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INFLATION, OIL REVENUE, AND MONETARY POLICY MIX IN AN OIL-DEPENDENT ECONOMY: EMPIRICAL INSIGHTS FROM THE CASE OF NIGERIA

Stephen Taiwo Onifade[1+]

Mehmet Alagöz[2]

Savaş Erdoğan[3]

Olalekan Obademi[4]

[1,2,3]*Faculty of Economics and Administrative Sciences, Şelcuk University Konya, Turkey.*
[1]*Email: stephentaiwo.onifade@lisansustu.selcuk.edu.tr Tel: +905313495039*
[2]*Email: malagoz@selcuk.edu.tr Tel: +90332 2233005*
[3]*Email: serdogan@selcuk.edu.tr Tel: +905364640376*
[4]*Department of Finance, University of Lagos, Nigeria.*
[4]*Email: eobademi@unilag.edu.ng Tel: +2348036285605*

(+ Corresponding author)

ABSTRACT

Oil revenues in many nations have remained largely unstable owing to factors like volatility in global oil prices and output regulations among other international and domestic issues, thereby affecting the stability of many oil-dependent economies. This study examines the combined impacts of oil revenue and inflation on the economic growth of Nigeria within the framework of the Autoregressive Distributed Lags models (ARDL) while incorporating selected monetary policy measures in the model to fit into the country's inflationary scenario amidst dwindling oil revenue in recent times. The empirical result provides evidence that both oil revenue and inflation exert significant diametric impacts on economic growth in Nigeria. While the former demonstrates a positive impact on growth the latter has a negative impact within the period of the study (1981-2017). The Granger Causality test also provides complementary evidence of causality from both oil revenue and monetary policy measures to growth. Considering the vulnerability of oil revenue to external shocks, we strongly recommend mapping out of aggressive diversification program to reduce the current huge dependence on oil proceeds while the monetary authorities keep close tabs on regulating the monetary environment to efficiently mitigate the negative impacts of inflation to facilitate sustainable growth in the long-run.

Contribution/Originality: This study uses a flexible empirical methodology that produces more accurate and robust estimates, thus providing timely insights and contributions to the existing literature on growth vis-à-vis the challenges of managing inflation in Nigeria amidst the dwindling oil revenues in recent times.

1. INTRODUCTION

Managing inflation among some other macroeconomic variables has become a major task and one of the top priorities of various monetary authorities around the world. Of course, the reasons for this are often closely connected to the general inherent adverse effects that inflationary pressure may trigger in an economy. These adverse effects may range from its gross unfavorable impacts on the purchasing power of a nation's currency; to its tendency to discourage adequate investments that are necessary for capital formation due to the high level of uncertainty that it may generate, thus inhibiting economic growth (Barro, 1995). On the micro-level, there are also possible damning effects of both actual or expected inflation on household welfare and spending pattern as cost of

living rises due to persistent increase in prices of foodstuff, clothes, and house rent among other necessities of life. Various households may be left with no other choice than to scale down their spending pattern when confronted with inflationary pressure, while some may have to augment their spending by borrowing to maintain their welfare standards even when it may not be convenient or appropriate to do so (Cavallo, Cruces, & Perez-Truglia, 2017; Malmendier & Nagel, 2016). For these reasons, policymakers often adopt diverse strategies in an attempt to curb the pressure that inflation exerts on the stability of their economies and many empirical studies have even suggested thresholds for inflation rates with notable variations in the figures that are suggested for developed and developing economies in diffirent instances (Blanchard, Dell'Ariccia, & Mauro, 2010; Dueker & Fischer, 1996; Khan & Ssnhadji, 2001).

Although inflation is often viewed from the general negative perspectives; perhaps due to some of the aforementioned adverse effects, however, there are also possible benefits that it could generate especially when considering its short-run political usefulness. For instance, Friedman and Schwartz (1986) noted that inflation can help to create relief in debt burden especially when public debts are secured in domestic currency. Alesina and Gatti (1995) have also identified short-term political gains for a government that wishes to remain popular and attract more public acceptance through larger spendings to fight unemployment even when such actions are expected to exacerbate the challenges of high inflation.

The Nigerian economy has been struggling with tackling inflationary pressure for decades. In the 1980s and 1990s, the annual consumer price index inflation rate stood at an average of about 22.1% and 30.63% respectively (World Development Indicator WDI, 2018). There was an easing in inflationary pressure in the 2000s with the annual consumer price index inflation rate falling to about 11.53% on the average between the year 2000 and last the quarter of the year 2015 (WDI, 2018). However; more recent statistics have shown that the nation is yet to achieve desired success in stemming inflation to a sustainable single-digit rate as 2016 and 2017 statistics show annual inflation rates of 15.67% and 16.52% respectively (WDI, 2018).

