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Article

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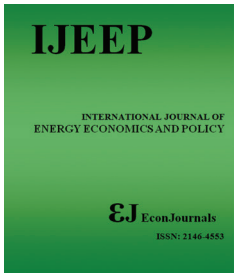

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The Effects of Resource Rent, Human Capital and Government Effectiveness on Government Health Expenditure in Organization of the Petroleum Exporting Countries

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ABSTRACT

The low economic growth and lack of qualified institutions have led to a lower level of health in the resource-rich developing countries. This paper explores the effects of resource rent, human capital and government effectiveness on government health expenditure in Organization of the Petroleum Exporting Countries (OPEC). It uses Panel Fully Modified Least Squares method in Eviews software over the period 2002-2015. Findings imply that the resource rent, human development index and government effectiveness influence directly the government expenditure on health, when the interactions between explanatory variables are ignored. However, the sign and magnitude of coefficients are changed, when interaction terms are included in regression models. The oil rents affect the healthcare sector in OPEC. Accordingly, the abundance of oil resources is not bad per se. Thus, the key determinant in the transformation of rents from oil resources into disaster or blessing is the government effectiveness across oil exporting countries.

Keywords: Health, Resource rent, Panel Fully Modified Least Squares
JEL Classifications: C52, I15, P48

1. INTRODUCTION

Prior to the 1990s, the causality from natural resource abundance (NRA) to economic growth was the dominant relationship between NRA and economic development. During 1990s and afterwards, numerous studies challenged this traditional linkage. NRA increases the likelihood of negative socioeconomic and political consequences like poor economic performance, low democracy level, internal war, and government dependence on exports of natural resources. In other words, most resource-based economies rely on natural resources in financing public expenditure. Many researchers do not accept resource abundance as an advantage of development (Bannon and Collier, 2003).

Some studies indicate that NRA reduces the economic growth. As a result, the tax coverage decreases along with increasing reliance of government budget on resource incomes. For instance, Wheeler (1984) found that in sub-Saharan Africa, countries rich in mineral resources experienced less economic growth in the 1970s than countries that were not wealthy in terms of mineral resources. Similarly, Gelb (1988) pointed out that economies having mineral resources have recorded serious distortions in efficiency of domestic capital formation during boom of 1971-1983 rather than countries poor in mineral resources, which in turn led to considerable fall in economic growth of resource-based economies and oil–exporting countries. Sachs and Warner (1995) examined the experiences of resource-rich countries during 1970-

1990, and found that resource-abundant countries tended to have small contributions from export growth in manufactures.

Auty (2001) found that resource-abundance tends to undermine the efficiency of investment whereas a resource-poor endowment places a premium on efficient investment. He added that between 1960 and 1990 the per capita incomes of the resource-poor countries grew at rates two to three times faster than those of the resource-rich countries.

Auty and Gelb (2001) considered a chronic tendency for the overextended state as a characteristic of resource abundance, especially in mineral exporters. They recognized three avenues of redistribution, namely extended periods of protection for import-competing sectors; the creation of employment through growth of the public sector; and overextended public expenditure. They believed that all three channels reduce the benefits of an abundant natural resource endowment.

In Gylfason (2001) viewpoint, natural capital crowds out human capital and slows down the pace of economic development. Resource rents may be used for health and educational programs (Papyrakis and Gerlagh, 2004). Using panel data model, Busse and Gröning (2013) showed that exports of natural resources leads to an increase in corruption.

Farag et al. (2013) examined the relationship between country health spending, infant and child mortality, using data from 133 selected countries for the years 1995, 2000, 2005, and 2006. Government health spending had a significant effect on reducing infant and child mortality in countries with high level of good governance.

Balabanova et al. (2013) argued that improvements in health could be achieved in countries with relatively few resources, though strategic investment is necessary to address complex chronic diseases and growing population expectations.

Health services coverage is associated with democratic political accountability (Greer and Méndez, 2015). Democratization gives governments' particular incentive to expand health coverage. In addition, governance shapes any decision to strive for universal health coverage and the shape of its implementation.

Saltman and Duran (2016) regarded strengthening governance in the health services provider sector as a complex endeavor, which involves balancing the multiple conflicting logics and interests of patients, staff, citizens, politicians, and other stakeholders. All of these agents call for improving access, quality and safety, and health outcomes, responsiveness and system performance.

