.0818***	0.0760***	0.0847***
	(9.97)	(10.09)	(9.96)	(10.46)	(3.17)	(3.68)	(3.29)	(3.96)
TEPA	0.661***				0.0629*			
	(4.52)				(0.66)			
Oil		0.176***				0.115***		
		(6.79)				(7.25)		
Petroleum			1.057***				0.187*	
			(4.24)				(1.29)	
Resources				0.172***				0.120***
				(7.12)				(7.77)
L.GDPUS					0.807***	0.780***	0.803***	0.773***
					(22.41)	(22.21)	(22.86)	(23.02)
_cons	−7.249*	−5.962	−11.26**	−6.259*	−6.402**	−5.570*	−6.720**	−4.919*
	(−2.00)	(−1.85)	(−3.02)	(−2.22)	(−2.64)	(−2.46)	(−2.75)	(−2.52)
N	267	255	267	278	246	234	246	255

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001.

APPENDIX (B2): THE EFFECT OF INTERACTION TERM BETWEEN DIVERSIVICATION AND DIFFERENT VARIABLES ON GDP PER CAPITA

	FE (1)	FE (2)	FE (3)	FE (4)	GMM (5)	GMM (6)	GMM (7)	GMM (8)
DIV	−0.0624**	−0.0239*	−0.0501**	−0.0301*	−0.0201*	−0.00498*	−0.0156*	−0.00527*
	(−2.87)	(−1.38)	(−2.70)	(−2.00)	(−1.42)	(−0.43)	(−1.21)	(−0.53)
Industry	−0.0804***	−0.143***	−0.0490*	−0.138***	0.00671	−0.0262*	0.0171	−0.0267*
	(−4.37)	(−9.39)	(−2.48)	(−9.46)	(0.58)	(−2.46)	(1.44)	(−2.54)
Services	0.0556	0.222***	−0.00571	0.208***	0.000779	0.0841**	−0.0288	0.0856**
	(0.89)	(4.04)	(−0.09)	(3.97)	(0.02)	(2.62)	(−0.78)	(2.74)
Agriculture	0.329***	0.321***	0.325***	0.317***	0.0709**	0.0866***	0.0759**	0.0891***
	(9.96)	(10.38)	(10.00)	(10.63)	(3.05)	(4.04)	(3.28)	(4.29)
TEPA	−0.957*				−0.604			
	(1.56)				(−1.48)			
TEPA x DIV	−0.00125*				−0.00299*			
	(0.50)				(−1.68)			
Oil		−0.106				−0.0837		
		(−1.52)				(−1.86)		
Oil x DIV		−0.00161***				−0.00109***		
		(−4.32)				(−4.69)		
Petroleum			−1.637				−1.373**	
			(−1.95)				(−2.62)	
Petroleum x DIV			−0.0126***				−0.00744**	
			(−3.35)				(−3.10)	
Resources				−0.0800				−0.0680
				(−1.21)				(−1.43)
Resources x DIV				−0.00141***				−0.000987***
				(−4.07)				(−4.19)
L.GDPUS					0.808***	0.758***	0.793***	0.755***
					(22.27)	(22.17)	(22.37)	(22.91)
_cons	−8.639	0.885	−6.020	−0.819	−3.787	−1.938	−3.193	−2.122
	(−1.88)	(0.25)	(−1.51)	(−0.27)	(−1.31)	(−0.84)	(−1.19)	(−1.06)
N	267	255	267	278	246	234	246	255

