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Does Oil Rent Increase Standard of Living? An Investigation of Four African Oil-Producing Countries

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Abstract

This study investigated the impact of oil rent on the standard of living of citizens in selected oil-producing countries. The data used for the analysis were from 1995 to 2015 and were sourced solely from the World Bank. The study employs the use of fixed effects methodology and partial efficiency analysis. The results indicate that oil rent reduces the standard of living in the countries studied, though this result is not statistically significant. The study also finds that, given the different levels of oil rent, oil-producing countries in Sub-Sahara Africa perform efficiently in terms of standard of living compared with their Middle East and North African counterparts. The study recommends the use of rents from oil for the promotion of job-rich growth as well as the provision of a social safety net for vulnerable people in the society.

Key words: Oil rent, Mineral rent, GDP, Per capita and Fixed effects

I. INTRODUCTION

Countries rich in natural resources such as oil have earned enormous revenues over the years from exploration of these resources as demand keeps rising. It is ordinarily expected that revenues earned from natural resources in developing countries are reinvested in their economies to stimulate economic growth and productivity. It is important to note, however, that economic growth should not be viewed simply as growth for the sake of growth; rather, the primary aim of economic growth is to promote human development and opportunities, and to increase standards of living, welfare, and wellbeing. This involves expenditure on programs and projects that improve infrastructure and health care, and provide social amenities for citizens. However, scholars find that in most oil-producing countries, standards of living and welfare of citizens have not improved or increased *pari passu* with the increases in revenues from oil exploration. Citizens in most oil-rich countries seem to suffer from poverty, live in unhealthy environments, lack basic social amenities, and experience increases in economic inequality. These citizens thus seem to lack the opportunity to improve their standards of living. This study therefore seeks to investigate the impact of natural resources on standards of living in selected oil-producing countries in Africa. The study is divided into five sections: section I is the

introduction, section II deals with the conceptual framework, and section III is the review of empirical literature. Research methodology was discussed in sections IV. Section V was based on analysis and discussion of results, while the conclusion and recommendations are presented in section VI.

II. CONCEPTUAL FRAMEWORK

In this article, we trace the relationship between standards of living and oil revenue in selected oil-producing countries in Africa, using oil rent as our focal variable. Oil rent here is the difference between the price of oil in the international market and the cost of production in the country of exploration. Oil rent is the best explanatory variable for how well a country may have fared in the use of revenue from oil for development purposes because it accounts for the cost of production, which differs amongst countries.

As a proxy for standard of living, we use gross domestic product (GDP) per capita converted to international dollars using purchasing power parity (PPP) rates. The PPP takes account of countries' different costs of living and inflation rates in order to ensure an adequate comparison of living standards. It measures a population's standard of living as consumers and is one of the most prominent measures of quality of life and standard of living. It is widely used as an objective of public and economic policy. It is a synoptic measure of how well a society is doing. One advantage of using GDP per capita (PPP) is that accounting for population allows us to assess whether general economic output is commensurate with increases in rent from oil and the economic value of attributable to each citizen in the country on average.

There is no doubt that the use of GDP per capita as a means of quantifying standard of living has some perceived weaknesses. This can also be said of the term "standard of living," as there is no clear-cut definition of what it entails. One major weakness of GDP per capita as a means of measuring standard of living is that it does not consider how output generated in an economy contributes to the quality of life of the citizens, nor does it assess the quality of the environment, both of which have a tremendous impact on standard of living. Indeed, GDP takes account of productive economic activities from companies that produce goods and services detrimental to human health and the environment. Similarly, government expenditure on fighting crime and vice adds to the GDP with no meaningful impact on standards of living. However, standard of living can be described as the levels of comfort and affluence, material goods, social amenities, and opportunities available to a particular group of people at a particular period of time. It is usually used to make comparisons between countries. It includes factors such as average income, economic growth, economic and political stability, environmental quality, and many others. It is closely related to quality of life, which, however, is deemed subjective. While quality of life depends on individual preferences, standards of living can, to a large extent, be objectively measured.

