THE ECONOMIC IMPORTANCE OF CRUDE PALM OIL IN NIGERIA

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Abstract
Before the advent of crude oil production in Nigeria, Nigeria’s mainstay was agriculture and was dominated by palm crude oil production. Despite all these the Nigerian palm crude oil production and exportation ranked ⁴th in the world. In the light of the poor performance of the Nigerian economy since independence despite the huge mineral, material and human endowment, as well as the accelerating dynamics of the global economy, this study was set out to examine the economic importance of palm crude oil production in Nigeria. The objective of the study is to first evaluate the relationship between palm crude oil production and Nigeria’s economic performance and second determine the substitutability of palm oil for crude oil in Nigeria. It is hypothesized that palm crude oil production does not have any significant impact on economic growth in Nigeria; and that palm crude oil production cannot be substitute for crude oil in Nigeria. Secondary data were sourced from the central bank of Nigeria and were analyzed using the ordinary least square econometric technique with a multiple regression model and with the aid of the e-views software. Both palm crude oil production and crude oil production showed the right signs being positive but the rate at which palm oil substitute for crude oil showed the wrong sign being negative however none of the variables was statistically significant and so we accepted both hypotheses. ADF unit root test reveals that all the variables were stationary at level except RTS that was stationary at first difference. Despite a weak short-run result the variables showed to be converging at the long-run equilibrium as indicated by the Johansen-Juselius cointegration test which showed three cointegrating equations.

Keywords: cointegration, unit root, production function, palm oil, crude oil

1.0 Background of the Study
Historically, Nigeria is largely an agrarian society. Agriculture was the mainstay of the economy during the pre-colonial and the colonial period. Despite lack of modern farm implements which undermined the potential for large-scale production, Nigeria emerged in the first decade of her independence as a leading exporter of many major agricultural commodities. From over 60 percent in the late 1960s, the contribution of agriculture to GDP plummeted to 22.2 percent in the 1980s (National Bureau of Statistics, 2009). Recent data put the contribution of agriculture to the country’s real GDP at about 42 percent (Central Bank of Nigeria, 2010).

The current reality is that Nigeria relies on crude oil and gas as the main source of government’s revenue. In spite of oil exports accounting for over 80 percent of its income, it is contributing only 5.5 percent to the gross domestic product (GDP) (National Bureau of Statistics, 2011). This fact questions the utilization of resources and also exposes how vulnerable the country is to the vagaries and fluctuations in the price of oil exports. The above facts strongly indicate the need to diversify the economy. Two important factors that could help the decision to diversify: First, whether Nigeria has enough potential for the production of any product in commercial quantity; and second, whether the product has a market that is big enough to generate income that is sufficient to justify the investment.

Admittedly, Nigeria has untapped potentials for massive agricultural production. The critical issue is that policy makers should encourage agricultural production, especially in areas where the potentials for massive production exist. Take palm oil for instance which was once a major source of foreign exchange for Nigeria, its importance in the world economy is still revered. In the world today palm oil remains one of the veritable means of reducing the uncertainties in the oil and gas subsector. This is because in measurable terms, palm oil trade has shown improvement that outstripped it closest alternatives. Its production has shown an increase of 26 percent over its common rival; Rapeseed and Soya beans oil (Thoenes, 2006). Similarly the consumption of palm oil has been on the increase globally. All these points to the fact that palm oil could be a veritable source of revenue earnings for the country and given the fact that from 1558 to 1855 palm oil produce constituted the major export and foreign earnings in Nigeria (Edoumiekumo and Tamuno 2010).

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1.1 Objective and Significant of the Study

Palm Crude Oil is a very important part of a nation’s economy for several reasons, principal among which is the number of persons the sub sector employs. In a country at an early developmental stage it employs far more people than all other industries or sectors put together that is between 60-70 percent of the total work force. Closely, allied to that is the fact that most nations’ agricultural activities are undertaken in the rural areas where the majority of the poor reside. Consequently a well developed palm crude oil sub sector has an immense capacity for poverty reduction. In addition to the above, the palm crude oil sub sector in a country in an early stage of development has the capacity to be a major source of foreign exchange and thus spur growth and development. It thus becomes very important for a country’s strategic interest to develop its palm oil sub sector rather than rely on imports. Therefore the importance of palm produce in Nigeria’s aspiration to achieve a sustained growth cannot be overemphasized.