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

APPENDIX (B3): THE EFFECT OF INTERACTION TERM BETWEEN GOVERNMENT EFFECTIVE AND DIFFERENT VARIABLES ON GDP PER CAPITA

	FE (1)	FE (2)	FE (3)	FE (4)	GMM (5)	GMM (6)	GMM (7)	GMM (8)
GE	-1.007	0.472	-1.200	0.227	0.183	-0.273	0.0935	-0.233
	(-1.14)	(0.60)	(-1.39)	(0.30)	(0.35)	(-0.53)	(0.18)	(-0.46)
DIV	-0.0606**	-0.0714***	-0.0876***	-0.0682***	-0.0463**	-0.0400**	-0.0472**	-0.0370**
	(-2.78)	(-4.49)	(-4.17)	(-4.69)	(-2.74)	(-3.04)	(-2.74)	(-2.86)
Industry	-0.0505*	-0.0970***	-0.0348	-0.0960***	0.0116	-0.0186	0.0143	-0.0174
	(-2.47)	(-6.19)	(-1.57)	(-6.29)	(0.87)	(-1.46)	(1.02)	(-1.39)
Services	0.0457	0.220***	-0.00607	0.215***	0.0336	0.109**	0.0241	0.108**
	(0.66)	(4.12)	(-0.08)	(4.18)	(0.81)	(3.02)	(0.54)	(3.07)
Agriculture	0.326***	0.328***	0.332***	0.323***	0.0549	0.131***	0.0579	0.126***
	(7.91)	(9.51)	(8.06)	(9.63)	(1.63)	(4.32)	(1.71)	(4.29)
TEPA	0.727***				0.0347			
	(4.41)				(0.32)			
TEPA x GE	0.214*				0.00840			
	(2.38)				(0.16)			
Oil		0.302***				0.204***		
		(10.16)				(9.69)		
Oil x GE		0.334***				0.188***		
		(9.36)				(7.79)		
Petroleum			1.225***				0.105	
			(4.41)				(0.60)	
Petroleum x GE			0.433**				0.0400	
			(3.11)				(0.48)	
Resources				0.283***				0.191***
				(10.22)				(9.64)
Resources x GE				0.309***				0.167***
				(9.25)				(7.34)
L.GDPUS					0.791***	0.655***	0.787***	0.660***
					(19.38)	(17.01)	(19.68)	(17.73)
_cons	-9.103*	-10.69**	-14.04**	-10.45***	-9.535**	-9.838***	-9.794**	-9.356***
	(-2.03)	(-3.22)	(-3.09)	(-3.45)	(-2.70)	(-3.66)	(-2.73)	(-3.57)
N	235	223	235	242	198	186	198	201

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

APPENDIX (B4): THE EFFECT OF INTERACTION TERM BETWEEN REGULATORY QUALITY AND DIFFERENT VARIABLES ON GDP PER CAPITA

	FE (1)	FE (2)	FE (3)	FE (4)	GMM (5)	GMM (6)	GMM (7)	GMM (8)
TEPA	0.629***				0.0305			
	(3.79)				(0.28)			
TEPA x RQ	0.0135				0.0349			
	(0.12)				(0.51)			
RQ	1.702	-1.148	0.293	-1.271	0.587	-1.158*	-0.0835	-1.277*
	(1.26)	(-1.21)	(0.23)	(-1.40)	(0.71)	(-2.09)	(-0.11)	(-2.34)
DIV	-0.0619**	-0.0642***	-0.0827***	-0.0627***	-0.0455**	-0.0323*	-0.0495**	-0.0325*
	(-2.86)	(-3.69)	(-4.01)	(-4.02)	(-2.71)	(-2.43)	(-2.94)	(-2.48)
Industry	-0.0682***	-0.141***	-0.0453*	-0.139***	0.0100	-0.0459***	0.0189	-0.0420**
	(-3.37)	(-8.44)	(-2.01)	(-8.63)	(0.76)	(-3.34)	(1.39)	(-3.15)
Services	0.0834	0.237***	0.0441	0.237***	0.0344	0.138***	0.0134	0.133***
	(1.22)	(3.98)	(0.62)	(4.17)	(0.85)	(3.69)	(0.32)	(3.70)
Agriculture	0.323***	0.329***	0.316***	0.328***	0.0539	0.117***	0.0580	0.116***
	(7.75)	(8.70)	(7.60)	(8.98)	(1.61)	(3.81)	(1.73)	(3.87)
Oil		0.274***				0.205***		
		(8.29)				(9.31)		
Oil x RQ		0.218***				0.162***		
		(5.85)				(6.65)		
Petroleum			1.138***				0.259	
			(4.01)				(1.36)	
Petroleum x RQ			0.472*				0.302*	
			(2.18)				(2.01)	
Resources				0.260***				0.190***
				(8.48)				(9.26)
Resources x RQ				0.198***				0.142***
				(5.82)				(6.30)
L.GDPUS					0.790***	0.717***	0.781***	0.716***
					(19.82)	(19.59)	(20.10)	(20.10)
_cons	-8.513	-7.251*	-12.74**	-7.739*	-9.164**	-7.988**	-10.50**	-8.272**
	(-1.91)	(-2.00)	(-2.86)	(-2.38)	(-2.59)	(-2.92)	(-2.96)	(-3.09)
N	235	223	235	242	198	186	198	201