In seeking to address the problems of using GDP per capita as a measure of standards of living, Ruben (2016) has thoroughly investigated its adequacy as an indicator relative to other selected indicators. His findings support the use of GDP per capita PPP in our study. Ruben (2016) identified other indicators of standard of living, which he categorized as objective and subjective, and tested whether they had a positive relationship with GDP per capita using panel data for developing countries (representing a group with lower income and lower per capita GDP) and developed countries (representing a group with

higher incomes and higher GDP per capita), using a fixed effect panel methodology. He focused on indicators such as the:

1. Legatum Prosperity Index: this is based on eight pillars including economic growth, entrepreneurship and opportunities, governance, health, safety and social security, personal freedom, and social capital.
2. Human Wellbeing sub-score of the Sustainable Society Index: this takes account the health, education, population growth, and income distribution.
3. Environmental Wellbeing sub-score of the Sustainable Society Index: this assesses natural resources, climate, and energy.
4. Economic Wellbeing sub-score of the Sustainable Society Index: this takes account of public debt, GDP, employment rates, and manufacturing capital.
5. Human Development Index: this is comprised of three dimensions: long and healthy life, knowledge, and a decent standard of living. These dimensions are further broken down into life expectancy at birth, mean years of schooling, and gross national income per capita (PPP) amongst others.

He found that indicators 1, 2, and 5 were positively related to GDP per capita in the developed countries. By contrast, the Economic Wellbeing index was found to be negatively related to GDP per capita in the developed countries. For the developing countries, GDP per capita was found to be positively related to indicators 1, 2, and 4, but negatively related to the Environmental Wellbeing index. The coefficients for the Human Development Index and the Legatum Prosperity Index were statistically significant in the developed and developing countries models.

These findings therefore affirm GDP per capita as a good proxy for standard of living. We shall now move on to a review of empirical literature related to the impact of oil on economic growth.

III. EMPIRICAL LITERATURE

Different scholars have used different methods and tests to understand the relationship between revenue from oil and economic growth, along with its impact on citizens' standards of living of in oil-producing countries. We shall review some of these studies.

Renowned scholars such as Sachs and Warner (1997), Gylfason and Zoega (2002), and Sala-i-Martin (1997) have carried out several studies and found that the relationship between economic growth and natural resource abundance was negative. A cross-country econometric estimation involving 79 countries over a 21-year period found that, despite controlling for unidentified variables, the relationship between the two variables of interest was negative. Using natural resource exports as a proxy for natural resources, Sachs and Warner found that an increase of one standard deviation in resource exports was associated with a 0.39% reduction in annual growth equivalent to a 7% reduction in GDP per capita over 20 years.

Sachs and Rodriguez (1999) have argued conversely that countries with natural resources tend to have higher GDP per capita. Saraswati (2013) has studied the relationship between oil rent and economic growth in Indonesia by carrying out a path analysis on secondary data, finding that the quality of institutions indirectly caused a negative relationship between oil rent and economic growth in the country. This implies that an increase in oil rent does not translate to an increase in economic growth. Cotet

and Tsui (2013) have exploited variations in the size of initial oil endowments and the timing of oil discovery, finding a positive relationship between oil and economic growth in the long run.

Akanni (2007), in a sophisticated study, has analyzed the effect of oil rents on economic growth in oil-exporting countries. The research also identified the channels through which the 'resource curse' affects economic growth in 47 oil-producing countries. It also differentiates 12 oil-exporting countries in Africa by adopting a panel regression model. He concludes simply by stating that oil rents failed to promote economic growth in both groups of countries.

Matallah and Matallah (2015) have tested the impact of oil rents on economic growth and examined symptoms of the resource curse in oil-abundant Middle East and North African (MENA) countries over a period of 19 years, using a combination of pooled effects, fixed effects, and the generalized method of moments (GMM) estimator. They found a positive relationship between oil rent and economic growth in MENA countries but add that oil rents have the potential to discourage economic diversification by encouraging rent-seeking activities in the economy due to the huge financial inflows from exports of the product. Furthermore, they state that the trio of oil rents, governance, and diversification plays a crucial role in promoting economic growth and stability. Similarly, Bjorvatn and Farzanegan (2013), using the GMM estimators, have argued that rents from natural resource abundance tend to have the potential to crowd out resources and credit to other sectors of the economy, such as the manufacturing sector, and could ultimately lead to lower real GDP per capita in the long run.