The task of unraveling the inflation mystery in the Nigerian economy cannot be completed without going back to the various developments that took place in the past in connection to the oil sector of the economy especially in the 1970s (Bayo, 2011; Orji, Orji-Anthony, & Okafor, 2015). Right from its discovery in Oloibiri in the present day Bayelsa State of Nigeria in 1956 to its production in commercial quantity in the 1970s, oil revenue which is a major source of income to the government has remained largely unstable owing to factors like volatility in global oil prices and output regulations among others international and domestic issues.

Anyanwu (1992) pointed out that the Nigerian economy was transformed from its high dependency on agriculture to oil dependency following the series of crisis that the nation witnessed in the successive years after the adoption of the structural adjustment program (SAP) of the 1980s which eventually exacerbated inflation crisis with its attendant effects. Thus, instability in oil revenue often creates various multiplier effects on the nation's economy that has already grown to become grossly dependent on oil proceeds over the years. Some of these multiplier effects are conspicuously seen in the breakdowns of government revenue in line with its direct impacts on public expenditure. Over the years, a substantial amount of public expenditures vis-à-vis capital and recurrent expenditures come from the proceeds of the oil sector and in fact, the national budget is often benchmarked on crude oil prices, thereby making the revenue from the oil sector to be of extreme importance to the Nigerian government. Proceeds from the oil sector also affect the country's external reserve that is often used to maintain the stability and value of the local currency since oil revenue account for the lion's share of the country's foreign exchange earnings and the whole interplay often turn out to create major impacts on important macroeconomic indicators in the country.

Considering the history of inflationary pressure in Nigeria amidst the recent economic recession in the wake of dwindling revenue from the country's predominant source of income, this study focuses on examining the combined impacts of oil revenue and inflation on the economic growth of the country while incorporating selected monetary

policies under the framework of the autoregressive distributed lag models. The study seeks to extend the body of knowledge by examining the subject matter of the dynamic nexus among these variables within the scope of the country's current economic realities, thus making the study to be of timely importance to the Nigerian economy. Besides, the study also adopts a flexible methodology that helps to provide precise and more robust empirical perspectives on the subject matter thereby avoiding some of the shortfalls in the existing empirical studies.

The study has been divided into 5 sections. Section 1 contains the introductory part while section 2 provides a short review of oil revenue in the Nigerian economic growth experience. Section 3 provides a review of some related studies. Section 4 provides the details of the adopted methodology for the empirical analysis and the interpretation of results. The study was concluded in section 5 with recommendations based on the findings and suggestions for further studies.

2. OIL REVENUE IN THE NIGERIAN ECONOMIC GROWTH EXPERIENCE

Crude oil is a global essential commodity that constitutes a significant component of the gross domestic product (GDP) of many oil-producing economies. It is also among the major natural resources that are capable of expanding a nation's fortune overnight through the high revenue generating capacity especially in times of price surge in the international oil market. However, experiences from a couple of oil-producing nations have shown that having huge revenues from excessive foreign exchange earnings may not necessarily satisfy the sufficient conditions for economic prosperity and desirable sustainable growth. In fact, on the contrary, Corden (1984) used the Dutch Disease Model to explain why windfalls from resource boom such as rising oil prices could create a more adverse effect in an economy that is not properly diversified. For instance, it has been observed that many African countries remain in a state of poverty despite being endowed with numerous natural resources such as oil in the case of Nigeria (Anyanwu, 2014; Anyanwu & Erhijakpor, 2014). This is because many of these nations depend largely on resource export and most windfalls from the boom in those resource sectors are often accompanied by a sudden rise in revenue, real exchange rate appreciation and higher wages that could stimulate excessive dependency on the sector at the detriment of other important sectors. Also, some countries are under much pressure to pump the huge earnings into the economy in an attempt to urgently tackle social-economic problems such as issues of unemployment and poverty regardless of their real economic size and capability.