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

APPENDIX (B5): THE EFFECT OF DIFFERENT INTERACTION TERM ON GDP PER CAPITA (THOUSAND US$)

	Reg (1)	Reg (2)	Reg (3)	Reg (4)	Reg (5)	Reg (6)
Petroleum x DIV	-0.0178**	-0.0178**	-0.0135*	-0.00463*	-0.00308*	-0.00661*
	(-2.54)	(-2.53)	(-1.97)	(-0.99)	(-0.75)	(-1.47)
Petroleum x GE	0.717**	0.714**	0.467*	0.360*	0.305*	0.408**
	(3.14)	(3.11)	(2.05)	(2.53)	(2.46)	(3.04)
Petroleum x RQ	1.081**	1.081**	0.749*	0.524*	0.226*	0.334*
	(2.91)	(2.89)	(2.03)	(2.20)	(1.08)	(1.54)
DIV	-0.283***	-0.284***	-0.196***	-0.0287*	-0.0114*	-0.0147*
	(-9.80)	(-9.52)	(-5.63)	(-1.04)	(-0.47)	(-0.53)
Petroleum	6.090***	6.074***	4.211**	0.202*	0.397*	0.311*
	(3.87)	(3.84)	(2.66)	(0.19)	(0.43)	(0.31)
RQ	2.048	1.973	3.049	0.499	1.393	0.585
	(0.97)	(0.93)	(1.48)	(0.36)	(1.15)	(0.47)
GE	-1.013	-1.072	-0.399	-1.312	-1.150	-1.644
	(-0.66)	(-0.69)	(-0.26)	(-1.41)	(-1.42)	(-1.94)
Trade		-0.00781	-0.0403	0.00245	0.0157	0.0195
		(-0.29)	(-1.51)	(0.14)	(1.04)	(1.19)
Population			0.689***	0.428**	0.442***	0.442**
			(4.51)	(3.04)	(3.61)	(3.24)
Industry				0.0762***	0.0157	0.0389
				(3.38)	(0.75)	(1.43)
Agriculture					0.324***	0.337***
					(8.41)	(8.46)
Services						-0.108
						(-1.37)
_cons	-49.19***	-48.67***	-71.17***	-30.49***	-30.51***	-30.62***
	(-8.52)	(-8.31)	(-9.44)	(-3.76)	(-4.33)	(-4.01)
N	294	291	291	240	240	235

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001.

