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Institutional Quality and Curse Resources: An Experimental Study on OPEC Countries

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Abstract
This paper is to study the resource curse applying annual data from 2002 to 2016 for the Organization of the Petroleum Exporting Countries (OPEC) members i.e. Algeria, Iran, Kuwait, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela. For this purpose, there were concerned the interactions role of resource abundance and institution quality, and their marginal effect of the countries' economic growth. Results show that resource abundance and investment have a positive significant effect on the economic growth. Yet, initial income level is observed to have a significant negative effect on the economic growth. In addition, the results showed that the positive effects of resource abundance in the OPEC countries were reduced with increasing institutional quality. The empirical results rejected the resource curse assumption for OPEC, because the effects of resource abundance on the economies of OPEC were significantly positive. Results of the present study indicated, since the institutional structure of these countries is based on oil, the lack of oil revenues in short-run can have a negative effect on their economies.

Keywords: Oil Revenues, Institutional Quality, OPEC.

Introduction
Numerous studies have supported the view that resource poor countries often outperform resource rich countries in economic growth; so that there is a growing body of evidence suggesting that natural resource abundance is harmful to the economic development of low and middle income countries. The natural resource curse has not been studied in few anecdotes or case studies. It has been borne out in some statistical tests of the economic performance across a comprehensive sample of countries. Sachs and Warner (1995) found that economic dependence on oil and mineral is correlated with slow economic growth, controlling for other structural attributes of the country. Sachs and Warner (2001) summarized and extended previous studies indicating that countries with great natural resource wealth tended to grow more slowly than resource poor countries. They suggested that there was little direct evidence that either omitted geographical or climate variables explained the curse or that there was a bias in their estimates resulting from some other unobserved growth deterrent. This counter-intuitive result underpins the so-called resource

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curse puzzle (Nankani, 1979; Sachs and Warner, 1995; 1997; 2001). Resource abundance does not directly harm growth, but acts to crowd out the activity that is driving growth within a country. There are different growth catalysts that for each, there is an accompanying theory explaining that how it may be crowded out by a large primary sector (Sachs and Warner, 2001; Fleming et al., 2015; Satti et al., 2014).

An interesting aspect explaining the variation of results appears to be the interaction between the resource curse and the economic and political institutions. The curse is clarified by how natural resources cause local factors to act improperly, and how they affect the economic development. Decline or neglect of agriculture and industry, weak institution and corruption, poverty and inequality, environmental degradation, and violent conflict are some of such factors (Sachs and Warner, 2001; Siakwah, 2018a; Siakwah, 2018b).

A review of various empirical studies suggests that there is a consensus that different political and social variables influence the relationship between wealth of natural resources and development implications. The interactions between natural resources and economic growth, and taking advantage of the role of institutions in different studies have been investigated (Isham et al., 2005; Mehlum et al., 2005; 2006a; 2006b; Andersen and Aslaksen, 2008; Bhattacharyya and Hodler, 2010; Bjorvatn et al., 2012; Collier and Goderis, 2012; Anshasy and Katsaiti, 2013; Papyrakis, 2011; 2014). Accordingly, resources are helpful for growth only if the institutions are high-quality enough to restrict the possible rent-seeking activity, which determines the adverse effects of the resource abundance. So, the first stream of the literature has focused on political economic explanations associating oil with the presence of inferior institutions and rent-seeking competition (Bjorvatn and Naghavi, 2011; Bjorvatn and Selvik, 2008; Bulte et al., 2005; Papyrakis et al., 2016; Wick and Bulte, 2006; Mehlum et al. 2006a; Boschini et al., 2007; Collier and Hoeffler, 2009; Ross, 2012; Menaldo, 2013). Most of them establish that in countries with good institutions, resources can contribute to the economic growth; while in countries with bad institutions, they prevent economic growth. As mentioned, resource stimulate rent-seeking (cf. Tornell and Lane, 1999) or different institutions (producer-friendly vs. grabber-friendly, as Mehlum et al. 2006b call them) generate different incentives to engage in productive or redistributive activity in the presence of natural resources. Anyway, institutions seem at least to mitigate the negative effect of the resource curse or provide foundations for growth, using natural resources in the best case. In recent years, there have been numerous empirical studies trying to evaluate the resource curse on democracy. One branch attempts to integrate the relationships of oil and other natural resources with both growth and democracy, but usually by viewing the effects of democracy as mediating the effects on growth (Acemoglu et al., 2008; Al-Ubaydli, 2012; Cassidy, 2018). Blanco et al. (2016) found that oil revenues did not have long-run effects on policy, civil liberties, and political rights in oil exporting countries. This result is different from the one by Andersen and Ross (2014). Other papers have focused on a variety of transmission channels (Weinstein and Partridge, 2011; Weber, 2011; Douglas and Walker, 2017).