Corden (1984) noted that inflation often becomes inevitable if the size of the economy is not large enough with substantial production capacity to accommodate the excess inflow of revenue from the windfalls of a sharp rise in commodity prices. Krugman (1987) also noted that excessive dependence on a resource-based export sector will crowd out the contributions of other sectors especially in terms of manufacturing. Thus we can imply that the expected impact of higher oil revenue or appreciating oil prices on an economy may vary depending on the structure of the economy vis-à-vis the efficiency of other sectors and the extent to which the economy is diversified. In the light of the foregoing, a review of the contributions of the oil sector to the entire economy of Nigeria vis-à-vis the performances of other sectors of the economy right from its discovery and production in commercial quantity have shown a drastic transformation in the nation's GDP composition. The sharp transformation of the economic structure is reflected in the remarkable decline that was witnessed in the contributions of other sectors to the GDP over the years. For instance, before independence in 1960 and before the oil boom period of the 1970s, the agricultural sector was described as the mainstay of the economy as it employed more than 70% of the total labor force with over 48% contribution to the GDP in 1970 (Sogo-Temi & Olubiyo, 2004). However, by the year 2000, the contribution of the same sector has dropped below 25% of the GDP and the distortions that were witnessed in the significant contributions of the agricultural sector to the economy has been strongly associated with the sudden boom in the oil sector (Otaha, 2012; Sogo-Temi & Olubiyo, 2004).
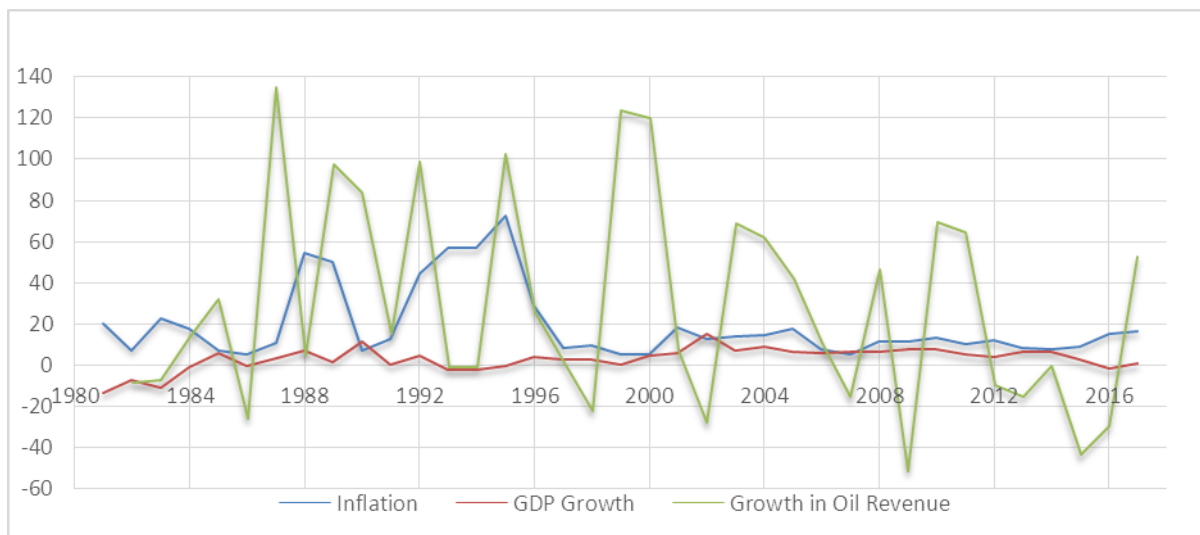
Figure-1. Growth of oil revenue and GDP in Nigeria with inflation.

On average, the Nigerian GDP grew by about 6.5% within 1970 and 1978 (WDI, 2018) the period in which the nation witnessed what many have described as the oil boom era. The rising revenue in the oil boom period triggered a massive upward wage review which is often viewed as part of the earliest stages of inflation scenarios in the country (Aiyede, 2002; Bayo, 2011; Olubusoye & Oyaromade, 2008). However, the post-oil boom period was followed by a sharp decline in growth rate in the 1980s when the economy experienced negative growth to an average of about -1.5% (WDI, 2018). This development can be largely attributed to the falling prices of crude oil which has replaced various commodities from the abandoned agricultural sector to become the country's main export commodity and source of revenue.

Oil prices rose remarkably in the 2000s and it sold at an average of about $83 per barrel over 10 years between 2005 and 2014. This marks another period when the country witnessed a level of remarkable stability in the growth rate of about 6%, especially after the 2008 global financial crisis. However, as reflected by the downward trend of the growth rate in Figure 1 above, the rhythm changed again towards the end of 2015 and by the last quarter of 2016 when the economy grew at negative 1.61% (WDI, 2018) the nation was declared to have officially gone into recession. Following this development, there have been some concerns about the falling oil revenue coupled with the weakening value of the local currency which has led to the depletion of the nation's external reserves in an attempt to defend the local currency and ensure a stable exchange rate in the wake of rising and disproportionate import bills. There were also major concerns on the rising inflation figures amidst the falling nominal value of the local currency which in turn created some impediments on trade and commerce. By the end of the last quarter of 2017, inflation had risen to about 16.52% and the nominal official exchange rate of the naira to the $US average at about N305.2 to $1US (WDI, 2018). On the overall, the entire scenario serves as a timely reminder to us on how much the economy has grown to be over-dependent on oil as the government largely depends on the proceed from this sector for the finance of its various expenditure plans (Onifade, Çevik, Erdoğan, Asongu, & Bekun, 2020).