APPENDIX C

APPENDIX (C1): THE EFFECT OF PETROLEUM, COAL, AND NATURAL RESOURCES ON GDP PER CAPITA

	Reg (1)	Reg (2)	Reg (3)	Reg (4)	Reg (5)	Reg (6)	Reg (7)	Reg (8)
Petroleum	0.155	0.317*	0.524***	0.654***	0.439**	0.468***	0.605***	0.691***
	(1.04)	(2.18)	(3.58)	(4.68)	(3.09)	(3.61)	(5.53)	(7.56)
Coal	-0.144*	-1.511***	-0.684***	-0.607***	-1.439***	-1.301***	-1.423***	-0.437***
	(-2.43)	(-14.40)	(-4.60)	(-4.29)	(-8.82)	(-8.72)	(-11.34)	(-4.03)
Natural gas	1.120***	0.238	-0.134	1.000***	0.000824	0.0925	0.276	-0.0698
	(6.22)	(1.30)	(-0.71)	(5.42)	(0.00)	(0.47)	(1.68)	(-0.51)
Manufacture		0.0380***	0.0442***	0.0181***	0.0592***	0.0407***	0.0201***	0.0166***
		(15.57)	(17.35)	(6.56)	(11.46)	(8.51)	(4.96)	(4.89)
Agriculture			-0.125***	-0.107***	-0.135***	-0.0630***	0.0426***	-0.0520***
			(-7.77)	(-6.99)	(-8.87)	(-4.44)	(3.46)	(-4.90)
Investment				0.274***	0.346***	0.250***	0.173***	0.0679***
				(19.68)	(22.17)	(16.96)	(13.75)	(6.22)
Services					-0.00973***	-0.00671***	-0.00373***	-0.00208**
					(-9.29)	(-6.95)	(-4.58)	(-3.05)
Tariff rate						-1.171***	-0.670***	-0.207***
						(-25.27)	(-16.19)	(-5.61)
PSAV							9.366***	0.680*
							(35.63)	(2.09)
GE								12.09***
								(36.31)
_cons	11.18***	10.55***	11.18***	10.13***	9.928***	19.72***	16.16***	12.76***
	(38.29)	(36.50)	(37.54)	(34.92)	(33.41)	(41.94)	(39.64)	(36.12)
N	3540	3460	3460	3420	3100	3060	3060	3060

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001. **GDP per capita (Billion US$)**

APPENDIX (C2): THE EFFECT OF INTERACTION TERM BETWEEN PETROLEUM AND POLITICAL STABLITY ON GDP PER CAPITA

	Reg (1)	Reg (2)	Reg (3)	Reg (4)	Reg (5)	Reg (6)	Reg (7)
Petroleum x PSAV	1.207***	1.143***	0.980***	0.626***	1.030***	0.855***	1.097***
	(11.44)	(10.45)	(8.54)	(5.45)	(8.39)	(7.26)	(11.47)
Petroleum	1.533***	1.423***	1.337***	0.935***	1.105***	1.030***	1.143***
	(18.58)	(15.07)	(13.93)	(9.54)	(11.17)	(10.88)	(14.88)
PSAV	9.978***	9.961***	9.750***	9.353***	9.914***	8.829***	-0.350
	(38.74)	(38.39)	(37.10)	(36.22)	(36.75)	(32.25)	(-1.10)
Manufacture		0.00247*	0.0104***	-0.00405	0.00353	-0.00240	0.0137***
		(2.28)	(5.10)	(-1.81)	(1.03)	(-0.73)	(5.07)
Agriculture			-0.0441***	-0.0356***	-0.0478***	-0.0212	-0.0733***
			(-4.59)	(-3.79)	(-4.17)	(-1.92)	(-8.09)
Investment				0.166***	0.175***	0.137***	0.0520***
				(14.08)	(13.77)	(11.06)	(5.08)
Services					-0.00240***	-0.00108	-0.00321***
					(-3.46)	(-1.61)	(-5.91)
Tariff rate						-0.668***	-0.162***
						(-15.90)	(-4.46)
GE							12.67***
							(39.95)
_cons	11.34***	11.35***	11.50***	10.89***	11.24***	16.84***	12.57***
	(49.26)	(48.45)	(48.77)	(46.22)	(48.36)	(41.46)	(36.31)
N	3540	3460	3460	3420	3100	3060	3060