Mehlum et al. (2006), Robinson, Torvik and Verdier (2006), McSherry (2006) and Smith (2007) suggested that for the country which had already good institutions at the time that oil was discovered was more likely to be put to use for the national welfare rather than the welfare of an elite. Isham et al. (2005) found that the commodities that were damaging to institutional development, which they called “point source” resources, are, in addition to oil: other minerals, plantation crops, and coffee and cocoa (versus the same small-scale farm products identified by Engerman and Sokoloff). Sala-I-Martin and Subramanian (2003), and Bulte, Damania, and Deacon (2005) also came to the conclusion that point-source resources i.e. oil and some particular minerals undermine institutional quality and thereby growth, but not agricultural resources. Mehlum et al. (2006b) observed the distinction by designating

them loot able resources. Arezki and Brückner (2009) found that oil revenues worsened corruption (but, unusually, that they improved civil liberties at the same time). Alexeev and Conrad (2009) found that neither oil nor mineral wealth interacted positively with institutional quality.

Accordingly, in this study, concentrating on oil as a point-source resource, the model of Mehlum et al. (2006b) was extended. It was concerned the interactions role of resource abundance and institutions as well as their marginal effect on the economics growth of the OPEC members. The reason for applying the OPEC data was to put an exogenous assumption of oil production into the model of Mehlum et al. (2006b). This is why some questioned the assumption that oil discoveries were exogenous and institutions were endogenous. In other words, oil wealth is not necessarily the cause and institutions the effect. Norman (2009) suggested that the discovery and development of oil were not purely exogenous, but rather endogenous with respect to the economic efficiency. Nevertheless, what is clear is that in the OPEC members, oil production for each country is based on its specific quota, and is largely extraneous.

The remainder of this paper is organized as follows. Section 2 provides a brief review of the theoretical foundations. Section 3 elaborates the core variables used in this work. Section 4 presents the empirical framework, and Section 5 provides some concluding comments on the key points of the paper.

Theoretical Foundations

In this section, a summary of Mehlum et al (2006b) model is proposed:

In the model the total number of entrepreneurs is denoted by N=nP+nG, where nP are producers while nG are grabbers. Grabbers target rents from natural resources R and use all their capacity to appropriate as much as possible of this rent. To what extent grabbing succeeds depends on the institutions of the country. In the model the institutional quality is captured by the parameter λ, which reflects the degree to which the institutions favour grabbers versus producers. Formally λ measures the resource rents accruing to each producer relative to that accruing to each grabber. When $\lambda = 0$, the system is completely grabber friendly such that grabbers extract the entire rent, each of them obtaining R/n_G. A higher λ implies a more producer friendly institutional arrangement. When $\lambda = 1$, there are no gains from specialization in grabbing as both grabbers and producers each obtain the share R/N of resources. In other words, $1/\lambda$ indicates the relative resource gain from specializing in grabbing activities. In countries where λ is low, this relative gain is large. Clearly, in this case rent appropriation and production are competing activities. In countries where λ is higher, however, rent appropriation and production may become complementary. The higher is λ, the lower is the resource gain from specializing in grabbing and the less willing are entrepreneurs to give up the profits from production to become grabbers. Considering to this assumptions, the below result is consequented:

Proposition 1. When institutional quality is high, the equilibrium is a production equilibrium. When the institutional quality is low, the equilibrium is a grabber equilibrium.