Thus this study is at time when Nigeria is in dire need of alternative sources of revenue. This study is important to the extent its findings shall bring to fore important policy formulation issues upon which recommendations shall be made. Furthermore, it shall bridge the literature gap that currently exists and be a source of knowledge to the academia and researchers alike. One is tempted to examine the economic importance of Palm Crude Oil production in Nigeria. To be more specific, this study seeks to examine the relationship between palm crude oil production and Nigeria’s economic performance and to examine the substitutability of palm oil for crude oil in Nigeria.

2.0 LITERATURE REVIEW

2.1 Theoretical Framework

The literature on economic development after World War II has been dominated by four major and, sometimes, competing strands of thought: (a) the linear-stages-of-growth model, (b) theories and patterns of structural change (c) international dependence revolution, and (d) the neoclassical, free-market counterrevolution. However, this study shall anchor on the production function based growth model. A production function defines the relationship between output and inputs in a production system. Specifically, it defines the output of goods and services as a function of the input of factors of production. Algebraically, if \( Q \) defines national output, \( K \) capital input, \( L \) labour input, \( N \) land input, \( E \) entrepreneurship, then we define \( Q = Q(K, L, N, E) \) as a production function. The usual assumption is that the marginal product of each factor of production is positive but diminishing. Thus;

\[
Q_K > 0; \quad Q_L > 0; \quad Q_N > 0; \quad Q_E > 0; \quad Q_{KL} < 0; \quad Q_{NN} < 0; \quad Q_{EE} < 0.
\]

Taking the total differential of \( Q \), \( dQ \), we have \( dQ = Q_dK + Q_dL + Q_dN + Q_dE \).

From the foregoing, it is clear that economic growth in terms of the production function based model, depends on the quantity of inputs of factor services and factor productivities. Development then involves two sets of elements. The first is the quantity of inputs of factor services, the more the inputs of these factors of production, the more the growth of national output. The second is the quality or productivity of these factors. The more productive these factors are, the greater the growth of national output. Development policies should then aim at increasing the supplies of these factors as well as enhancing their productivities. Capital and skills are key factors in terms of their ability to enhance the productivity of other factors. Thus savings and investment (including investment in human capital) are critical variables in the growth and development process (Okowa, 1996).

2.2 Past Studies about Oil Palm Industry in Nigeria

The oil palm subsector of the Nigerian economy is a potential productive sector that could be used to diversify the economy and ward it from shocks in the crude oil and gas market after several years of neglect. According to Purvis (1970) historically, this subsector has been a source of growth in a stagnant economy because of the numerous economic potentials of the oil palm. Ahmed (2001) argued that the economic tree crop has provided direct employment to about four million Nigerians in about 20 oil palm growing states in Nigeria and indirectly to other numerous people involved in processing and marketing. Omoti (2001) emphasized that Nigeria has enormous potentials to increase her production of palm crude oil and palm
processing techniques. In the opinion of Agboola (1993) improved technologies that meet both growth and sustainability goals can be effectively used by oil palm processors but most technologies are designed for developed rather than developing countries. That notwithstanding, most farmers in developing countries use imported seed materials obtained from research centres but without a corresponding application of packages that are meant to be used with them. Even when these packages are used as instructed, yields are usually lower than those obtained in the research centres where the seeds are bred.

Jalani, et al (2000) stressed the need for oil palm processors to embrace well integrated capital intensive, high volume and high extraction rate in their processing method in other to encourage high transformation of the oil palm industry in the country. Kei et al (1997) opined that the stagnation in the oil palm sector in Nigeria was influenced by the overall agricultural policies that could be classified into three periods: Following the independence (1960-1970), industrialization was financed by export taxes through commodity marketing boards which monopolized commodities such as cocoa, groundnut, palm oil, cotton and rubber. The resulting producer price had a damaging effect on the production of crops. In addendum, the civil war from 1967 to 1970 did not help matters. In the oil export boom period (1970-1985) with OPEC’s intervention, oil prices in early 1970 increased four folds and oil became the dominant export commodity and source of government revenue leading to the “Dutch disease”.

Kei (1997) in their study observed that because of the increased demand for oil palm produce, sequel to the increase in population and income growth, relative to the low productivity of the oil palm sector, Nigeria has become a net importer of palm oil. At the same time, the rapid devaluation of the Naira combined with the high transportation costs from ports to the interlands put imported oil in a competitively disadvantageous position. Kei (1997) thus opined that Nigeria’s first goal should be to meet the domestic demand and then if possible, seek to become competitive in exporting the product. Kei (1997) further iterated that Nigerian palm oil production is potentially competitive in the domestic market if oil palm sector productivity is increased by shifting the technology frontier further. They further argued that the transformation of the oil palm industry would enhance the overall economic development through the income and employment multiplier in the rural and urban areas. Olagunju, (2008) investigated the economics of palm oil processing in South-western Nigeria and discovered that palm oil processing was profitable. He also found extraction cost and cost of palm fruit to be negatively and significantly associated with net return. Also depreciation of tools and other inputs showed an inverse relationship with net return. In contrast no significant relationship was found to exist between net return and such factors as processing experience and cost of labour. Based on these premises, this study dwells on the relevance of the crude palm oil in fast-tracking growth in Nigerian.