3. LITERATURE REVIEW

The impacts of inflation on economic growth seems to have created divided opinions among researchers as there is no unanimous consensus on the direction of its effects on economic growth. Grier and Grier (2006) have noted that there is little consensus on how inflation impacts on growth. By extension, this may imply that in some instances inflation may be insignificant as far as output and growth are concerned in an economy. While there are papers that have postulated that inflation has a positive effect on growth, some others maintained a contrary opinion.

Barro (1995) used instrumental variables in panel models to analyze the impact of inflation on the growth of a group of countries and concluded that inflation has significant negative effects on growth with more pronounced effects especially in economies with higher inflation rates. Gillman, Harris, and Mátyás (2004) have also obtained a significant negative relationship between growth and inflation using instrumental variable (IV) approach on data from Asia-Pacific Economic Cooperation (APEC) and Organization for Economic Co-operation and Development (OECD) countries. Chaturvedi, Dholakia, and Kumar (2008) in South-East Asia, and Kasidi and Mwakanemela (2013) in the case of Tanzania have all obtained various degrees of a negative relationship between inflation and economic growth using different approaches. On the contrary, there is also empirical evidence that inflation may have a positive relationship with economic growth as shown in the study of Khadim, Ilyas, and Mehmood (2016) for some selected economies within a linear framework. The study of Antwi, Mills, and Zhao (2013) for the case of Ghana, and Mallik and Chowdhury (2001) for some selected South Asian countries which include India, Pakistan, Bangladesh, and Sri Lanka, have also revealed a positive relationship between inflation and growth.

Although evidence for positive and negative relationship has dominated the empirical findings on the nexus between inflation and economic growth in the literature, nonetheless, there is yet another category of studies whose findings have demonstrated that the inflation-growth nexus relates more to the inflation threshold. The inflation threshold is a certain range of inflation rates within which inflation can be tolerated but beyond which it could hamper growth if necessary actions were overlooked as empirically demonstrated in many studies (Khan & Ssnhadji, 2001; Kremer, Bick, & Nautz, 2013). However, adequate caution must be taken to avoid making a wrong generalization about the impact of inflation based on the threshold phenomenon as various empirical pieces of evidence have demonstrated that the threshold of inflation varies from one country to another especially with regards to the developed and emerging economies (Gonçalves & Salles, 2008; Lopez-Villavicencio & Mignon, 2011). Thus, it is crucial to note that inflation may be triggered by numerous factors that are often connected to the uniqueness or differences of individual countries.

In Nigeria, the debate on inflation is still very much open as there is no consensus on the inflation-growth nexus. It appears that the available empirical findings vary depending on the methodologies that each study adopted. Chimobi (2010) applied the Granger Causality approach and obtained a unidirectional causality from inflation to growth in Nigeria. Ayo, Ifeakachukwu, and Ditimi (2011) also obtained a one-way causality between the two variables using the VECM approach. Their findings further reveal that inflation will affect growth negatively in the long run. In different studies, Umaru and Zubairu (2012) and Osuala, Osuala, and Onyeike (2013) obtained a positive relationship between economic growth and inflation in Nigeria. However while the former found evidence that growth causes inflation, the latter maintained that there is no causality among the two variables. On the aspect of oil revenue and economic growth relation, major emphases have been on the importance of proper disbursement of revenue from the oil sector as a key to stimulating other sectoral growth (Adeniyi, Oyinlola, & Omisakin, 2011; Akinlo, 2012).

The methodological approaches and submissions from some of these extant studies especially on the inflation-growth nexus raise some concerns regarding the issues of the robustness of the findings. To the best of our knowledge, a substantial proportion of the extant studies has followed a similar approach and some studies have even utilized a single-variate model thereby leaving out some important variables while exploring the nexus. Thus, this present study critically explores the nexus within the framework of the Autoregressive Distributed Lags (ARDL) models while incorporating some other crucial variables into the model to fit into the context of the dwindling oil revenue which has been the nation's predominant source of income.