Proposition 2. More natural resources is a pure blessing in a production equilibrium. More natural resources is a curse in a grabber equilibrium.

Proposition 3. In the grabber equilibrium more producer friendly institutions (higher values of λ) increase profits both in grabbing and production, and thus leads to higher total income. In the production equilibrium a further increase in λ has no implications for total income.

Proposition 4. In the grabber equilibrium a higher number of entrepreneurs N raises the number of producers n_P, lowers the number of rent-seekers n_G, and leads to higher profits in both activities.

To see how the dynamics work consider Figure 1 where we measure the number of productive entrepreneurs n_P on the horizontal axis and the value of resources R on the vertical axis. equilibrium the long-run relationship between R and n_P is

$$R = \frac{\overline{N}}{1-\lambda}\pi(n_p) - n_p\pi(n_p) \quad (1)$$

In the producer equilibrium, however, n_P is by definition equal to $\overline{N}$. Thus the long-run relationship in Figure 3 has a kink for $\overline{N} = n_p$. The kink defines the separation between the grabber and the producer equilibrium and is thus given by R^*. The long-run relationship between R and n_P is given by the bold curve in Figure 1.

In the Figure we have also drawn iso-income curves. Each curve is downward sloping as more natural resources are needed to keep the total income constant when the number of producers declines. For a fixed total income $Y = Y_i$, an iso-income curve is given by:

$$R = -L - n_p\pi(n_p) + Y_i \quad (2)$$

By comparing this expression with (1) we see that the iso-income curves are steeper than the long-run equilibrium curve, as depicted in Figure 1.

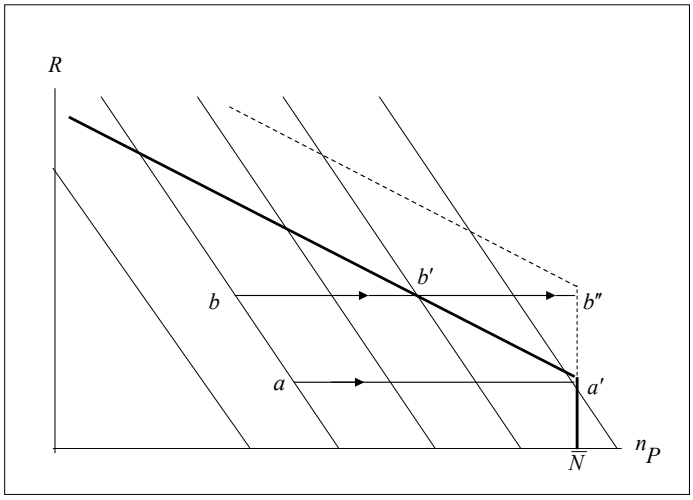

Figure 1. Resources and Rent Seeking

We are now ready to illustrate the implications of resource abundance and institutions on income growth. We first focus on two countries, A and B, that have the same quality of institutions (the same λ) and by construction the same initial income level. Country A has little resources, but a high number of producers, while country B has more resources and fewer producers. Country A, that starts out in point a, ends up in point α', while country B, that starts out in point b, ends up in point b'. As seen from the Figure the resource rich country B ends up at a lower income level than country A with the resource poor. The reason is that country A because of its lack of resources, ends up in the production equilibrium, while country B because of its resource abundance ends up in the grabber equilibrium. Accordingly, over the transition period growth is lowest in the resource rich country. This is a specific example of a more general result. As proved in Proposition 2, country B would increase its growth potential if it had less resources.

Assume next that country B instead had more producer friendly institutions and thus a higher λthan country A. As country B now is more immune to grabbing, it can tolerate its resource abundance and still end up in the production equilibrium. As a result, the long-run equilibrium curve for country B shifts up, as illustrated by the dotted curve in Figure 1. With grabber friendly institutions (low λ) country B converges to point b', while with producer friendly institutions (high λ) country B converges to point b''. Income is higher in b''than in

b'. Over the transition period growth is therefore highest with producer friendly institutions. Moreover, with more producer friendly institutions, the resource rich country *B* outperforms the resource poor country *A*, eliminating the resource curse.