Aregbeyen and Kolawole (2015) have also investigated the relationship between oil revenue, government spending, and economic growth in Nigeria. They sought to trace whether oil revenue affected government spending and economic growth over a 33-year period using the ordinary least squares (OLS), co-integration, and Granger causality techniques to determine the impact and direction of causality of the variables. Their research indicates that oil revenue Granger-caused both government spending and growth, while no causal relationship was found to exist between government spending and growth in the country. The study recommends that, for the government to boost economic growth and development in the country, expenditure on capital projects should be increased and efforts should be made to increase the potential and output of other sectors of the economy, aside from oil.

Some scholars have paid attention to countries' internal states and counties when analyzing the impact of resource abundance in order to further explain why some states or counties may perform better than others. James and Aadland (2011) analyzed 3,092 counties in the US between 1980–1995 using the two-stage generalized least squares (GLS) model, concluding that natural resource abundance tends to reduce real income per capita. In the same year, Boyce and Emery (2011) analyzed 50 U.S. states from 1970 to 2001 using an OLS regression method, also concluding that resource abundance negatively affects economic growth.

RESEARCH METHODOLOGY

We identified four oil-producing countries in Africa and grouped them according to the World Bank classification of countries in Africa. We identified Algeria and Egypt from the MENA countries and Nigeria and Cameroun from Sub-Saharan African (SSA) countries.

The data used for the analysis were from 1995 to 2015 and were sourced solely from the World Bank. We employed the use of fixed and random effects in explaining our model as well as partial equilibrium analysis, which attempts to rank the countries in terms of efficiency. The functional relationship is specified below:

GDPC = f (ORT, MRT, IFL) (1)

Where GDPC = GDP per capita (PPP)

ORET = Oil rent

MRT = Mineral rent

IFL = Inflation

Accordingly, the mathematical form of the models is stated as:

$GDPC_t = \alpha_0 + \alpha_1 ORT_t + \alpha_2 MRT_t + \alpha_3 IFL_t + \mu_{1t}$ (1.1)

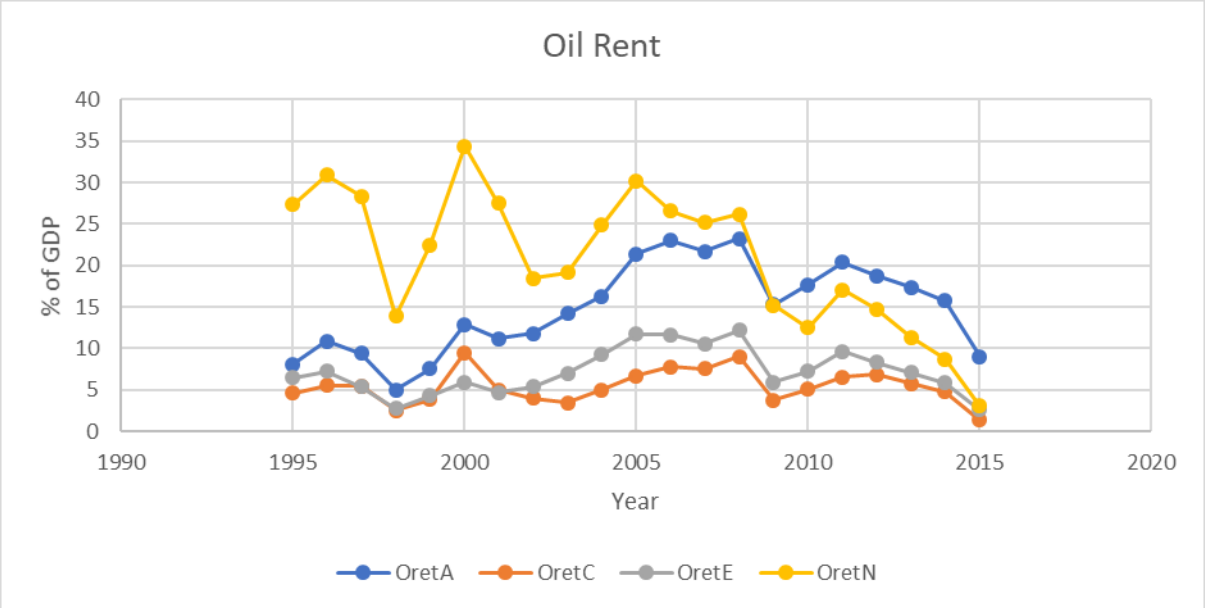
Where:

GDPC, ORT, MRT, and IFL are as earlier defined and α_0 - α_3= Parameter estimates and μ_{1t} = Error term and assumed to be normally distributed.

IV. RESULT AND DISCUSSION

We present results from our data analyses beginning with a trend analysis below.

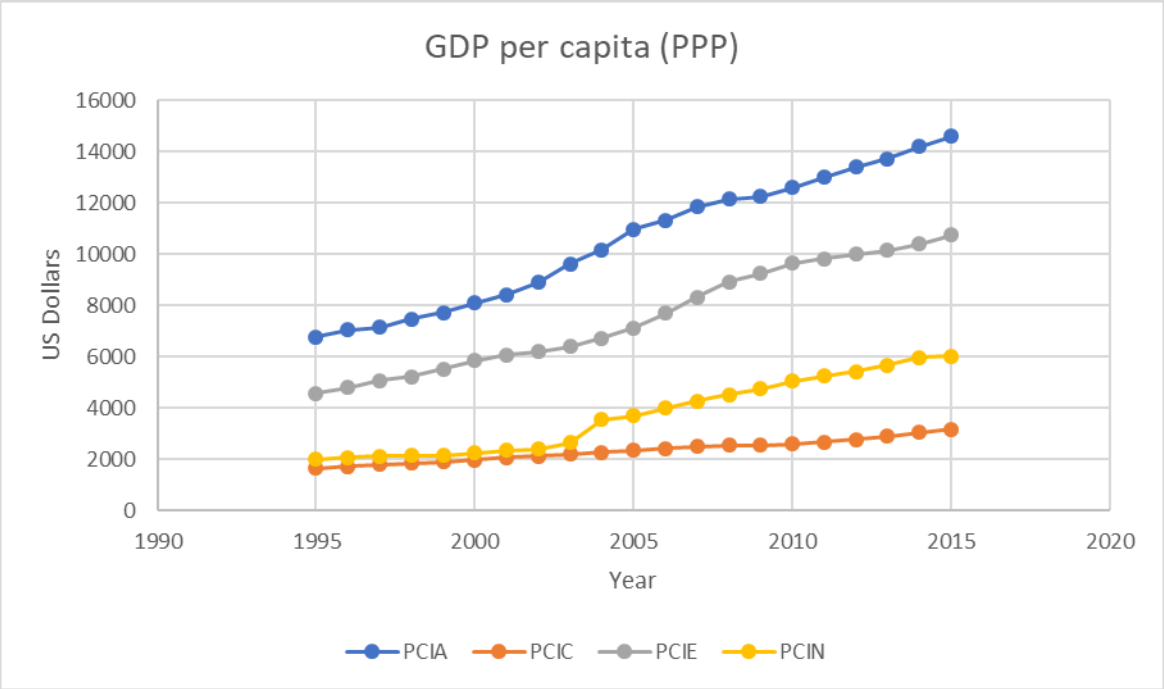
Figure 1. Trend of Oil Rent in Selected Oil-Producing Countries



Source: *Author's Computation (2018)*

Looking at Figure 1, above, it is clear that Nigeria (OretN) earned the highest amount of rent from oil in 1995 compared to the other three countries. All the countries experienced a dip in oil rent from 1995 to 2000, but an increase in 2000. Between 2000 and 2005, Egypt (OretE) and Algeria (OretA) began to experience increases in rent while Nigeria (OretN) and Cameroon (OretC) witnessed a dip in their rent but steady growth. By 2008, Algeria (OretA) and Nigeria (OretN) earned the same amount of rent from oil; however, from that year Algeria became the country earning the highest amount of rent amongst the four countries up to 2015. We note, however, that the rent from oil had been on a downward trend. This may have been caused by increases in the costs of production or by declining demand for oil within the period.