The increasing health expenditure is a main concern for health managers and decision-makers in the world. The major determinants of this issue are the continuous advancement of new and expensive health technologies, increasing expectations on health systems and emerging chronic and refractory diseases. In addition, both economic and non-economic factors have fueled this problem. For example, various studies confirm the significant effects of age, education, income, and urbanization on health status (Ross and Wu, 1996; Dolan, 2000; Moore et al., 2003; Frijters et al., 2005; Silles, 2009).

In our best knowledge, the nexus among resource abundance, government effectiveness and health expenditure has attracted less attention, especially in resource-based economies. Hence, this paper aims to explore the effects of resource rent, government effectiveness and human capital on government health expenditure in Organization of the Petroleum Exporting Countries (OPEC).

This paper consists of 5 sections. Section 2 explains the theoretical basics. Section 3 devotes to literature review. Section 4 presents data and methodology. Finally, section 5 concludes.

2. THEORETICAL BASICS

A number of researches attribute the low growth of resource-rich countries to "Dutch disease," which comes from economic recession in the Netherlands after exploration of natural gas in its coastal region. The exploration and exporting natural gas resulted in appreciation of national currency and finally Dutch disease. The exports' crowding-out effect hurt temporarily the Netherlands economy; however, de-industrialization did not occur (Gylfason, 2001).

A resource-based economy faces two problems: First, the share of exports in gross domestic product (GDP) decreases. Second, the national income gets heavily dependent on world prices of natural resources. This is aggravated by natural fluctuations in commodity prices. In this case, the dependency of government expenditure on resource incomes lowers the accountability of government, expands the financial corruption and distorts the taxation system. Studies focusing on government contribution to overcome resource curse argue that natural resource wealth creates great responsibility for strong and public institutions, which provide opportunity for progress. In this context, resource abundance has positive impact on economic growth, since resource-rich countries can easily improve own economic structures and human capital (Sachs and Warner, 1999).

From political economy viewpoint, the natural resource wealth disperses the conflict seeds among politicians, tribes and citizens. As a result, beneficiaries are stimulated to seek unfair natural resource rents. In such cases, an effective government plays key role in linking resource abundance to economic boom. Resource abundance is an advantage for any country in which government manages resource rents efficiently in order to maximize the long-run economic growth. However, if resource rents are distributed unevenly, the willingness to overexploitation of natural resources may not cause economic growth. Leamer et al. (1999) show that uneven distribution of resource incomes resulted in relatively higher income inequality in Latin America, and this in turn caused failure in capital accumulation including human capital, and unsustainability of economic growth.

Regarding "Dutch disease" concept, Sachs and Warner (1995) argued that natural resource-abundant countries tend to have a

larger service sectors and smaller manufacturing sectors than resource-poor economies. In addition, natural resource abundant countries tend to have slower growth in exports of manufactures than do resource poor-economies. In another work, they show that if exports of manufactures are an important engine of growth, and if the Dutch disease effects of NRA tends to squeeze this sector, then this provides a channel for the negative association between natural resource-abundance and growth (Sachs and Warner, 1999).

The experience of advanced countries shows that the economic development cannot be explained only through physical assets and working population. In fact, the other factors accelerate the economic growth in these societies. These are called "surplus or residual factors", which increase the productivity of capital and human resources. Many economists believe that "residual factors" in advanced economies depend on better education (Sadeghi and Emadzadeh, 2003).

In resource-based countries, one of the factors affecting human capital is the availability of natural resources. Natural capital leads to lower human capital in these countries. In fact, the resource-rich developing countries employ more labor to produce raw materials and commodities. Since production requires the low-skilled labor, such countries are less concerned with training and health of the labor force. As a result, they are of less-educated labor and low human capital. In contrast, resource-poor countries produce and export manufactured goods, which require high-skilled labor. Therefore, they spend more on labor force and get higher human capital through learning -by-doing and technology development.

By defining dependence on natural resources in terms of exports of metals and fuel, and resource abundance on the basis of the subsoil assets per square kilometer and per capita, Daniele (2011) reached a negative correlation between metals and ore exports and human development, and positive correlation between subsoil assets and economic development. He concluded that the effects of natural resources on human and economic development strictly relate to specific national political and institutional characteristics.

The basic logic behind the hypothesis that dependence on natural resources or the abundance of resources affects health indicators lies in the concept of government's windfall wealth (Moore, 2001). Governments are able to increase their financial independence by exploiting natural resources. This reduces the public sector' reliance on taxes and discourages efficient provision of public goods such as health care.

