Comparative analysis of investment funding in the Nigerian oil and agricultural sector

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Abstract: This paper makes a comparative analysis of investment funding between the Nigerian oil and agriculture industry, where both debt and non-debt financing instruments are considered. It employs both descriptive and long-run analyses to establish the facts using data from 1971–2011. The empirical results revealed that all the adopted debt and non-debt financing instruments, follow the same direction with varying magnitudes. Among all these instruments, savings (development stocks and treasury bills) are the best non-debt and (debt) financing mix used to propel the development of both agriculture and oil sector. More so, a negative shock was reported from treasury certificate and bond and international lending club on both sectors’ output. However, policy should aim at areas that would make foreign funds have a trickle-down effect on the physical assets of the two sectors and not areas where their funds can easily be repatriated.

Keywords: debt and non-debt investment financing; agriculture and industrial performance; Nigeria.

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1 Introduction

Many developing countries in Africa experienced a declining contribution of agriculture sector to economic growth as they focus on improving the performance of their industrial sector as the main contributors to economic development in the last three decades. Scholars noted that the share of agriculture in a country's labour force and total output declines in both cross-section and time series samples as income per capita increase (Kuznets, 1966). Timmer (1988) argued that the declining rate is uniform and pervasive and it is often driven by powerful forces inherent in development process, whether in socialist or capitalist countries, Asian, Latin American or African, developed or developing. In addition, past international empirical evidences suggest that most resource-rich countries are characterised by slow or stagnating growth, de-industrialisation, low savings, lagging human and physical capital accumulation, and stagnating or declining productivity which is often labelled the 'resource curse'. An example of countries with this problem given by Ariyo (1999) is Ecuador, Mexico, Nigeria, Venezuela, etc. For instance, oil revenues in Nigeria have led to huge investments in capital and infrastructure in the 1970s and 1980s but productivity declined and per capita GDP remained at about the same level as at 1965 (Akpan, 2009). This is not only prevalent in oil sector but also in other sectors such as the agriculture sector.

In Nigeria, agriculture remains the mainstay of the economy since it is the largest sector in terms of share in employment (Philip et al., 2009). In an effort to diversify her oil base economy, Nigeria is placing much emphasis on financing the agricultural sector, since it has the potential to stimulate economic growth through provision of raw materials, food, jobs and increased financial stability. In the 1960s and up to the early 1970s, Nigeria’s agriculture flourished, where she was one of the world’s highest producers of palm oil, cocoa, and groundnut. Over time, agriculture has declined in importance due to low attention placed on the sector by both government and investors. This may be attributed to the fact that low returns and long-term gestation of investment period. However, finance is required by agricultural sector to purchase land, construct buildings, acquire machinery and equipment, hire labour, irrigation, etc. (Ariyo, 1999). In some cases, loans may also be needed to purchase new and appropriate technologies, which are not available to users. This would have accelerated the adoption of new technologies as well as removing financial constraints. Thus, agriculture financing has been one of the most important instruments of economic policy for Nigerian economy in her effort to stimulate development in all directions.

Hence, the important of financing has not only been recognised in the agricultural sector but also evident in the oil sector. Starting from the period at which oil has been discovered in the 1950s till this moment, the exploration, i.e., the upstream sector has
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been dominated by foreign investors because of the huge capital involvement (Ogunnaike and Worlu, 2004). However, these foreign investors channel their investment in such a way that their profits and capital finances can easily be repatriated to their home countries. Today, the oil and gas industry is particularly hard-pressed for indigenous oil companies because of the large amounts of capital that are required to operate the business as well as long-time gap between capital investment and forecasted investment returns. The indigenous oil companies are confronted with the issue of financing since investors and lenders are looking for higher investment returns and limiting the risk of the bankruptcy or insolvency of the oil and gas producers (Gylfason, 2000). In the recent times, commercial banks are structuring proposed loans to oil and gas company with high credit ratings instead of giving value to these company’s probable and possible reserves.