Figure 2. Trend of GDP per Capita (PPP) in the Selected Oil-Producing Countries



Source: *Author's Computation (2018)*

The trend in Figure 2, above, shows that from 1995 to 2015, the GDP per capita of Algeria (PCIA) had not only been rising, but was the highest amongst the group of oil-producing countries. This is closely followed by Egypt (PCIE). Nigeria (PCIN) and Cameroon (PCIC) started off almost at the same level in 1995 before Nigeria's per capita income began to increase; however, this increase was lower than that of Egypt and Algeria. It is therefore safe to conclude that citizens in MENA countries have a higher per capita income than their SSA counterparts and that the gap between the country with the lowest per capita income in the MENA countries – namely, Egypt (PCIE) – and the SSA country with the highest per capita income – Nigeria (PCIN) – is wide.

Table 1. Fixed and Random Effects Result Presentation

Dependent Variables	GDP per Capita (PPP)	
Independent Variables	Fixed Effect (FE)	Random Effect (RE)
ORET	-10.35 (-0.31)	101.4 (2.06)
MRT	7139. (5.73)	10616. (4.46)
IFL	-49.22 (-2.32)	-83.8 (-1.96)
Constant	4464. (6.20)	4464. (6.20)
R^2 Within	0.32	0.28
R^2 Between	0.15	0.78
R^2 Overall	0.18	0.23
Hausman Test	Reject H_0	

Source: Author's Computation (2018). FE = Fixed Effects, RE = Random Effects; (0.00) = t- values;

Hausman test- Accept H_0 = RE best explains model; Reject H_0 = FE best explains model

The Table above shows the results of our model estimated by the GLS random effect method and the within fixed effect method of analysis. This methodology is best suited for panel data and it produces efficient results. The model is estimated at levels due to the uniqueness of the data used in the study.

We find here that oil rent positively and negatively impacts the standard of living of citizens in the RE and FE analyses respectively. Mineral rent by contrast positively influences wellbeing while inflation negatively affects standard of living in both analyses respectively. However, we reject the null hypothesis and accept the alternative hypothesis of the Hausman test that the fixed effect method best explains the model. Based on the fixed effects result of our model, the study reveals that the regression coefficient of oil rent is -10.35. This means that a unit increase in oil rent reduces GDP per capita (PPP) by about 10%. This negative relationship does not conform to our a priori expectations in line with economic theory and, indeed, this coefficient is not statistically significant. This is because the t-value of the coefficient is -0.31 and is less than the t-table value of 2.110. On the basis of these results, we accept the null hypothesis, which says that there is no significant relationship between oil rent and GDP per capita (PPP). On the other hand, we have discovered a positive and significant relationship between mineral rent and GDP per capita (PPP). Again, the result of the analysis reveals that the coefficient of inflation is -49.22. This implies that a unit increase in inflation reduces GDP per capita (PPP) by about 49%. The negative sign of inflation here conforms to our a priori expectation in line with economic theory. The coefficient of inflation is also statistically significant, at 5%. This is so because the t-calculated is -2.32 while the t-table value is 2.110. As with the oil rent variable, uncontrolled inflation significantly reduces the economic and societal welfare of the citizens.

Partial efficiency analysis: Following Kunst (2013), if the within and overall goodness of fit (R^2) are close, this is evidence for individual effects being not so important. From our fixed effect analysis, the values of R^2 within and overall are 32% and 18% respectively, implying that the gap between is large; individual differences are therefore of concern here. This result is not entirely surprising as the trend analysis shows considerable differences in the GDP per capita PPP of the citizens in the countries studied. Though they all show an increasing trend, there are gaps between all four countries in their per capita GDP levels.