Theoretically, the abundance of natural resources can boost economic growth because resource abundance can put a "big push" for the economy by investing more in providing infrastructure and developing human capital (Sachs and Warner, 1999).

Some studies attribute the misuse of resource rents to lack of good governance. Resource rents are not directly flowed into goods market, but they initially change the relative prices in productive and rentier sectors. Increasing rents provide the opportunities for gaining profit within the productive sector and shift entrepreneurs from the internationally tradable sectors (industrial and agricultural sectors) to the non-tradable sectors (services and housing). As a result, the production of the tradable goods decreases on the one hand and the production of the non-tradable services increases on the other hand. Finally, the emergence of the Dutch disease causes a recession in the goods market. Therefore, the relative changes within the productive sector directly relate to the tradability of goods internationally. Goods are internationally divided into 2 categories:

- Tradable goods: All goods that are traded internationally, which include all export and import goods. The prices of such goods are determined on the international markets.
- Non-tradable goods: All goods that are not traded in the global markets because of high volume, low value, high transportation costs, impossibility of transportation or trade carriers. Therefore, at constant terms of trade, the prices of non-tradable goods vary between countries.

Resource rents raise foreign exchange earnings and result in surplus in the balance of payments. The distribution mechanism of these rents in the whole economy is a function of the institutional and structural arrangements. Rents from rising resource prices can enter the economy through either direct distribution between people or the government spending, which increase the aggregate demand and cause the boom in the commodity market.

If the entire resource rents go into the economy through the private sector, the aggregate demand will increase more. Assuming the normality of tradable and non-tradable goods, i.e., the income elasticity of both goods is greater than zero, as aggregate demand increases, demand for both goods increases. In this case, the extent of increase in prices and change in the relative prices ultimately depend on the response of the supply side. Due to the domestic supply constraints, the supply of non-tradable goods is inelastic in the short run; however, supply of tradable goods can be increased through imports. Then, the relative price of non-tradable goods will go up. Note that imports do not necessarily increase by reducing the real exchange rate, but imports increase due to resource rents.

The increase in relative prices in the non-tradable goods increases the profitability of such goods versus tradable goods, and moves resources from tradable to non-tradable sectors. This in turn leads to a contraction in the production of tradable goods on the one hand and expansion the non-tradable goods on the other hand. Therefore, the imbalance between the productive sectors of the economy magnifies the losses caused by resource rents and creates the resource curse.

The cycle of windfall wealth in the economy indicates how rising oil prices affect the relative changes in demand for tradable and non-tradable goods (Gelb, 1988). Given that the government has a greater emphasis on investing in non-tradable sector after increasing oil rents, public investments in this sector (especially infrastructure) will increase the demand for non-tradable goods and will flow investment funds to this sector. Therefore, profitability in tradable sector will go up due to the increase in the relative price of non-tradable goods, and production resources are transferred from the tradable sector to the non-tradable sector. As a result, government expenditure increases due to revenues resulting from

upward oil price shocks. This reduces the production of tradable goods. The expansion of unproductive sector and rising corruption weaken the factors affecting health expenditure. Thus, social health status worsens because of increasing inequality in incomes, decreasing economic growth and increasing unproductive activities. In this context, Cockx and Francken (2014) found a negative relationship between windfall wealth from natural capital rents and health expenditure.

3. EMPIRICAL BACKGROUND

For selected Middle-East countries, Agheli (2018) analyzed the effects of quality of democracy, government size, and the degree of openness on depletion of reserves between 1985 and 2015. He concluded that higher oil depletion follows strengthening democratic foundations, resizing the public sector, expanding politico-economic ties with trade partners, and applying the modern technology in the upstream oil industries.

Agheli (2017) focused on the determinants of political stability (instability) in the MENA over the period 2000-2014. He found that political stability stems from natural resources rents, socioeconomic status and institutional quality. In his view, the proper allocation of these rents to productive investments, and welfare-enhancing efforts, the decrease in misery index and any increase in government effectiveness and/or rule of law result in political stability in the region.

El Anshasy and Katsaiti (2015) examined the association between economic dependence on various natural resources and investment in health by controlling for countries' geographical and historical fixed effects, corruption, autocratic regimes, income levels, and initial health status. Using panel data for 118 countries for the period 1990-2008, they found no compelling evidence in support of a negative effect of resources on healthcare spending and outcomes. However, they concluded that higher dependence on agricultural exports is associated with higher healthcare spending, higher life expectancy, and lower diabetes rates. Similarly, healthcare spending increases with higher mineral intensity.