Over time, investment financing mix of the Nigeria economy has been broadly categorised into external and internal sources (Adesoye et al., 2011a), which can also be classified into debt and non-debt. The non-debt sources include public and private savings and gains from international trade. Others include direct foreign investment, foreign aids and grants. The debt related sources include treasury bonds, development loan stocks and loans from bilateral, multilateral and international capital market sources. The quantum of these investment development financing flows usually determines the level and pace of development attainable by the country concerned (Adams et al., 2008). This has lead to government involvement to directly or indirectly mobilise long-term funds for the development aspirations of the nation.

On the basis of the foregoing, this study intends to make a comparative analysis of investment funding between agriculture and oil sector in the Nigerian economic system. Salient questions to answer are to what extent has the capital (non-debt and debt) instruments affected the outputs of both the oil and agriculture sector in Nigeria? What are the causal behaviours among debt investment financing, oil output and agriculture output growth in Nigeria? And in what ways do non-debt investment financing influences both the oil and agriculture output growth in Nigeria? Aside this introductory section, other sections of this research paper are organised as thus: Section 2 review some salient studies in the literature and identified a empirical gap this paper attempts to fill; methodological approach adopted, definition of variables employed, analytical approach and data sources intended for empirical analysis are presented and dealt with in Section 3; Section 4 discusses the empirical results while the last section (Section 5) concludes with policy implications and options.

2 Literature review

2.1 Investment financing and agriculture output growth

Oyejide (1999) in his study, “taking stock of long-term financing for sustainable development in Africa” argues that that the SSA region’s poor economic growth performance since the mid-1970s is not unrelated to its low investment rates. In addition, the author suggested that since the region’s domestic savings have been inadequate for financing even these low investment rates, it has historically relied rather heavily on external resource inflows. It is tempting, in these circumstances, to suggest that the solution to the growth problem in the SSA region is increased investment that is financed even more than in the past by inflow of foreign capital, both official and private.
Recent theoretical research, typified by endogenous growth models, suggests that high investment rates can result in a permanent increase in an economy’s overall growth rate (Romer, 1986; Lucas, 1988). The credibility of macroeconomic policy may be perceived through at least three main indicators: inflation (INF) rate and its variability; real exchange rate variability; and sustainability of fiscal balance. These three indicators interact with an economy’s degree of openness trade and the ease of cross-border financial transfers, as moderated by foreign exchange control regulations.

Capital flow may also be stimulated by exchange rate fluctuations and volatility, which in itself can also be influenced by inflationary pressures. For instance, high INF may create increasing expectations about future exchange rate depreciation, and may provide incentives for capital flight. While Hermes and Lensink (1992) found a strong support for a positive link between real effective exchange rate and capital flight in Cote d’Ivoire, Nigeria, Sudan, Tanzania, Uganda, and Zaire (now Democratic Republic of Congo) for the period 1978–1988.

The level of exports, adjusted for country size, reflects the economy’s openness, and openness generally is good for growth (Sachs and Warner, 1995; Edwards, 1998; Frankle and Romer, 1999). Gylfason (2000) opines that the link between openness and growth is through INF, however, one of the reasons why INF is inversely related to growth, may well be that INF hurts export through the real exchange rate, all else being the same. According to Gylfason (2000), sustained economic growth requires high-quality saving and investment. High net saving rate do not necessarily stimulate growth if they are accompanied by rapid depreciation and depletion of capital. Fry (1995), McKinnon (1973) and Shaw (1973) in their studies show that positive real interest rate stimulates saving and financial intermediation thereby increase supply of credit to be allocated to productive sectors. This, in turn, increases investment and economic growth.

2.2 Investment financing and oil-sector growth

Frynas and Paulo (2006) study used historical perspectives to examine the main body of the article ‘New Scramble’ evaluates the existence of a New Scramble from three subject angles: history, international relations, and business studies. They lay emphasis on the increased international importance of Africa, which can be attributed to the increasing demand for its natural resources and the interest from ‘new’ players such as China and India. The conclusion reached was somewhat different from what they expected before investigating this topic in greater depth. Today’s interest in Africa is markedly different from what has been termed the Scramble for Africa in the late 19th century; indeed, they believed that the expansion of the oil industry in the 1960s was more akin to a Scramble than the phenomenon we witness today. Ogunnaike and Worlu (2004) laid the groundwork for the successful implementation of the structural reform in the Nigeria Petroleum Industry. Marketing has for some decades now, been a subject of varied views from authorities. Also, deregulation has become inevitable the country’s petroleum downstream sector due to the despicable performance of our refineries. This consideration has guaranteed the Total Market Concept whose pre-occupation is the satisfaction of the customer as well as other stakeholders.