4. EMPIRICAL METHODOLOGY

The auto-regressive distributed lag model (ARDL) approach of Pesaran, Shin, and Smith (2001) was applied for the empirical analysis of this study. Annual data on each of the variables covering 37 years (1981-2017) were

sourced from the World Bank development indicators (WDI, 2018) and the Central Bank of Nigeria (CBN, 2017) Statistical Bulleting. The level of inflation was proxied by the consumer prices index (CPI), economic growth was proxied by the real gross domestic product per capita (RGDPC), and oil revenue was denoted by OILREV. Going by the arguments of Freeman and Yerger (1997) to avoid spurious regression results between economic growth and inflation, important cyclical factors ought to be accounted for and such factors include monetary policy measures for controlling inflation such as interest rate among other issues. Thus, the real interest rate (REIR) and Money supply as proxied by the broad money supply (M2) were incorporated as major monetary policy indicators for price stabilization while the data on imports of goods and services calculated as a percentage of the GDP and denoted with IMPORT was incorporated in the model to capture some possible impacts of imported inflation. Following the work of Greenidge and DaCosta (2009); Ndidi (2013) while examing the determinants of inflation in Nigeria noted that exposure to international trade is not significant in explaining the inflationary concept in Nigeria. However, we would like to pay more attention to the import segment of trade in an attempt to capture the inflation pass-through effect with respect to trade rather than utilizing an aggregate variable such as trade openness. The justification for this decision is premised on the current structure of the Nigerian economy, especially in the post-oil boom era. Firstly, the nation has grown to become a huge importing economy with import bills covering items that ordinarily should have been produced in the country. Secondly, substantial components of other sectors of the economy especially the manufacturing sector rely on imported materials mostly in the form of chemicals and some other related items for their production chain. Thus, incurring an extra cost in an attempt to meet up with the import requirements by manufacturers may trigger inflationary pressure. All the variables are in their natural log form except the real interest rate. We set up a general functional representation of the relationship between the variables as follows:

$$RGDPC = \gamma_1 + \beta_1 CPI + \beta_2 OILREV + \beta_3 REIR + \beta_4 M2 + \beta_5 IMPORT + \varepsilon_t \qquad (1)$$

Where all the variables remain as earlier defined and (γ_1) represents the intercept parameter. The beta parameters $(\beta_1, \beta_2, \beta_3, \beta_4, and\ \beta_5)$ represent the slope parameters that measure the impacts of the explanatory variables on the explained variables in Equation 1. The ARDL representation of the model is given in Equation 2:

$$\Delta RGDPC_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta RGDPC_{t-i} + \sum_{i=1}^{p} \alpha_2 \Delta CPI_{t-i} + \sum_{i=0}^{p} \alpha_3 \Delta OILREV_{t-i} + \sum_{i=1}^{p} \alpha_4 \Delta M2_{t-i} + \sum_{i=0}^{p} \alpha_5 \Delta REIR_{t-i}$$
$$+ \sum_{i=0}^{p} \alpha_6 \Delta IMPORT_{t-i} + \beta_1 RGDPC_{t-1} + \beta_2 CPI_{t-1} + \beta_3 OILREV_{t-1} + \beta_4 M2_{t-1} + \beta_5 REIR_{t-1}$$
$$+ \beta_6 IMPORT_{t-1}$$
$$+ \varepsilon_t \qquad (2)$$

From Equation 2, ε_t represents the error term that is expected to be serially uncorrelated with zero mean. The delta sign (Δ) represents the difference operator while subscript i denotes the appropriate lag length as chosen by the AIC criterion. The α_0 denotes the intercept parameter in the equation while the $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ represent the long-run coefficients. To conduct the bound test for cointegration, we set up a null hypothesis (H₀) to conduct a joint test for the long-run coefficient such that $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$ for Equation 2 to be tested against the alternative hypothesis (H₁) such that $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq 0$ that there is a level relationship among variables in

the model. We subsequently set up an error correction model that is associated with the long-run parameters in Equation 2 as represented in Equation 3.

$$\Delta RGDPC_t = c_0 + \sum_{i=1}^{p} \alpha_1 \Delta RGDPC_{t-i} + \sum_{i=2}^{p} \alpha_2 \Delta CPI_{t-i} + \sum_{i=1}^{p} \alpha_3 \Delta OILREV_{t-i} + \sum_{i=2}^{p} \alpha_4 \Delta MONEY_{t-i}$$

$$+ \sum_{i=2}^{p} \alpha_5 \Delta IMPORT_{t-i} + \sum_{i=1}^{p} \alpha_6 \Delta REIR_{t-i} + \emptyset ECT_{t-1}$$

$$+ \mu_t \qquad\qquad (3)$$

From Equation 3, ECT represent the error correction term while the μ_t represents the error term for the error correction model. The c_0 denote the intercept parameter in the equation while the $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$ represent the short-run coefficients. The ARDL approach may not be applicable in all circumstances as the methodology was designed to efficiently accommodate variables with an integration order that is not higher than one. It has been noted that the critical values as given by Pesaran et al. (2001) and Narayan (2005) cannot be applicable for the bound test in the ARDL approach in the situation whereby variables are integrated order of a degree that is higher than one (Onifade, Ay, Asongu, & Bekun, 2019; Ozturk & Acaravci, 2013). Hence we conducted the unit root test to check the order of integration of our variables before proceeding to obtain all needed parameter estimates.