Cockx and Francken (2014) investigated the link between natural resource wealth and public health expenditure in light of the hypothesis that resource wealth as a source of unearned state income enhances state autonomy and increases volatility. Using a large panel dataset of world countries covering the period from 1995 to 2009, they found a robust, significant inverse relationship between natural resource dependence, and even abundance, and public health spending over time. The effect remained significant after controlling for state autonomy, volatility, and other factors.

In a sample of twenty-two nonindustrial mineral-rich countries, Gylfason (2008) proved that, on average, they offer their citizens less education with larger families, less health care and less democracy than other countries with similar incomes and fewer natural resources. Using World Bank data covering 164 countries in 1960-2000, he examined correlations among education, natural resource dependence and growth. He achieved an inverse relationship between natural resource dependence and growth via human capital.

Torvik (2009) believed that many countries that export natural resources have a weak protection of property rights, much corruption, and poor-quality public bureaucracy. He concluded a negative robust correlation between the share of resource exports in GDP and economic growth during a 40-year period. This correlation remains even by controlling for institutional quality and the share of investments in GDP.

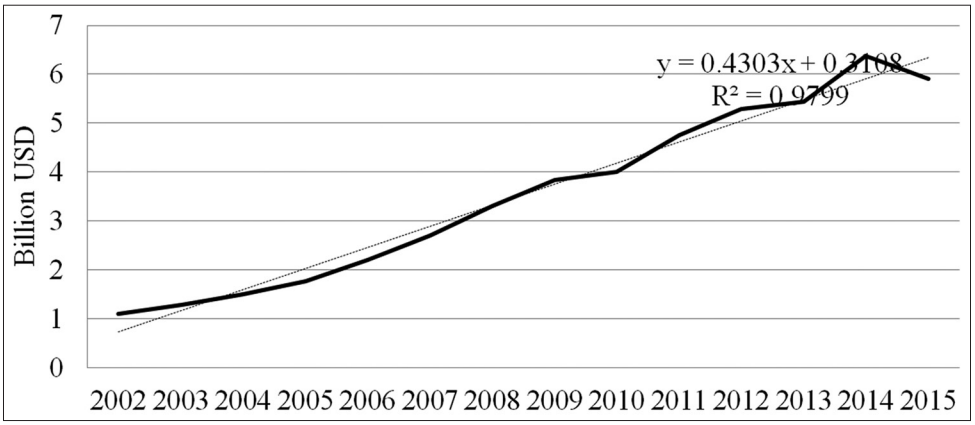
Countries rich in natural resources constitute both growth losers and growth winners. Mehlum et al. (2006) linked the quality of institutions to resource curse. The combination of grabber friendly institutions and resource abundance leads to low growth. However, producer friendly institutions help countries to take full advantage of their natural resources.

4. DATA AND METHODOLOGY

Research data constitutes the base of regression and econometric models. A rich dataset can help researcher and let him analyze the trend of variables accurately. Here, a schematic analysis is presented by using OPEC and the World Bank datasets.

Figure 1 depicts the government health expenditure for OPEC, on average. This variable is increasing with a slow rate of order 0.43

Figure 1: Average government health expenditure in organization of the petroleum exporting countries



Source of data: World Bank

over time. The high population growth rate, increase in demand for various health care services, use of advanced diagnostic and operation technologies, generation of expensive drugs, financing medical universities and hospitals are among factors resulting in the growth of public health expenditure.

Figure 2 illustrates the resource rent index in OPEC, on average. In context of OPEC, this index measures mainly oil rents as the difference between the value of crude oil production at regional prices and total costs of production. Exhaustible natural resources such as oil and minerals give rise to economic rents since they are not generated by human activities. If resource rents are used to support current consumption rather than to invest in new capital, the rate of depletion will be high. This index is a positive function of world oil prices. Figure 2 shows the first maximum for oil rents in 2008, since the oil price reached in its historical record about $130 per barrel. The next peak is observed in 2012, which Brent crude oil averaged $111.67 per barrel, and West Texas Intermediate oil averaged $94.05 per barrel in 2012. Meanwhile, OPEC oil price amounted to $109.45 per barrel.