We therefore employ the use of the partial efficiency frontier, which is an input-output comparative analysis that measures the countries or institutions that make the best use of inputs (oil rent in this instance) to produce expected outputs (standard of living in this instance). The partial equilibrium measures efficiency of output on a range of 0 (very low efficiency) to 1 (very high efficiency). We present the results of the efficiency analysis in Table 2, below:

Table 2. Partial Efficiency Result (Input = Oil rent; Output = GDP per capita (PPP))

Country	Efficiency Score	Efficiency Rank
Algeria	0.35	4
Cameroon	0.75	2
Egypt	0.61	3
Nigeria	0.77	1

Table 2, above, indicates that Nigeria recorded the highest efficiency level in per capita income (0.77), followed by Cameroon (0.75) given the available input. Cameroon, for instance, despite having low levels of oil rent, has the second-highest efficiency score; this implies that, if given the same amount of input as Nigeria or Algeria, Cameroon would make efficient use of it in raising its per capita income. Hence, Nigeria and Cameroon are ranked first and second respectively, followed by Egypt (third) and Algeria (fourth). Thus, we conclude that SSA countries (Nigeria, Cameroon) have a higher efficiency in GDP per capita (PPP) than MENA countries (Algeria, Egypt).

Discussion of Results

Based on our fixed effects results, we found that a unit increase in oil rent reduced rather than increased the general economic standard of living of citizens in the oil-producing countries. On the other hand, mineral rent significantly increased standard of living. As expected, inflation has the tendency to reduce economic standard of living. As with the oil rent variable, uncontrolled inflation significantly reduces the economic and societal welfare of the citizens.

Rent from oil, if managed properly, should improve the standard of living of citizens, in that an increase in economic growth would trickle down to improvements in general standards of living (or, as a proxy, increases in GDP per capita (PPP)). This negative but not significant relationship between oil rent and GDP per capita (PPP) is not surprising as it implies that if we analyze the impact of oil rent on GDP growth, we may discover a negative effect. The reason may be that funds released by the government for expenditure on capital and other projects in the economy are either directly stolen, or the projects are not executed or generally ineffective at improving societal welfare. Mehrara (2009) shares this view. He states that oil rents are often used to fuel government spending on infrastructure, education, and healthcare, thus promoting economic growth, but the puzzling fact is that this impact on growth, while positive in the lag period, turns negative in the current period in oil exporting countries because these expenditures do not trickle down to the masses. Andersen and Aslaksen (2008) state, too, that resource abundance has a significant negative relationship with economic growth. Also, Jha and Dang (2011) find that when inflation exceeds 10%, GDP per capita becomes negative in developing countries. Interestingly, Gylfason (2001) has empirically demonstrated that, over the past four decades, the members of OPEC collectively experienced a negative GDP per capita growth rate relative to oil rent. Akanni (2007) has also noted that low GDP

per capita growth rates of oil-exporting African countries could be explained by weak and poor-quality institutions that encourage corruption and further exacerbate the resource curse.

V. CONCLUSION AND RECOMMENDATIONS

Revenue from oil must be geared not only towards economic growth but also towards ensuring that this growth is inclusive so as to significantly increase the welfare of citizens. Inclusive growth can be generated via a variety of strategies, including (but not limited to) the following:

Promoting job-rich growth. The standard of living in a country ultimately depends on the ability of the country to produce the goods and services they consume. Thus, government should invest in and support the agricultural and manufacturing sectors to move from the production of primary products towards value-added products that create jobs along the value chain.

Creating social safety nets for the vulnerable in society. There should be introduction of food stamps targeted at women in the rural areas which will enable them to have access to food items that will not only improve their nutrition alone but also that of their children. It will also empower them.

Good governance and effective management of resources. The only way to ensure that oil rent has a significant impact on citizens is through good governance and effective management of resources for the greater good.

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