Adedipe (2004) highlighted the areas of impact of oil on economic policy formulation in Nigeria as well as the implications and indications of the possible way forward where he used time series analysis. He opined that the investment yield has also been very good which is same for the gas subsector. Also, the revenue spin-off from these sub-sectors
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should provide the needed capital to jumpstart other sectors of the economy, especially those that have the greatest socio-economic impact. Ogbonna (2012) investigated the effects of petroleum income on the Nigerian economy for the period 2000 to 2009 using the gross domestic product (GDP), per capita income (PCI), and INF as the explained variables, and oil revenue, petroleum profit tax/royalties (PPT/R), and licensing fees (LF) as the explanatory variables. The author employed descriptive statistics and ordinary least square model method to examine the effects of petroleum income on the Nigerian economy. His findings from the estimation of the model employed indicate that oil revenue has a positive and statistically significant relation with GDP and PCI respectively, but its relationship with INF is negative and not statistically significant.

Adams et al. (2008) examined the reaction of local Nigerians as US oil companies profit from their oil resources and they receive nothing in return. They illustrated how the US oil companies’ dependence on Nigeria’s oil resources will not only continue to affect the present generation, but will have a lasting effect on generations to come. They employed descriptive method of analysis for the research study. From their study, Unemployment is due to the lack of opportunities provided to Nigerian locals from the government. Most if not all of the employees of the oil companies are from other countries around the world (i.e., the USA, China, Honduras and, etc.). As a result of the impact Shell and other oil companies have had on Nigeria, the citizens have formulated a negative opinion of US oil companies.

Akpan (2009) employed an unrestricted vector autoregressive (VAR) model to study the dynamic relationship between oil production and food insecurity in Nigeria. The model specification is based on the assumption that availability of food and ability to purchase the food are two essential determinants of food security. The empirical results show that the variables expressed in logs are non-stationary. His result confirms Nigeria’s poor experience with managing oil revenue and is in tandem with the findings of some previous studies (Oriola, 2007; Van Wijnbergen, 1984; Akpan, 2009) which further verifies the neglect of the agricultural sector which is the main source of food, following the advent of oil.

Kombo (2003) employed the historical perspective to analyse the modes of deregulation in the downstream sector of the Nigerian Petroleum Industry. He viewed the two different schools of thought on deregulation. The first school opined that deregulation of the petroleum industry in Nigeria should be implemented in phases, so as to enable the state-owned monopolies to regain efficiency, before their full privatisation. The second school strongly believes that the Nigerian petroleum industry must not be liberalised, or deregulated, or privatised completely, for whatever reason, and that the status quo should remain, maybe, with some minor fine-tuning made, ‘here and there’, to improve efficiency, as appropriate, ‘in the overall national interest’ opined by the Nigerian Labour Congress (NLC).

3 Theoretical framework and research methodology

3.1 Thirlwall theory on growth and investment

It has been established that capital imports can raise the growth rate, but we have not considered how capital imports are financed and how the terms of borrowing may affect
the growth rate. A model which incorporates these considerations is developed by Thirlwall (1983) as presented thus;

Let

\[ 0 = Y + rD \]  

(1)

where \( O \) is output, \( Y \) is income, \( r \) is the interest rate, and \( D \) is debt. The difference between domestic output and national income is factor payments abroad. From equation (1) we have:

\[ \Delta 0 = \Delta Y + r \Delta D \]  

(2)

Now,

\[ \Delta 0 = \sigma I \]  

(3)

where \( \sigma \) is the productivity of capital, and

\[ I = sO + \Delta D - srD \]  

(4)