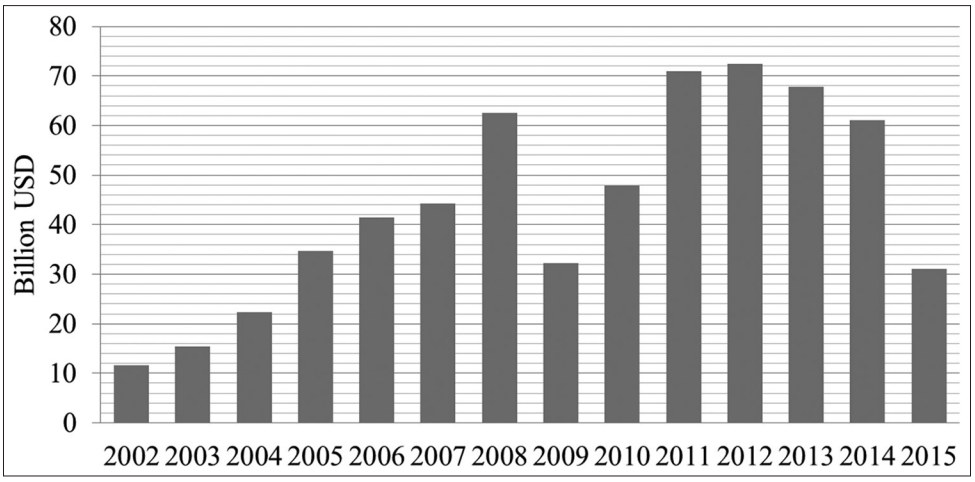
Figure 3 shows the human development index (HDI) in OPEC, on average. This variable is increasing with a slow rate during the period under consideration. Increasing economic growth, extending life expectancy, and improving the level of education, especially at primary level can be driving forces of enhancing human development. It should be noted that the sustained growth of HDI would be realized through continuous investment of governments in health and education systems.

Figure 4 shows the government effectiveness (GE) scores in OPEC, on average. GE is a sub-indicator of good governance indicator. It ranges from approximately −2.5 to 2.5, which minimum and maximum values indicate weak and strong performance of government, respectively. Since all scores are negative, one may conclude that each member in OPEC faces lower effectiveness of government. This may embodied in large and wasting government, which cannot provide goods and services at efficient scales. Lack of education and health facilities, poor infrastructure, huge government debts and low-productive labor are some symptoms of low government effectiveness in OPEC members.

According to the review of literature, the following model is introduced in order to estimate the effects of resource rent, human capital and government effectiveness on government health expenditure[1] (HEX) among OPEC countries over the period 2002-2015:

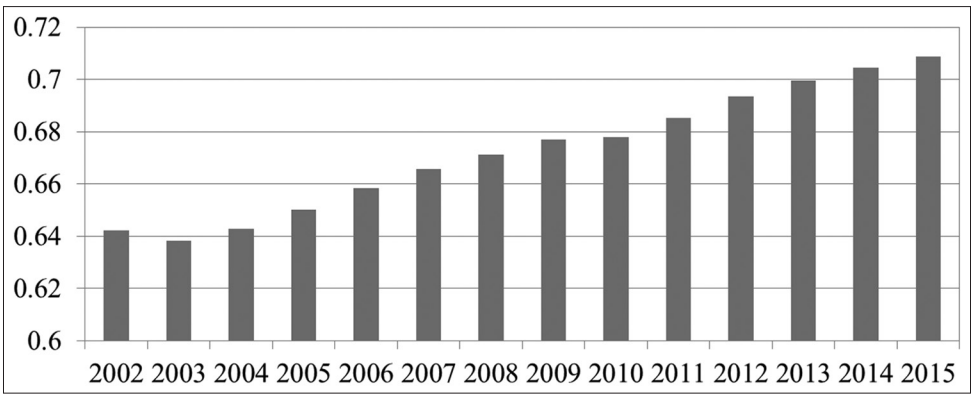
1 Data on public health expenditure is available by 2015 based on the latest updates.