3.0 Research Methodology

The cointegration technique was proposed by Engle and Granger (1987) to test for the granger causality among the variables. Two or more variables are cointegrated if they present long run equilibrium relationship(s) among themselves. As long as the two variables have a common trend, causality must exist in at least one direction, either unidirectional or bidirectional. If the variables under consideration have a cointegration, this will rule out the possibility of the estimated relationship being "spurious." The null hypothesis indicates no cointegration among the variables while the alternative hypothesis indicates the presence of cointegration. (Bekhet & Yusop 2009), (Gharleghi & Nor 2012)

If there are more than two variables, then, Johansen-Juselius cointegration methodology (1990) must be implemented, because there may be more than one cointegration vector. Johansen-Juselius cointegration technique represents the same thing as a multivariate generalization of the Dickey-Fuller used for unit root test. (Enders 2004)

Instead of \( y \) representing a single variable, there is an \( x \) and \( e \) representing \( (n*I) \) vectors, \( A \) denotes \( (n*n) \) matrix and \( I \) is \( (n*n) \) identity matrix.

\[
\Delta x_t = \pi x_{t-1} + e_t,
\]

\[
\pi_t = (A_t - I)
\]

The rank of \( \pi \) matrix \( r \) represents the number of linear combination of variables included in \( \pi \) matrix or number of cointegrating vectors. The following is the two tests statistics which declare the rank of matrix:

\[
\hat{\lambda}_{trace}(r) = -T \sum_{i=r+1} \ln(1 - \hat{\lambda}_i) \quad (3.44)
\]

\[
\hat{\lambda}_{max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1}) \quad (3.45)
\]

Where:

\( \hat{\lambda}_i = \) the estimated value of the characteristic roots obtained from the estimated \( \pi \) matrix.

\( T = \) the number of usable observation.

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4.0 Research Findings

The average growth rate of real GDP, which was 50.62 per cent in the period 1971-80, fell drastically to 3.32 in the period 1981-1990 and even became -0.74 in the following decade 1991-2000 and rose to 6.20 per cent in 2001-2009 (Central Bank of Nigeria Statistical Bulletin). The high average growth in the period 1971-1980 was attributed to the gradual expansion of oil production in the country and the oil boom in the late 1970s. The poor growth rate recorded in the period 1981-1990 is the footprint of the fall in oil prices in the early 1980s and the subsequent austerity measures (Structural Adjustment Programme (SAP)) adapted to relief the economy of the huge debt burden it had accumulated. The three dark decades of military rule also left its finger prints on the economy as real average growth rate for the decades in the period 1981-2000 did not increase but recorded persistent decline however with the return to democracy in 1999 the pictures became brighter as average growth for the following decade 2001-2009 increased from negative 0.74 percent to 6.2 percent. The average growth of crude oil production has been fluctuating since 1971 averaging 8.11 percent in the period 1971-1980 and declined to negative 0.37 percent in the preceding decades. Though it showed some prospects in the following decade when it increased to 1.93 percent but declined to a negative 0.64 percent in the period 2001-2009 this is not unrelated to the Niger Delta crises which heightened during the period. The palm oil subsector has been looked at with levity and left to the poor as a result its average growth rate has declined consistently from 3.24 percent in the period 1971-1980 to 1.95, 1.94 and negative 2.28 percent in the periods 1981-1990, 1991-2000 and 2001-2009 respectively.

4.1 ADF unit root test

TABLE 1 Unit Root Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF-statistics</th>
<th>Critical Values</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDPGR</td>
<td>-3.98*</td>
<td>1% -3.61</td>
<td>5% -2.94</td>
</tr>
<tr>
<td>PGR</td>
<td>-6.74*</td>
<td>1% -3.61</td>
<td>5% -2.94</td>
</tr>
<tr>
<td>CGR</td>
<td>-5.36*</td>
<td>1% -3.61</td>
<td>5% -2.94</td>
</tr>
<tr>
<td>RTS</td>
<td>-6.51*</td>
<td>1% -3.61</td>
<td>5% -2.94</td>
</tr>
</tbody>
</table>

* Significant at 1%

ADF-statistics shows that at the 5% level all the included variables are stationary at levels I(0) except the rate of technical substitution (RTS) which is stationary at first difference I(1) indicating the absence of a unit root in the time series. The stationarity of the first lagged error term at levels points to the existence of a long-run relationship among the variables.