And \( s \) is the propensity to save. Substituting equation (4) into (3)

\[ \Delta 0 = \sigma (sO + \Delta D - srD) \]  

(5)

And dividing by \( O \) gives an expression for output growth of:

\[ \frac{\Delta O}{O} = (\sigma s + \frac{\Delta D - srD}{O}) \]  

(6)

or

\[ \frac{\Delta O}{O} = \sigma s + (\sigma - r) \frac{\Delta D}{O} \]  

(7)

Equation (6) shows that the growth of output \((\Delta O / O)\) will be higher than the rate obtainable from domestic saving alone as long as \( \Delta D > srD \), that is as long as new inflows of capital exceed the amount of outflow on past loans that would otherwise have been saved. On the other hand, making the rate of growth of income as the dependent variable, then from equation (1) we have:

\[ \Delta Y = \Delta O - r \Delta D \]  

(8)

Substituting (4) into (3) and the result into (8) gives:

\[ \Delta Y = \sigma (sO + \Delta D - srD) - r \Delta D \]  

(9)

Now, since \( Y = O - rD \), we can also write equation (6) as:

\[ \Delta Y = \sigma sY + \Delta D(\sigma - r) \]  

(10)

And dividing through by \( Y \), we have an expression for the rate of growth of income of:

\[ \frac{\Delta Y}{Y} = \sigma \left( s + \frac{\Delta D - r \Delta D}{Y} \right) \]  

(11)
or

\[
\frac{\Delta Y}{Y} = \sigma s + (\sigma - r) \frac{\Delta D}{Y}
\]

Equation (11) shows that the growth of income \((\Delta Y / Y)\) will be higher than the rate obtainable from domestic saving alone as long as \(\Delta D > srD\), that is as long as new inflows of capital exceed the amount of outflow on past loans that would otherwise have been saved. Equations (6) and (11) lay the basis for investment financing and economic growth relationship.

3.2 Model specification

From equation (11), this study employed disaggregated approach in analysis the effect of both non-debt and debt developmental financing on outputs of both oil and agriculture sector in Nigeria. The non-debt development financing sources incorporated in this study are foreign private investment (FPI), official development assistance (ODA) and national savings (NS) (Adesoye et al., 2011a).

The mix of debt financing options used in Nigeria over the years is treasury bills (TB), development stock (DB), treasury certificate and bond (TCB), multilateral debt source (MULT) and international lending club (CLUB), i.e., Paris and London Club (Adesoye et al., 2011b).

For the essence of this study, the empirical methodology is formulated based on selected non-debt options available to the public sector for infrastructural facilities development. Therefore, the functional relationship between the selected non-debt and debt financing mix and oil output growth of the sectors (NOG) is express as:

\[
\text{NOG} = f(\text{Non-debt and Debt financing mix})
\]

(12)

Therefore, from the mix of selected variables the empirical model for the analysis of the impact of investment funds options on output growth of the oil and agriculture sectors in Nigeria between two decades after independence and 2011 fiscal year is specified as:

\[
\text{NOG} = f(FPI, ODA, NS, TB, DB, TCB, MULT, CLUB)
\]

(13)

The above equation (13) can be mathematically represented as thus:

\[
\text{NOG}_i = \beta_0 + \beta_1 FPI + \beta_2 ODA + \beta_3 NS + \beta_4 TB + \beta_5 DB + \beta_6 TCB + \beta_7 CLUB + \mu_i
\]

(14)

The output growth (NOG) can be divided into oil sector (OSG) and agriculture sector (ASG). For the purpose of this study, the model is divided into the two forms of investment funds (i.e., the non-debt and debt) as well as for the two sectors. The model for oil sector output growth is stated below as thus:

\[
\text{OSG}_i = \beta_0 + \beta_1 FPI + \beta_2 ODA + \beta_3 NS + \mu_i
\]

(15)

\[
\text{OSG}_i = \beta_0 + \beta_1 TB + \beta_2 DB + \beta_3 TCB + \beta_4 CLUB + \mu_i
\]

(16)

The model for agricultural sector output growth is stated below as thus:

\[
\text{ASG}_i = \beta_0 + \beta_1 FPI + \beta_2 ODA + \beta_3 NS + \mu_i
\]

(17)
where ASG = agriculture sector output growth; OSG = oil sector output growth; FPI = foreign private investment; ODA = official development assistance; NS = national savings; TB = treasury bills; DB = development stock; TCB = treasury certificate and bond; CLUB = international lending club; $\beta_0$ = intercept; $\beta_{1-4}$ = slope or parameters for both debt and non-debt financing mix; and $\mu$ = error term.