Data presentation and discussion

The method of Mehlum et al. (2006b) is used to illustrate the relationship between institutional quality and oil revenues in the Equation 3. Our sample is consisted of eight OPEC members i.e. Algeria, Iran, Kuwait, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela limited only by data availability. To this end, we used the annual data from 1996 to 2000:

$$GDPG = f(INI, RA, GDP, I, IT) \quad (3)$$

In the Equation 3, the dependent variable is GDP growth–growth rate of real GDP per capita ($GDPG$). Explanatory variables consist of initial income level–the log of GDP per head of the economically active population (INI), resource abundance–the share of oil exports in GDP (RA), investments–the ratio of real gross domestic investments over GDP (I), and institutional quality–an index ranging from zero to unity (IT).

✓ Resource Abundance: So that the ratio in the Equation 4, the percentage of oil exports to GDP in each country, is considered as an indicator of the resources frequency in one country:

$$RA_t = \frac{EXO_t}{GDP_t} \times 100 \quad (4)$$

In Equation 4, EXO_t shows oil exports in each period.

✓ Interaction Term: Based on Mehlum et al. (2006b), the variable introduced in Equation 5 is used to investigate the resource curse:

$$interaction\ term = resource\ abundance \times institutional\ quality \quad (5)$$

Interaction term is the multiplication of the resource abundance and the institutional quality.

✓ Institutional *Quality*: Institutional quality in Equation 5 is an unweighted average of six indices based on the data from Political Risk Services
✓ [1]:

1. Voice and accountability index;
2. Political stability and absence of violence index;
3. Government effectiveness index;
4. Regulatory quality index;
5. Rule of law index;
6. Control of corruption index.

All these characteristics capture various aspects of producer friendly versus grabber friendly institutions. The index is run from one (maximum producer friendly institutions) to zero. In order to investigate the various dimensions of institutional quality, the above-mentioned indices were individually used as well for calculating the interaction term as separated institutional quality variables. According to the model prediction, it is expected that the effect of the term "interacting" would be positive on the economic growth. The stationarity of variables in the model were examined using panel unit root test results of Levin, Lin and Chu, Im, Pesaran and Shin, ADF–Fisher and PP–Fisher tests. Results indicate that most of the variables in the model are non-stationary in level, but all of them are stationary in first difference, which allows us to use the first differences of variables for estimation.

[1]. Commercial business information provider headquartered in Syracuse, United States. Website: www.prsgroup.com.

Table 1. Panel unit root tests results

	PP - Fisher	ADF - Fisher	Im, Pesaran and Shin	Levin, Lin & Chu
			Level	
Resource abundance	8.23	8.64	0.85	1.23
	(0.88)	(0.85)	(0.80)	(0.89)
GDP growth	42.70	45.44	-4.44	-4.92
	(0.00)	(0.00)	(0.00)	(0.00)
Investments	11.60	25.55	-2.07	-1.81
	(0.64)	(0.03)	(0.02)	(0.04)
Initial income level	20.07	28.62	-2.24	-3.14
	(0.13)	(0.01)	(0.01)	(0.00)
Institutional quality	6.97	8.54	0.64	0.91
	(0.94)	(0.86)	(0.74)	(0.82)
Voice and Accountability	8.84	13.21	0.05	0.04
	(0.84)	(0.51)	(0.52)	(0.52)
Political Stability and Absence of Violence	7.29	7.63	0.94	1.45
	(0.92)	(0.91)	(0.83)	(0.93)
Government Effectiveness	8.23	8.64	0.85	1.23
	(0.88)	(0.85)	(0.80)	(0.89)
Regulatory Quality	10.75	11.82	0.72	1.04
	(0.71)	(0.62)	(0.76)	(0.85)
Rule of Law	7.07	9.13	0.62	0.44
	(0.93)	(0.82)	(0.73)	(0.67)
Control of Corruption	12.80	12.83	-0.31	-0.31
	(0.54)	(0.54)	(0.38)	(0.38)
			First differences	
Resource abundance	55.87	49.68	-5.16	-8.21
	(0.00)	(0.00)	(0.00)	(0.00)
GDP growth	101.56	69.90	-7.34	-7.22
	(0.00)	(0.00)	(0.00)	(0.00)
Investments	67.23	52.79	-5.52	-5.40
	(0.00)	(0.00)	(0.00)	(0.00)
Initial income level	73.61	43.27	-4.08	-4.40
	(0.00)	(0.00)	(0.00)	(0.00)
Institutional quality	49.05	46.29	-4.76	-7.73
	(0.00)	(0.00)	(0.00)	(0.00)
Voice and Accountability	43.90	43.89	-4.49	-7.33
	(0.00)	(0.00)	(0.00)	(0.00)
Political Stability and Absence of Violence	52.20	47.37	-4.88	-7.85
	(0.00)	(0.00)	(0.00)	(0.00)
Government Effectiveness	55.87	49.68	-5.16	-8.21
	(0.00)	(0.00)	(0.00)	(0.00)
Regulatory Quality	49.11	41.51	-4.14	-7.19
	(0.00)	(0.00)	(0.00)	(0.00)
Rule of Law	46.04	51.05	-5.29	-8.55
	(0.00)	(0.00)	(0.00)	(0.00)
Control of Corruption	55.28	48.02	-4.72	-8.05
	(0.00)	(0.00)	(0.00)	(0.00)