Figure 2: Average resource rent (oil rent) in organization of the petroleum exporting countries



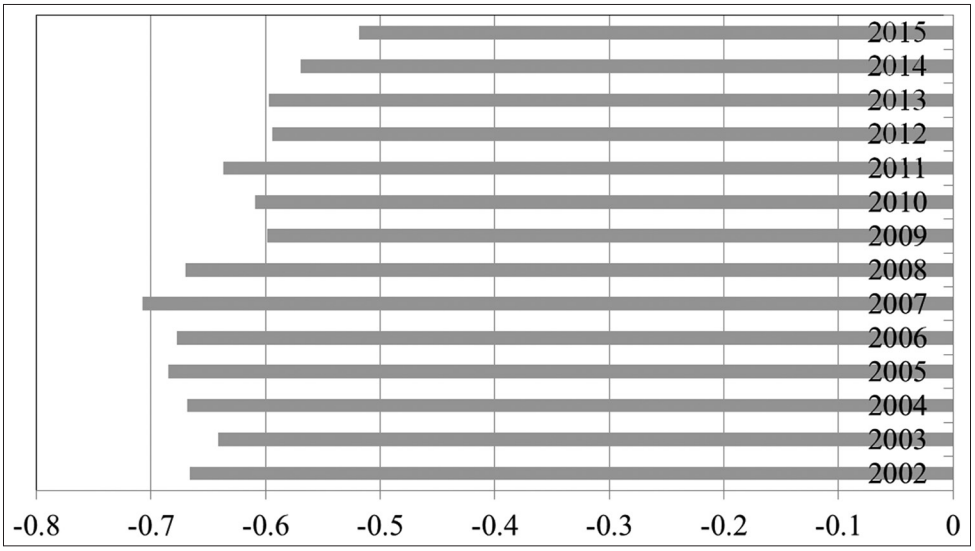
Source of data: World Bank

Figure 3: Average human development index in organization of the petroleum exporting countries



Source of data: UNDP (HDR)

Figure 4: Average government effectiveness score in organization of the petroleum exporting countries



Source of data: World Bank (World Governance Indicators)

$$HEX_{it}=\alpha_i+\beta_1 RENT_{it}+\beta_2 HC_{it}+\beta_3 GE_{it}+\varepsilon_{it} \quad (1)$$

Government health expenditure is of crucial importance in public sector economy of OPEC, since guaranteeing minimum health standards is the main task of government. The healthy people can demand for education, recreation, and other goods and services. Based on historical experiences, government provision of health services can stimulate the participation of private sector in various health subsectors.

RENT is a proxy for resource curse in the sample under study. Since resource curse reflects the negative effect of natural resources on economic growth, the present study uses the oil rents as a measure for natural resource curse in OPEC.

HC denotes human capital. Based on the advanced economies, there is a positive relationship between human capital and public health expenditure. Such relationship may also exist in OPEC. Hence, it is supposed that increased human capital requires more government expenditure on health. Due to difficulties in measurement of human capital, the HDI is included as a proxy variable.

GE symbolizes the government effectiveness[2]. An effective government can provide public goods and services effectively. Education, health and security are three basic themes, which every government is obliged to provide them. It is assumed that the government health expenditure increases along with its effectiveness.

In Model (1), *s*ymbols *i* and *t* in the subscript *it* indicate country and time, respectively. In addition, is a disturbance term with identically independent distribution.

For different countries, general government expenditure on health and oil rents as percentages of GDP are reported by the World Bank. These figures are multiplied by GDPs to get the government health expenditure and oil rents. Data for HDI is obtained from the United Nations human development reports[3]. Finally, government effectiveness data is collected from the Worldwide Governance Indicators (WGI) project of the World Bank[4].

Since the units of measurement of variables are different, we enter HEX and RENT in logarithmic forms, and HDI, proxy for human capital, and government effectiveness in their nominal units.

In the following, we estimate three versions of Model (1). Model *A contains 4 variables: Log(HEX), Log(RENT), HC and GE; Model B contains variables of Log(HEX), log(RENT), GE and GE*Log(RENT), and Model C includes series of Log(HEX), Log(RENT), HC and HC*Log(RENT).*

4.1. Testing for Pool/Panel Data

Since 15 members of OPEC are considered over the period 2002-2015, the structure of model can be in the form of pool or panel data. The proper model is selected through redundant fixed effects test. In such test, the null hypothesis (H_0) implies the redundancy of fixed effects. If H_0 is rejected, then model should be estimated with panel data method. In addition, the Hausman (1978) test is applied to choose between fixed and random effects. Here, H_0 indicates the relevance of random effects, and its rejection means that model should be estimated through fixed effects approach. According to Table 1, all probability values imply the rejection of H_0 in both pool/panel test and Hausman test. Therefore, a panel data model with fixed effects is our preferred specification.