All the incorporated variables are log linearised to avoid multi-collinearity and also to revert the mean generating process. The specified multiple regression models (15) to (18) are estimated through the use of Ordinary Least Square Estimator. The time series data on agriculture sector output growth; oil sector output growth; FPI; ODA; NS; TB; DB; TCB; and CLUB were sourced from the Central Bank of Nigeria statistical bulletin, volume 23, 2012. This time frame for this study covers the period of pre structural adjustment program (SAP), SAP and post SAP era in the Nigerian economy within 1970 to 2011 fiscal year.

4 Empirical results

4.1 Descriptive statistics

Table 1 shows that the average value of TB, TCB, DBs, agriculture sector output (ASG), oil-sector output (OSG), international lending clubs (CLUB), FPI, official development assistant (ODA) and NS stood at 242,060.6, 164,371.2, 2,331.4, 105,981.2, 74,156.6, 603,042.2, 122,021.3, 93,954.3 and 771,441.9 respectively. All the variables have standard error values higher than their respective minimum value from the distribution. The probability value of the Jarque-Bera statistics for all variables shows their distribution level at mean zero and constant variance.

Table 2 shows the correlation coefficients of the variables employed for analysis. From Table 2, the variability of relationship among the variables ranges from strong positive through ten weak negative relations. Also, the dependent variables show different level of association among themselves.

A time-series plot reveals the trend of debt and non-debt investment financing in relation with oil sector output and agriculture sector output in Nigeria between a decades after independence till 2011. This enables to determine causal relationship among debt and non-debt investment financing in relation with oil-sector output and agriculture sector output. The time series plot of debt investment financing indicators (TB, TCB and DBs), non-debt investment financing (NS, FPI and ODA) presented in Figures 1 and 2 respectively while Figure 3 depicted both oil and agriculture sector output growth.

From Figure 1, DBs witnessed a low attention from the onset till 1988 (late 1980s), indicated by the trend negative growths. It then changes appearance from 1989 till 2010 with a positive growth steadily, but a sharp growth was recorded in 2010 with 136.4%. Contrary, TB exhibits a zigzag relationship between the periods. Also, the highest values for the growth rates are 47.1%, 21.8%, 19.2% and 21.8% for 1989, 2006, 2008 and 2011 respectively. Other periods besides the highest values showed a negative growth rates. Invariably, TCB followed same trend as TB. These following periods shows the positive and highest values of 25.5%, 32.3%, 18.0%, 76.6% and 7.7% for 1975, 1982, 1995, 1997 and 2011.
### Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th>TB</th>
<th>TCB</th>
<th>DB</th>
<th>ASG</th>
<th>OSG</th>
<th>CLUB</th>
<th>FPI</th>
<th>ODA</th>
<th>NS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>242,060.6</td>
<td>164,371.2</td>
<td>2,331.345</td>
<td>105,981.2</td>
<td>74,156.64</td>
<td>603,042.2</td>
<td>122,021.3</td>
<td>93,954.3</td>
</tr>
<tr>
<td>Standard error</td>
<td>50,104.1</td>
<td>29,084.75</td>
<td>238.6789</td>
<td>14,980.98</td>
<td>7,191.125</td>
<td>179,878.4</td>
<td>28,477.75</td>
<td>41,331.09</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>324,711.7</td>
<td>188,490.7</td>
<td>1,546.816</td>
<td>97,087.82</td>
<td>46,603.82</td>
<td>1,165,745</td>
<td>184,556.9</td>
<td>267,856.1</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>–0.2980</td>
<td>–1.5463</td>
<td>–1.3908</td>
<td>–0.0670</td>
<td>–1.1247</td>
<td>3.4834</td>
<td>4.5546</td>
<td>18.3087</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.1102</td>
<td>0.5619</td>
<td>0.1157</td>
<td>0.9555</td>
<td>–0.5340</td>
<td>2.1316</td>
<td>2.0978</td>
<td>4.0824</td>
</tr>
<tr>
<td>Range</td>
<td>1,019,928</td>
<td>444,647.2</td>
<td>4,909</td>
<td>335,391.9</td>
<td>137,032.3</td>
<td>4,393,000</td>
<td>790,883.1</td>
<td>1,470,233</td>
</tr>
<tr>
<td>Minimum</td>
<td>556</td>
<td>228</td>
<td>220</td>
<td>1,808.7</td>
<td>465.6</td>
<td>0</td>
<td>1,003.2</td>
<td>15,33439</td>
</tr>
<tr>
<td>Maximum</td>
<td>1,019,928</td>
<td>444,647.2</td>
<td>4,909</td>
<td>335,391.9</td>
<td>137,032.3</td>
<td>4,393,000</td>
<td>790,883.1</td>
<td>1,470,233</td>
</tr>
<tr>
<td>Sum</td>
<td>10,166,546</td>
<td>6,903,589</td>
<td>97,916.5</td>
<td>4,451,211</td>
<td>3,114,579</td>
<td>25,327,772</td>
<td>5,124,894</td>
<td>3,946,080</td>
</tr>
<tr>
<td>Obs.</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
</tr>
</tbody>
</table>