4.1. Unit Root Test

The ADF and PP tests were used to perform the unit root test and the test results are given in Table 1.

Table-1. Unit root test results.

(LEVEL)	RGDPC	OILREV	CPI	IMPORT	M2	REIR
τ_G (ADF)	0.8126	0.9617	0.9552	0.4882	0.8482	0.0000 ***
τ_C (ADF)	0.7910	0.5622	0.5610	0.4141	0.7344	0.0000 ***
τ_G (PP)	0.1107	0.9715	0.9605	0.4664	0.7870	0.0000 ***
τ_C (PP)	0.9304	0.5342	0.4966	0.4187	0.8499	0.0000 ***
(1st Diff)	RGDPC	OILREV	CPI	IMPORT	M2	REIR
τ_G (ADF)	0.0371 **	0.0009 ***	0.0300 **	0.0000 ***	0.0955 *	0.0000 ***
τ_C (ADF)	0.0071 ***	0.0000 ***	0.0150 **	0.0000 ***	0.0302 **	0.0000 ***
τ_G (PP)	0.0371 **	0.0000 ***	0.2063	0.0000 ***	0.2323	0.0000 ***
τ_C (PP)	0.0071 ***	0.0000 ***	0.0734 *	0.0000 ***	0.0818 *	0.0001 ***

Note: τ_G represents the most general model with drift and trend while τ_C is the model with drift and without a trend.

RGDPC represents real gross domestic product per capita, OILREV for oil revenue, CPI for consumer price index, IMPORT for import as a percent of GDP, M2 for money supply and REIR for the real interest rate. All variables are in their natural log form except the real interest rate (REIR) due to the availability of negative values in its sample observation. The ADF and PP tests were used to perform the unit root test. The asterisk ***, ** and * represent the rejection of the null hypothesis at the 1%, 5%, and 10% levels respectively. Tests for unit roots have been carried out on E-VIEWS 10.

From the unit root test result, real interest rate (REIR) is stationary at level thus making it an I(0) variable while all other variables are I(1) since they are only stationary at their first difference. Applying the ARDL technique in the case of this study is therefore justifiable. In addition to the properties of the dataset which are

compatible with the application of the ARDL technique, there are other important beneficial aspects of applying this technique in our study such as the benefit of obtaining both the long-run and short-run dynamics of the system as identified in various empirical studies (Folarin & Asongu, 2019; Li & Lin, 2016; Nwaka & Onifade, 2015).

4.2. Bound Test and Long-Run Estimates

With clear evidence from both the ADF test and the PP test that each variable is stationary at least at the first difference, we, therefore, proceed to conduct the bound test to see if there is a co-integration relationship among the long-run variables in Equation 2 and the results of the test are presented in Table 2.

Table-2. Bound test results.

Equations	Lags (AIC)	F-Statistics	Decision
(2)	2	11.91	Cointegration
Critical Values for (F-Statistics)	Lower bound at 5% = 2.62	Upper bound at 5% = 3.79	

The null hypothesis of no level relationships among our variables has been tested against the alternative using the critical values of the F-bound test for case 3 (Pesaran et al., 2001). The lower and upper critical values at 10%, 5%, and 1% are 2.26/3.35, 2.62/3.79 and 3.41/4.68 respectively.

From the bound test results, we reject the null hypothesis of no level relationship among the variables given that the F-statistics from the estimates exceed the upper bound critical values for at a conventional level of significance. Hence we proceeded to estimate the long-run model parameters that are associated with Equation 2 and the results are presented in Table 3.

Table-3. Long run coefficients for economic growth.

Variables	Coefficients	t-statistics	P–Values
CPI	–0.2944	–6.3079***	0.0000
OILREV	0.1761	3.4703***	0.0024
M2	0.1744	3.8851***	0.0009
IMPORT	–0.1493	–2.2591**	0.0352
REIR	0.0050	3.4516***	0.0025

Note: RGDPC represents real gross domestic product per capita, OILREV denotes oil revenue, CPI for consumer price index, IMPORT for import as a percent of GDP, M2 for money supply and REIR for the real interest rate. The asterisk ***, ** and * represent the statistical significance of estimated coefficients at the 1%, 5% and 10% levels of significance respectively.