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

APPENDIX (C3): THE EFFECT OF INTERACTION TERM BETWEEN COAL AND POLITICAL STABLITY ON GDP PER CAPITA

	Reg (1)	Reg (2)	Reg (3)	Reg (4)	Reg (5)	Reg (6)	Reg (7)
Coal x PSAV	1.300***	0.539***	0.910***	0.129	0.678**	0.729***	0.0967*
	(10.59)	(4.10)	(5.81)	(0.79)	(3.12)	(3.50)	(0.49)
Coal	-0.627***	-0.734***	-0.971***	-1.169***	-1.289***	-1.182***	-0.215**
	(-9.79)	(-6.37)	(-7.63)	(-9.46)	(-10.79)	(-10.33)	(-2.77)
PSAV	10.31***	9.986***	10.25***	9.574***	10.27***	9.067***	0.449
	(41.10)	(40.41)	(40.36)	(38.42)	(39.75)	(34.19)	(1.37)
Manufacture		0.0273***	0.0223***	0.00877***	0.0242***	0.0177***	0.0107***
		(14.02)	(9.87)	(3.77)	(6.04)	(4.59)	(3.32)
Agriculture			0.0685***	0.0283	0.0510***	0.0742***	-0.0402**
			(4.32)	(1.82)	(3.43)	(5.17)	(-3.23)
Investment				0.200***	0.219***	0.178***	0.0689***
				(16.44)	(16.99)	(14.20)	(6.29)
Services					-0.00464***	-0.00355***	-0.000758
					(-4.90)	(-3.92)	(-0.99)
Tariff rate						-0.672***	-0.203***
						(-16.06)	(-5.43)
GE							12.16***
							(35.95)
_cons	12.29***	11.73***	11.41***	10.72***	10.83***	16.50***	13.12***
	(53.69)	(50.91)	(47.27)	(44.93)	(45.12)	(40.21)	(36.75)
N	3560	3480	3480	3440	3120	3080	3080

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

APPENDIX (C4): THE EFFECT OF INTERACTION TERM BETWEEN NATURAL GAS AND POLITICAL STABLITY ON GDP PER CAPITA

	Reg (1)	Reg (2)	Reg (3)	Reg (4)	Reg (5)	Reg (6)	Reg (7)
Natural gas x PSAV	0.717***	0.660***	0.522***	0.179	0.660***	0.507***	0.783***
	(7.20)	(6.53)	(4.87)	(1.68)	(5.33)	(4.27)	(8.06)
Natural gas	1.424***	1.223***	1.078***	0.408***	0.873***	0.811***	1.042***
	(15.28)	(11.29)	(9.39)	(3.39)	(6.09)	(5.92)	(9.31)
PSAV	10.06***	10.05***	9.868***	9.379***	10.03***	8.922***	0.261
	(38.51)	(38.21)	(37.00)	(35.84)	(36.67)	(32.14)	(-0.80)
Manufacture		0.00394***	0.0112***	-0.00183	0.00417	-0.00191	0.0152***
		(3.52)	(5.03)	(-0.79)	(1.17)	(-0.56)	(5.36)
Agriculture			-0.0382***	-0.0401***	-0.0436***	-0.0169	-0.0697***
			(-3.76)	(-4.07)	(-3.75)	(-1.50)	(-7.52)
Investment				0.183***	0.182***	0.142***	0.0576***
				(14.91)	(14.10)	(11.35)	(5.51)
Services					-0.00253**	-0.00117	-0.00378***
					(-3.12)	(-1.50)	(-5.92)
Tariff rate						-0.679***	-0.174***
						(-15.96)	(-4.69)
GE							12.66***
							(39.05)
_cons	11.80***	11.77***	11.89***	11.20***	11.56***	17.24***	12.99***
	(51.47)	(50.26)	(50.38)	(47.48)	(49.60)	(42.12)	(36.96)
N	3540	3460	3460	3420	3100	3060	3060