*Source:* Authors' computation (2014)
Thus, the non-debt investment financing trend depicted in Figure 2 shows the growth rates of FPI, ODA and NS. Their trends vary during the periods recorded accordingly.
Table 2  Correlation analysis (ordinary)

<table>
<thead>
<tr>
<th></th>
<th>TB</th>
<th>TCB</th>
<th>DB</th>
<th>ASG</th>
<th>OSG</th>
<th>CLUB</th>
<th>FPI</th>
<th>ODA</th>
<th>NS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TCB</td>
<td>0.9162</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DB</td>
<td>-0.5091</td>
<td>-0.4415</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASG</td>
<td>0.9089</td>
<td>0.8668</td>
<td>-0.3387</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSG</td>
<td>0.7449</td>
<td>0.7928</td>
<td>0.0735</td>
<td>0.8443</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLUB</td>
<td>0.5683</td>
<td>0.6142</td>
<td>-0.1435</td>
<td>0.3185</td>
<td>0.4792</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPI</td>
<td>0.8576</td>
<td>0.7824</td>
<td>-0.5073</td>
<td>0.9178</td>
<td>0.6380</td>
<td>0.1546</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ODA</td>
<td>0.5707</td>
<td>0.4780</td>
<td>-0.3672</td>
<td>0.5716</td>
<td>0.4192</td>
<td>0.0204</td>
<td>0.5162</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>NS</td>
<td>0.7292</td>
<td>0.6216</td>
<td>-0.4963</td>
<td>0.8394</td>
<td>0.4773</td>
<td>-0.0645</td>
<td>0.9433</td>
<td>0.4368</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Authors’ computation, 2014

Figure 3  Percentage growth of oil sector and agriculture sector output (see online version for colours)

However, the performance of the country’s oil-sector and agriculture sector output in percentage growth (see Figure 3) depicted varying trends between 1971 and 2011. Both sectors experienced worst growth performance according for 1971, 1974, 1975 and 1981 ranging from 25% to 89% for the periods.
4.2 Long-run estimates

Furthermore, the results of the estimated regression for the two sectors ranging from debt investment financing to non-debt investment financing are presented in Table 3 as thus.

4.2.1 Effect of non-debt investment financing on agriculture sector output

Table 3 reports the estimated result for the multiple parameters regression specified to capture the effect of non-debt investment financing on agriculture sector output growth in Nigeria. It reveals that NS exerts positive influence on agriculture sector output in Nigeria which conforms to the theoretical expectation. This implies that for a percent increase in NS; the Nigerian agriculture sector grows by 0.8609%. Thus, Table 3 also reports that log of FPI and ODA exert negative effects on agriculture sector output growth in Nigeria during the review periods and these does not conforms to the a priori expectations based on sign. However, in terms of magnitude of effect, a percentage increase in the log of FPI and ODA will deteriorate the agriculture sector by 0.1800% and 0.1803%, respectively.