4.2. Testing for Unit Root

In the context of time-series data, the unit root test examines whether variable under study is stationary**.** The existence of unit root indicates unstable mean and variance for variable under study over time. In this case, a typical researcher faces a spurious regression, where statistical inference and causal relationships will not be reliable.

2 Government effectiveness as sub-indicator of good governance indicators is available from the 2002 onward.

3 http://www.hdr.undp.org/.

4 http://info.worldbank.org/governance/wgi/#home.

There are various strategies for examining the unit root in panel data models. Here, we use the LLC (Levin et al., 2002) unit root test. LLC test assumes that there is a common unit root process so that autoregressive coefficient is identical across cross-sections, when arbitrary y_{it} is regressed over its first lag. Table 2 reports the LLC unit root results. Hence, *Log(HEX), Log(RENT) and HC*Log(RENT)* are integrated of degree one, i.e., they are non-stationary at their levels. However, *HC, GE,* and *GE*Log(RENT)* are stationary at 1% level of significance. Due to different orders of integration, we have to test for co-integration among variables under study.

Table 3 indicates the existence of a long-term and co-integrating relationship among variables in terms of Kao (1999) residual co-integration test, so there is no need to use the research data in differenced forms.

4.3. Model Estimation

Because of different degrees of integration among variables, a Panel Fully Modified Least Squares strategy applied to estimate Model (1). The results of the estimation are presented in Table 4 in three versions of Model (1).

Table 4 shows that all variables, except for *Log(Rent)* in Model B, are statistically significant at 1% level. The adjusted R-squared measures indicate that all models explain more than 98% of changes in the dependent variable. In the following, we try to interpret the findings of Table 4. It should be mentioned that we keep other variables fixed in interpreting partial regression coefficients.

According to Model A, the government health expenditure increases about 0.29% for a 1% increase in resource rents. If human capital increases by one unit, the *HEX* will increase by 7.5%. This finding may be surprising at the first glance. However, one should note that HDI, as proxy for human capital, ranges from 0 to 1. Therefore, one-unit increase in HDI is an extraordinary work, which should be supported by increasing health and education expenditure. The coefficient of *GE* has been estimated as much as 0.676. This means that if government effectiveness increases by one unit, then public health expenditure will increase about 0.68%.

Based on Model B, the government health expenditure will increase about 0.14%, if resource rents increase by 1%. Of course, this relationship is meaningful at 10% level of significance. If human capital increases by one unit, the *HEX* will increase by 6.2%. In this Model, the coefficient of *GE* has been estimated as much as 5.29. This means that if government effectiveness increases by one unit, then public health expenditure will increase about 5.29%. The interaction effect of *Log(RENT)* and government effectiveness is negative. This means that higher resource rent and greater effectiveness of government reduces the public expenditure on health, if other things being constant. In this model, the effect of *Log(RENT*) on *Log(HEX)* is calculated as follows:

$$\frac{\partial LOG(HEX)}{\partial LOG(RENT)} = 0.144 - 0.204GE$$

Since *GE* is negative for all OPEC members (Figure 4), $\partial LOG(HEX))/(\partial LOG(RENT)$ will be positive. For example, if we set *GE* equal to −0.4, then $\frac{\partial LOG(HEX)}{\partial LOG(RENT)}$ will be 0.226.

Considering Model C, the government health expenditure increases about 1.03%, if resource rents increase by 1%. A one-unit increase in human capital results in 35% increase in the *HEX*. In this Model, the coefficient of *GE* is about 0.6. This means that one-unit increase in government effectiveness increases public health expenditure as much as 0.6%. The interaction effect of *Log(RENT)* and human capital is negative. This means that higher resource rent and more human capital reduces the public expenditure on health, if other things being equal. In this model, the effect of *Log(RENT)* on *Log(HEX)* is calculated as follows:

$$\frac{\partial LOG(HEX)}{\partial LOG(RENT)} = 1.028 - 1.174HC$$

Since *HC* is considerably different from one (Figure 3), $\partial LOG(HEX))/(\partial LOG(RENT)$, may be positive. For example, if we put *HC* equal to −0.4, then $\frac{\partial LOG(HEX)}{\partial LOG(RENT)}$ will be 0.226.