Empirical framework

Estimated results from our model in the Equation 3 are presented in Tables 2 and 3. The Hausman test is the standard procedure used in empirical panel data analysis in order to discriminate between fixed effect and random effect models, which is insignificant at a level of 5%. Therefore, we used the random effects panel model. The results are indicated in seven different models. In each model, using one of the indices, the interaction term is calculated.

Table 2. Estimated results for the models 1 to 4

		Model 1	Model 2	Model 3	Model 4
Initial income level		-1.60*** (-8.13)	-1.59*** (-5.15)	-1.54*** (-4.22)	-1.48*** (-10.5)
Resource abundance		19.60*** (4.94)	14.97*** (3.01)	12.23** (2.51)	16.30*** (8.95)
Investments		0.13*** (7.66)	0.14*** (5.51)	0.14*** (4.34)	0.14*** (12.0)
Interaction term	Institutional quality	-13.85*** (-2.67)			
	Voice and Accountability		-8.19 (-1.25)		
	Political Stability and Absence of Violence			1.83 (0.148)	
	Government Effectiveness				-14.59*** (-4.36)
Hausman Test		2.68 {0.61}	3.16 {0.53}	6.43 {0.16}	9.79 {0.13}

Note: The numbers in brackets are t-values. (*) indicates that the estimate is significant at the 10% level, (**) indicates that the estimate is significant at the 5% level, (***) indicates that the estimate is significant at the 1% level.

Table 3. Estimated results for the models 5 to 7

		Model 5	Model 6	Model 7
Initial income level		-1.63*** (-9.34)	-1.61*** (-5.27)	-1.46*** (-6.19)
Resource abundance		17.17*** (6.33)	13.99** (2.56)	17.74*** (4.76)
Investments		0.13*** (8.51)	0.14*** (5.58)	0.12*** (5.42)
Interaction term	Regulatory Quality	-7.40*** (-3.12)		
	Rule of Law		-4.37 (-0.89)	
	Control of Corruption			-18.67** (-2.47)
Hausman Test		2.74 {0.6}	3.21 {0.52}	2.07 {0.72}

Note: The numbers in brackets are t-values. (*) indicates that the estimate is significant at the 10% level, (**) indicates that the estimate is significant at the 5% level, (***) indicates that the estimate is significant at the 1% level.