The estimated t-statistics result shows that all the estimated parameters were found to be partially statistically significant at 5% critical level because their p-values are less than 0.05. However, the F-statistic result shows that all the incorporated agriculture sector output growth and non-debt investment financing indicators are simultaneously significant at 5% critical level. Whereas, the adjusted R-squared result reveals that 85.6% of the total variation in agriculture sector is accounted by changes in all explanatory

<table>
<thead>
<tr>
<th>Non-debt investment instruments</th>
<th>Dependent variables</th>
<th>Debt investment instruments</th>
<th>Dependent variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agriculture growth</td>
<td>Oil sector growth</td>
<td>Agriculture growth</td>
</tr>
<tr>
<td>FPI</td>
<td>−0.180 (0.259)</td>
<td>−0.082 (0.360)</td>
<td>TB</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DB</td>
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<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>ODA</td>
<td>−0.181 (0.080)**</td>
<td>−0.369 (0.111)*</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS</td>
<td>0.861 (0.185)*</td>
<td>0.979 (0.258)*</td>
<td>TCB</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>4.686 (0.927)*</td>
<td>3.551 (1.290)*</td>
<td>CLUB</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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</tr>
<tr>
<td>Adjusted R²</td>
<td>0.845</td>
<td>0.725</td>
<td>Adjusted R²</td>
</tr>
<tr>
<td>F-stat</td>
<td>75.203*</td>
<td>37.036</td>
<td>F-stat</td>
</tr>
<tr>
<td>Durbin-Watson</td>
<td>1.724</td>
<td>1.627</td>
<td>Durbin-Watson</td>
</tr>
<tr>
<td>No. of obs.</td>
<td>42</td>
<td>42</td>
<td>No. of obs.</td>
</tr>
</tbody>
</table>

Note: Heteroskedasticity-consistent standard errors in parenthesis; statistical significant coefficients at 5% & 1% at respectively are denoted by ** and *.

Source: Authors’ computation (2014)
Comparative analysis of investment funding

variables. The Durbin-Watson test result reveals that there is presence of semi-strong positive serial correlation among the residuals, because of the d-value (1.724) is far from zero but close to two.

4.2.2 Effect of non-debt investment financing on oil-sector output

Further, Table 3 reports the estimated result for the multiple parameters regression specified to capture the effect of non-debt investment financing on oil sector output growth in Nigeria. Table 3 further shows that NS exerts positive influence on oil sector output in Nigeria between a decade period after Nigeria’s independence and 2011 fiscal year and this conform with the theoretical expectation. This implies that for a percent increase in NS; the Nigerian oil sector grows by 0.9785%. Also, Table 3 reports that log of FPI and ODA exert negative effects on oil sector output growth in Nigeria during the review periods and these does not conforms to the a priori expectations based on sign. However, in terms of magnitude of effect, a percentage increase in the log of FPI and ODA will worsen outputs of the oil sector by 0.08236% and 0.3692%, respectively.

Assessing the partial significance of the estimated parameters, the t-statistics shows that all the estimated parameters were found to be partially statistically significant at 5% critical level because their p-values are less than 0.05. Also, the F-statistic result shows that all the incorporated oil sector output growth and non-debt investment financing indicators are simultaneously significant at 5% critical level. While the adjusted R-squared result reveals that 74.5% of the total variation in oil sector is accounted by incorporated explanatory variables. The Durbin-Watson test result reveals that there is presence of semi-strong positive serial correlation among the residuals, because of the d-value (1.6267) is far from zero but close to two.