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

APPENDIX (C5): LIST OF SAMPLE COUNTRIES

1	Afghanistan	65	Germany	129	Norway
2	Albania	66	Ghana	130	Oman
3	Algeria	67	Greece	131	Pakistan
4	American Samoa	68	Grenada	132	Palau
5	Andorra	69	Guatemala	133	Panama
6	Angola	70	Guinea	134	Papua New Guinea
7	Antigua and Barbuda	71	Guinea-Bissau	135	Paraguay
8	Argentina	72	Guyana	136	Peru
9	Armenia	73	Haiti	137	Philippines
10	Aruba	74	Honduras	138	Poland
11	Australia	75	Hong Kong SAR, China	139	Portugal
12	Austria	76	Hungary	140	Puerto Rico
13	Azerbaijan	77	Iceland	141	Qatar
14	Bahamas	78	India	142	Romania
15	Bahrain	79	Indonesia	143	Russian Federation
16	Bangladesh	80	Iran, Islamic Rep	144	Rwanda
17	Barbados	81	Iraq	145	Samoa
18	Belarus	82	Ireland	146	Sao Tome and Principe
19	Belgium	83	Israel	147	Saudi Arabia
20	Belize	84	Italy	148	Senegal
21	Benin	85	Jamaica	149	Serbia
22	Bermuda	86	Japan	150	Seychelles
23	Bhutan	87	Jordan	151	Sierra Leone
24	Bolivia	88	Kazakhstan	152	Singapore
25	Bosnia and Herzegovina	89	Kenya	153	Slovak Republic
26	Botswana	90	Kiribati	154	Slovenia
27	Brazil	91	Korea, Dem. People's Rep	155	Solomon Islands
28	Brunei Darussalam	92	Korea, Rep	156	South Africa
29	Bulgaria	93	Kosovo	157	Spain
30	Burkina Faso	94	Kuwait	158	Sri Lanka
31	Burundi	95	Kyrgyz Republic	159	St. Vincent and the Grenadines
32	Cambodia	96	Lao PDR	160	Sudan
33	Cameroon	97	Latvia	161	Suriname
34	Canada	98	Lebanon	162	Sweden
35	Central African Republic	99	Lesotho	163	Switzerland
36	Chad	100	Liberia	164	Syrian Arab Republic
37	Chile	101	Libya	165	Tajikistan

38	China	102	Lithuania	166	Tanzania
39	Colombia	103	Luxembourg	167	Thailand
40	Congo, Dem. Rep	104	Macao SAR, China	168	Timor-Leste
41	Congo, Rep.	105	Madagascar	169	Togo
42	Costa Rica	106	Malawi	170	Tonga
43	Cote d'Ivoire	107	Malaysia	171	Trinidad and Tobago
44	Croatia	108	Maldives	172	Tunisia
45	Cuba	109	Mali	173	Turkey
46	Cyprus	110	Malta	174	Turkmenistan
47	Czech Republic	111	Mauritania	175	Tuvalu
48	Denmark	112	Mauritius	176	Uganda
49	Dominica	113	Mexico	177	Ukraine
50	Dominican Republic	114	Micronesia, Fed. Sts	178	United Arab Emirates
51	Ecuador	115	Moldova	179	United Kingdom
52	Egypt, Arab Rep.	116	Mongolia	180	United States
53	El Salvador	117	Montenegro	181	Uruguay
54	Equatorial Guinea	118	Morocco	182	Uzbekistan
55	Eritrea	119	Mozambique	183	Vanuatu
56	Estonia	120	Myanmar	184	Venezuela, RB
57	Eswatini	121	Namibia	185	Vietnam
58	Ethiopia	122	Nepal	186	Virgin Islands
59	Fiji	123	Netherlands	187	West Bank and Gaza
60	Finland	124	New Zealand	188	Yemen, Rep.
61	France	125	Nicaragua	189	Zambia
62	Gabon	126	Niger	190	Zimbabwe
63	Gambia	127	Nigeria		
64	Georgia	128	North Macedonia		

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