From the estimated long-run coefficients above, oil revenue has a significant positive effect on economic growth in Nigeria as a percentage rise in oil revenue is expected to make real gross domestic product per capita to rise by about 0.17%. These findings buttress the fact that the oil sector is an important component of the Nigerian economy. Import has a negative impact on economic growth as the estimated model reveals that a percentage expansion in the volume of import with respect to the size of the economy would lead to an approximate 0.14% fall in the nation's real gross domestic product per capita and this estimate is found to be significant. The reason for this is can be linked to the fact that excessive importation often reduces the efficiency and productive capacity of the local industries as they are exposed to unhealthy competition from foreign goods. In addition to that, several small and medium scale businesses (SMEs) can be forced out of operation due to the prevailing excessive patronage for imported goods by the public at the expense of local products. Money supply has a significant positive impact on economic growth over the period of the study as a percentage rise in M2 is expected to stimulate growth in the economy by about 0.17%. However, there is a risk of possible inflation which could undermine the desirable growth level since the estimates also show that a percentage rise in inflation is expected to slow down economic growth by about 0.29%. This result upholds the position of Fischer (1993) that inflation is a threat to economic growth in the long-run. The real interest rate is also found to be significant to economic growth although it bore an unexpected sign such that a percentage rise in real interest rate is expected to stimulate growth by 0.5%. Based on apriori

expectation, we would expect that a lower interest rate should help in stimulating economic growth. However, going by the policy of the central bank of Nigeria over the years and most especially in recent times vis-à-vis the peculiarity of the economy, double-digit interest rates have been utilized as a part of contractionary monetary policies to effectively curb and reduce the damning effects of inflation that are often triggered by larger supply of money and to ensure stability in the general price level. While the central bank recognizes the fact that there is a need to stimulate the economy through money supply, our findings have just confirmed that interest rate has contributed positively to economic growth for the period of the study since real sustainable economic growth can not be achieved by arbitrarily pumping money into circulation without controlling for the possible consequences.

4.3. Error Correction and Short-Run Estimates

The estimated coefficients from the error correction model are presented in Table 4.

Table-4. Error correction model.

Variables	Coefficients	t-statistics	P-Values
C	0.5341	9.5967	0.0000
ΔCPI	0.0755	1.5372	0.1399
ΔCPI (-1)	0.1923	4.2335	0.0004
ΔOILREV	0.0389	3.5539	0.0020
ΔM2	0.0798	1.7623	0.0933
ΔM2 (-1)	-0.1998	-3.5493	0.0020
ΔIMPORT	-0.0064	-0.5103	0.6154
ΔIMPORT (-1)	0.0426	3.3816	0.0030
ΔREIR	0.0010	4.7664	0.0001
ECT (-1)	-0.3947	-9.4549***	0.0000
R2	0.85		
Adjusted R2	0.80		
F-statistic	16.75		
DW-stat	2.28		
P-Value	0.0000		

Note: RGDPC represents real gross domestic product per capita, OILREV denotes oil revenue, CPI for consumer price index, IMPORT for import as a percent of GDP, M2 for money supply and REIR for the real interest rate. The asterisk ***, ** and * represent the statistical significance of estimated coefficients at the 1%, 5% and 10% levels of significance respectively.

Table-5. Granger causality test.

	F-Statistics						
Variable	RGDPC	CPI	OILREV	M2	Import	REIR	Decision
RGDPC	_	2.15772	3.09038*	3.45426**	1.40228	2.91958*	$(OILREV, M2, REIR) \rightarrow RGDPC$
CPI	0.21951	_	1.00204	4.73576**	0.65216	0.66185	$M2 \rightarrow CPI$
OILREV	1.27895	1.44434	_	0.06565	1.01026	2.14637	
M2	0.06066	3.63895**	3.60923**	_	2.25956	0.33083	$(CPI, OILREV) \rightarrow M2$
IMPORT	3.81717**	1.92830	1.01721	1.39789	_	1.98500	$RGDPC \rightarrow IMPORT$
REIR	1.16600	2.15338	1.76779	1.60249	0.28264	_	

Note: RGDPC represents real gross domestic product per capita, OILREV denotes oil revenue, CPI for consumer price index, IMPORT for import as a percent of GDP, M2 for money supply and REIR for the real interest rate. The asterisk ***, ** and * represent statistical significance of the probability of the estimated F-statistics for the null hypothesis that the independent variable does not granger cause the dependent variable at 1%, 5% and 10% levels of significance respectively.

The error correction model reveals that about 39% of the short-run disequilibrium in the model is expected to be adjusted per annum and this speed of adjustment is found to be highly statistically significant. In the short-run scenario oil revenue, real interest rate and money supply have a positive and significant impact on economic growth

while import has a negative but insignificant impact on economic growth. This further buttresses the role that oil revenue plays in the Nigerian economy. Inflation has a positive but insignificant impact on economic growth in the short-run scenario. We perform a Granger Causality test to ascertain the direction of causality among the variables and the summary of the results is provided in Table 5.