4.2.3 Effect of debt investment financing on agriculture sector output

In addition, Table 3 revealed that that TB and DBs exert positive influence on agriculture sector output in Nigeria and this conform with the theoretical expectation. This implies that for a percent increase in TB and DBs; the Nigerian agriculture sector grows by 0.7662% and 0.6253% respectively. Table 3 also reports that TCB and CLUB exert negative effects on agriculture sector output growth in Nigeria during the review periods and these does not conforms to the a priori expectations based on sign. However, in terms of magnitude of effect, a percentage increase in the TCB and CLUB will deteriorate the agriculture sector by 0.1840% and 0.0704%, respectively.

The estimated result for t-statistics shows that all the estimated parameters were found to be partially statistically significant at 5% critical level because their p-values are less than 0.05. Thus, the F-statistic result shows that all the incorporated agriculture sector output growth and debt investment financing indicators are simultaneously significant at 5% critical level. However, the adjusted R-squared result reveals that 95.5% of the total variation in agriculture sector is accounted by changes in incorporated explanatory variables. The Durbin-Watson test result reveals that there is presence of semi-strong positive serial correlation among the residuals, because of the d-value (1.46265) is far from zero but close to two.
4.2.4 Effect of debt investment financing on oil sector output

Table 3 reports the estimated result revealed that TB and DBs exert positive influence on oil sector output in Nigeria and this conform with the theoretical expectation. This implies that for a percent increase in TB and DBs; the Nigerian oil sector grows by 0.6811% and 1.0180% respectively. Table 3 also reports that TCB and CLUB exert negative effects on oil sector output growth in Nigeria during the review periods and these does not conforms to the a priori expectations based on sign. However, in terms of magnitude of effect, a percentage increase in the TCB and CLUB will deteriorate the oil sector by 0.1274% and 0.0708%, respectively.

The estimated result from t-statistics shows that all the estimated parameters except TCB were found to be partially statistically significant at 5% critical level because their p-values are less than 0.05. Although the F-statistic result shows that all the incorporated oil sector output growth and debt investment financing indicators are simultaneously significant at 5% critical level. Thus, the adjusted R-squared result reveals that 93.6% of the total variation in explanatory variables. The Durbin-Watson test result reveals that there is presence of semi-strong positive serial correlation among the residuals, because of the d-value (1.3087) is far from zero but close to two.

5 Conclusions and policy options

From the above analysis, the following highlighted findings drawn from this research work are given as thus: FPI and ODA exert almost the same negative influence on agriculture sector output growth but a varying degree on oil sector output growth; the NS exhibit a greater impact on the outputs of oil sector than agriculture sector; agriculture sector output reported a positive influence from TB and DB while a negative shock from TCB and international lending club. However, the positive influence outweighs the negative impact as it affects the overall effect of debt investment financing on agriculture sector; and in the same vein, TB and DB and (TCB and CLUB) exert positive and (negative) influence on the oil sector outputs growth in Nigeria.

Furthermore, the aforementioned analysis showed that NS and (DBs and TB) are the best non-debt and (debt) financing mix to propel the development of agriculture sector and oil sector towards enhancing the living standards of citizens. The finding contradicts Adesoye et al. (2011a) regarding TB for the two sectors. However, empirical results negate findings of Adesoye et al. (2011b) that TCB enhances productivity of both sectors. In contrary, it supported findings that financial sources from international lending clubs de-likes of Paris Club, London Club, etc., should be avoided at all costs since it has negative externalities on the sectors. Loan from these international lending clubs are neglected ever since 2006 till 2011 due to the recognition of such debt implications over the years. However, the two investment financing options have significant impact on development programs of the two sectors.

The benefits of the two investment financing options should be well articulated so that maximum or optimal use are not only ensured but also enhance development and output growth of the sectors. Invariably, public debts should be well controlled as a result of the possibility of increasing the aggregate money supply which might exert inflationary pressure on the entire economy especially if the debt is consumption oriented rather being used for productivity purposes to offset the obstinate problem of INF. Lastly,
the federal government should utilise the use of national resources in financing developmental projects meant for economic prosperity and standard of living improvement. Considering the heavy reliance of the Nigerian economy on oil revenues, excess crude funds should be channelled towards the financing of developmental projects and maintenance of obsolete infrastructures in the country.

References