In all the models, we included initial income level, resource abundance and investment share of GDP, respectively. Resource abundance and investment have a positive significant effect on growth; while initial income level have a negative significant effect on it. However,

the interaction term variables provided new insights to the resource curse. Results indicated that the interaction term effect was negatively strong, and significant for the variables i.e. institutional quality, government effectiveness, regulatory quality, and control of corruption. The impact of a marginal increase in resources implied by the model 1 is:

$$\frac{d(growth)}{d(resource\ abundance)} = 19.60 - 13.85\ (Institutional\ quality) \quad (6)$$

The impact of a marginal increase in resources implied by model 2 is:

$$\frac{d(growth)}{d(resource\ abundance)} = 14.97 \quad (7)$$

The impact of a marginal increase in resources implied by model 3 is:

$$\frac{d(growth)}{d(resource\ abundance)} = 12.23 \quad (8)$$

The impact of a marginal increase in resources implied by model 4 is:

$$\frac{d(growth)}{d(resource\ abundance)} = 16.30 - 14.59\ (Government\ Effectiveness) \quad (9)$$

The impact of a marginal increase in resources implied by model 5 is:

$$\frac{d(growth)}{d(resource\ abundance)} = 17.17 - 7.40\ (Regulatory\ Quality) \quad (10)$$

The impact of a marginal increase in resources implied by model 6 is:

$$\frac{d(growth)}{d(resource\ abundance)} = 13.99 \quad (11)$$

The impact of a marginal increase in resources implied by model 7 is:

$$\frac{d(growth)}{d(resource\ abundance)} = 17.74 - 18.67\ (Control\ of\ Corruption) \quad (12)$$

According to the Equations 6, 9, 10 and 12, the effect of each unit increase in resource abundance is detected with regard to the mount of institutional quality. Thus, the positive effect of resource abundance decreases by increasing the institutional quality. Since the mount of the institutional quality index is between zero and one, the final effect is positive. It should be noted that if the corruption control index value is one, the final effect value will be negative $(17.74 - 18.67 = -0.93)$, and this is only an exception in the results.

Conclusion and Policy Implications

This paper reinforced previous results by the studies in conditional natural resource curse, and asserted that natural resources were growth-enhancing even if they had nefarious effect through various transmission mechanisms. In this study, the model by Mehlum et al. (2006b) was reexamined. So, it is the quality of institutions which determines whether countries avoid the resource curse or not. So that using the OPEC annual data, the role of interactions of resource abundance and institutions was considered. Furthermore, the marginal effect of these interactions in the countries' economic growth was investigated.

Considering the theoretical foundations of the present study, the revenues from oil resources under the existing institutional framework and its interaction with it, will change the opportunities for gaining profit. Thus, through the transfer of entrepreneurial activists from productive activities in the productive sectors to rendering activities, it can reduce non-oil production and even the entire economy production and, as a result, create curse of resources.

Results indicated that with institutional quality growth, the positive effects of resource abundance on the OPEC members were increased. Therefore, the positive effects of resource abundance on the OPEC members can be negatively affected by institutional factors increasing. The empirical results rejected the model assumption by Mehlum et al. (2006b) on the resource curse, so that the effects of resource frequency on the economies of the OPEC countries were positive. The negative effects of institutional quality on reducing the positive effects of resource frequency can be interpreted in terms of how resources are used in short or long run. However, the producer friendly institutions help countries take full advantage of their natural resources in long-run. As institutional quality increases in the OPEC countries, revenues from the oil sale in short-run are less invested in the economy, and thus are injected into the economy in a long-run process. This policy will delay the positive effect of the resource abundance on the country's economic growth in short-run. Results of the present study indicated the dependency of the OPEC members' economies on the revenues of oil sales. Therefore, since the institutional structure of these countries is based on oil, the lack of oil revenues in short-run can have a negative effect on their economies.

Modeling to explain how revenues from oil resources have changed the opportunities for profit within the productive part of the economy can be interpreted in the context of the Dutch disease phenomenon. So that as a result of the transfer of productive entrepreneurs from production activities in an interchangeable sector to productive activities in the non-exchangeable sector can, on the one hand, contract and reduce the exchangeable sector production and, on the other hand, expand the non-tradable sector production. Nevertheless, judging by the long-run effects of resource revenues on economic growth can be interpreted in how it affects the combination of production, and moves the resources towards productive or non-productive production in the short-run, because if resources are moved to counterproductive sectors, the long-run effects on economic growth will be uncertain. Hence, it is suggested that future studies examine the oil revenues effects on the process of OPEC's economic growth in the short-run.

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