The results of the research imply that the resource rent, HDI and government effectiveness influence directly the government expenditure on health, when the interactions between explanatory variables are ignored. However, the sign and magnitude of coefficients are changed, when interaction terms are included in Models B and C.

Table 1: Results of pool/panel and hausman test

Model	Pool/panel test			
	Effects test	Stat.	d. f.	Prob.
A	CS/P F	81.89	(27.179)	0
	CS/P χ^2	544.26	27	0
B	CS/P F	76.26	(27.178)	0
	CS/P χ^2	531.54	27	0
C	CS/P F	75.98	(27.178)	0
	CS/P χ^2	530.84	27	0
Model	**Hausman test**			
A	CS Random	22.32	3	0.0001
B	CS Random	29.12	4	0
C	CS Random	31.99	4	0

CS and P refer to cross-section, and period, respectively. F and χ^2 denote F-statistic and Chi-square. Stat, d. f. and prob. are acronyms of statistic, degree of freedom and probability

Table 2: Results of LLC panel unit root test (intercept and trend term)

LLC Test	Log (HEX)	Log (RENT)	HC	GE	GE*Log (RENT)	HC*Log (RENT)
LLC stat.	1.346	3.405	−3.324	−3.176	−2.41	3.837
Prob.	0.911	0.999	0	0	0.008	0.999
Result	I (1)	I (1)	I (0)	I (0)	I (0)	I (1)

LLC: Levin-Lin-Chu, Stat and Prob are acronyms of statistic and probability. I (0) and I (1) indicate integration of order zero, i.e., stationary series, and order one, respectively.
Source: Research findings

Table 3: Results of Kao residual co-integration test

Model	Test	Stat.	Prob.
A	ADF	−3.95	0.000
B	ADF	−1.86	0.030
C	ADF	−1.69	0.0701[5]

Source: Research findings

Table 4: Estimation results using Panel FMOLS (Depvar.: LOG (HEX)

Model	A	B	C
Var.	Coef.	Coef.	Coef.
LOG (RENT)	0.289*	0.144***	1.028*
	(3.55)	(1.76)	(12.44)
HC	7.506*	6.197*	35.05*
	(101.32)	(83.38)	(470.16)
GE	0.676*	5.295*	0.602*
	(7.61)	(59.12)	(6.75)
GE*LOG (RENT)		–0.204*	
		(–2.32)	
HC*LOG (RENT)			–1.174*
			(–15.09)
R^2	0.984	0.985	0.985

Depvar denotes dependent variable. Var and Coef denote variable and coefficient, respectively. T-statistics are in the parentheses. *and ***indicate the statistical significance at 1% and 10%, respectively. Source: Research findings. FMOLS: Fully modified least squares

Our findings are compatible with Papyrakis and Gerlagh (2004) study. They believe in resource rents as driving forces in health programs. In addition, this research reconfirms the Greer and Méndez (2015) findings, which consider democratization as particular incentive to expand health coverage. In a democratic system, governments are more effective than dictatorships. Thus, effective government requires high spending on HDI-enhancing efforts such as investment in health and education. On the other hand, the findings of this research are contrary to Balabanova et al. (2013), who attribute improvements in health to low resources' endowment.

5. CONCLUSION

The abundance of natural resources in developing countries is addressed as "resource curse" in the economic literature. When we compare the development of East Asia with that of Africa, Latin America and the oil countries, we see this phenomenon evidently. Most African, Latin American and oil-rich countries have rich mineral and oil reserves, while their growth has been negligible compared to the growth of East Asian countries lacking natural resources over the past 40 years. This low record and the other institutional and social factors have led to a lower health outcomes in such countries. This paper tried to examine the interactions among resource rent, human capital, government effectiveness and public expenditure on health in OPEC.

The results of the research indicate that the "resource rents" and government effectiveness have positive impacts on the level of government health expenditure. In other words, oil rents have been able to affect the healthcare sector in these countries. Accordingly, the abundance of oil resources is not bad per se. As a result, it can be argued that the key determinant in the transformation of rents from oil resources into disaster or blessing is the government effectiveness across oil exporting countries. In fact, resource curse occurs in countries where their institutional quality index is below the threshold level. Thus, the establishment of sound, transparent and accountable institutions should be considered in making policies and setting priorities in the sector and aggregate levels.

5. For model C, the co-integrating relationship is confirmed at 10% level of significance. We can ignore the estimation related to this model, and rely on the estimations of Models A & B.

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