Upon estimation with the aid of Econometric View software for windows, the following results were obtained:

\[
\text{GDPGR} = 43.03 + 0.60\ PGR + 0.42\ CGR - 32640\ RTS
\]

<table>
<thead>
<tr>
<th>SE</th>
<th>t-stat.</th>
<th>Adjusted R²</th>
<th>F-stat.</th>
<th>Prob (F-stat.)</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>(21.10)</td>
<td>(2.03)</td>
<td>0.022</td>
<td>0.29</td>
<td></td>
<td>1.30</td>
</tr>
<tr>
<td>(0.46)</td>
<td>(1.29)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.52)</td>
<td>(0.81)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(21.875)</td>
<td>(-1.49)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The result shows that both PGR and CGR are positively related to GDPGR as expected. But the rate of technical substitution (RTS) showed a negative sign. Specifically, all things being equal, a percentage increase in PGR will call forth 0.6 percent of GDPGR and a percentage increase in CGR will call forth 0.427 percent of GDPGR while a unit increase in RTS will retard GDPGR by 32640 units. However the standard error test showed that both PGR and RTS are statistically insignificant therefore we accept both hypothesis one and two. This implies that palm oil production does not have any significant impact on economic growth in Nigeria and that palm oil cannot substitute for crude oil. The coefficient of determination (Adjusted R²) showed that only about two per cent of changes in GDPGR were explained by the regression line, this indicates a poor fit. The F-statistics of 01.29 is insignificant as indicated by the probability of 0.29, implying that the overall regression is statistically insignificant. A Durbin-Watson statistics of approximately one lying between zero and two indicates that our result is inconclusive and so we resorted to testing for a long-run relationship.
To identify the number of co-integrating equations we resort to the Johansen’s co-integration test. With the rejection of the hypothesis of the existence of at most two co-integrating equations, the Johansen’s co-integration test shows the existence of three co-integrating equations at 5% indicating that in the long-run there is no tendency that PGR, CGR and GDPGR will wander away from one another. This tells us that though both PGR and CGR are statistically insignificant, in the long-run they both shall contribute significantly to economic growth in Nigeria with the right attitudes and policies in place.

### TABLE 2 Johansen-Juselius Cointegration Tests

<table>
<thead>
<tr>
<th>H0</th>
<th>H1</th>
<th>%5 Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value</td>
<td>Value</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r = 0</td>
<td>25.96**</td>
<td>51.16**</td>
</tr>
<tr>
<td>r = 1</td>
<td>16.43**</td>
<td>25.20**</td>
</tr>
<tr>
<td>r = 2</td>
<td>8.77**</td>
<td>8.77**</td>
</tr>
</tbody>
</table>

Trace and Max Eigenvalue tests indicate three cointegrating vectors at 5% level

### 5.0 Conclusion, Implications and Future Directions of the Study

This study was designed to examine the impact of palm crude oil on economic growth in Nigeria and the substitutability of palm crude oil for crude oil in Nigeria over the period of 1971-2009. It is hypothesized that palm crude oil production does not have any significant impact on economic growth in Nigeria. This weak result shows that over the years palm crude oil has not been given the needed attention, also the resources accruing from crude oil has not been used judiciously for the benefit of the domestic economy. However, based on the analysis, in the long run, both the palm crude oil and crude oil have the potentials of engendering economic growth. The Johansen’s co-integration test showed that there are cointegrate vectors among variable implies the long-run relationship among mentioned variables.

The study had found that definitely both the growth of palm oil and crude oil will contribute to the growth of Nigeria economic, but the rising concern is how to encourage more people to indulge in agricultural industry in Nigeria. According to African Development Indicators 2001 Report, the agricultural sector has suffered a relative decline because of the dominance of oil in the economy, but it still the largest employer in the country. A study on six African countries found that the poorest of the poor did not benefit from economic growth and their prospects were not tanned unless there was more investment in human capital (Demery and Squire, 1996). Instead of the efforts in encouraging people, especially the younger generation to engage with this sector, it is important to the Nigerian citizens to enhance their skills and add up more agricultural related knowledge so that they can excel in this sector.

On a final note, this research was clearly based on the secondary data and thus this study was not able to examine the working accessibility barriers among the Nigerians. Instead of PGR, CGR and RTS, additional studies comparing the working accessibility barriers by different cohort groups, as well as by stratum might provide more insight findings in modeling the economic growth model in Nigeria.

### 6.0 References


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