The Granger Causality test results also buttress the significance of oil revenue to the nation's economic growth as both oil revenue and monetary policy indicators are found to be Granger causing economic growth. In addition, contrary to the conception that oil revenue causes inflation, there is no evidence of direct causality between these two variables as only the money supply was found to be granger causing inflation in the economy while both oil revenue and inflation itself are granger causing money supply. Thus, implying that there is a two-way causality between money supply and inflation while there is a uni-directional causality from oil revenue to the money supply. Furthermore, the Granger causality results also show that the size of the economy itself is granger causing the level of import in the economy. Hence, the entire scenario could be a simple reflection of the analogy that the quantity of money supply is often being utilized as more of a tool to manage the inflationary pressure in the economy while oil revenues have been a major driver of the economic growth and expansion that has been stimulating the rise in the aggregate level of imports in the country within the period of the study. However, the instability that is often witnessed in the amount of oil revenue that accrues to the nation due to the volatility of oil prices among other issues in the international oil market raises major concerns on the extent to which the nation can continue to rely heavily on the proceeds from the oil sector as the mainstay of its economic growth. For more robustness checks on our estimates, various diagnostics tests have been carried out on the model and the results are provided in Table 6.

Table-6. Diagnostic test.

Test Statistics	Test Stat	Probability
Breusch-Godfrey Heteroscedasticity Test	0.9805	0.5040
Breusch-Godfrey Serial Correlation LM Test	1.0290	0.3774
Jarque-Bera Normality Test	0.5043	0.7771

The diagnostic results show that our models passed the heteroscedasticity, serial correlation and normality test as the probability value of the F-distribution for these tests lies above the 0.05% level. The plot of the CUSUM test also shows that our model is structurally stable and as such useful for policy direction.

5. CONCLUSION AND RECOMMENDATIONS

We have examined the combined impacts of oil revenue and inflation on the growth of the Nigerian economy as a resource-based economy within the framework of the Autoregressive Distributed Lags models (ARDL). The study utilized time-series data on the country between 1981 to 2017. Some selected monetary policy measures have also been incorporated in the model to fit into the rise in inflationary pressure amidst dwindling oil revenue in

recent times. The empirical analysis from this study provides evidence in support of the high relevance of the oil sector as the real backbone for the growth of the Nigerian economy. This sector has been the major source of revenue for budget finance and also the largest source of foreign exchange that is often needed as a buffer to strengthen the local currency in the wake of rising import bills among other factors. The findings further reveal that money supply and real interest rates have significant positive impacts on economic growth, while inflation and excessive importation, on the contrary, have negative impacts on economic growth for the period that was reviewed.

Oil revenue has been closely associated with the rising inflationary pressure in Nigeria especially in the years after the oil boom era of the 1970s. Based on the available data from the succeeding decade, the empirical findings of this study do not provide direct evidence in support of this view as there is no causality among the two variables. However, money supply which could be influenced by oil revenue has a major direct effect on the level of inflation in the country. Since oil prices are exogenously determined it follows that the amount of oil revenue would also exist mainly as an exogenous factor in the economy. Hence, to ensure stability in the economy, conscious efforts should be made to reduce dependence on the proceeds from the oil sector. We, therefore, recommend that an aggressive diversification program should be mapped out for the nation's economy.

Diversification is paramount for the Nigerian economy in two regards, firstly to boost production efficiency in other sectors of the economy that have been abandoned over the years especially the agricultural and manufacturing sectors. This will help to ensure economic self-sufficiency and reduce the nation's import bill. Secondly, to create sustainable alternative sources of foreign exchange earning to ensure the stability of the local currency that is sometimes susceptible to fluctuations in the international oil markets. In the light of this, more investment should be channeled towards the agricultural sector to cut down the huge import bills on food products and other commodities that the nation has some levels of comparative advantages in producing if all available resources are efficiently utilized. Besides, considering the present realities in the international oil markets and the increasing demand for alternative clean sources of energy with a higher prospect of usage in the future, it appears that the prospect of having another era of a massive windfall from oil price surge is getting slimmer day-by-day. As such, in the interim, we strongly recommend that concerted efforts should be made to save for raining days regardless of how safe the oil market indices might appear to be at the moment.

lastly, the Central Bank of Nigeria (CBN) should keep close tabs on regulating the monetary atmosphere to be able to promptly and effectively mitigate the possible negative effects of inflation in the economy. Based on our findings, it is clear that even if oil revenue and money supply are needed to stimulate economic growth there is still a need to design appropriate policies to contain any attendant inflationary pressure in order to guarantee sustainable growth, especially in the long-run. Our framework in this study can serve as a guide for future studies and the scope of the study can be expanded to incorporate more interesting variables to capture wider cyclical effects when exploring the inflation-growth nexus for other nations.

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