Global Oil Prices Shocks and the Nigerian External Sector: An Empirical Investigation

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Oil price shocks have a stagflationary effect on the macro economy of an oil - importing country. The effect of such shocks is determined by the size of the shock, both in terms of the percentage increase in oil prices and the real price. The dependence of the Nigerian economy on oil makes it susceptible to the vagaries of oil price shocks in the international market. This paper empirically investigated the effects of the cyclical global oil price shocks on Nigeria's external sector using Vector Autoregressive (VAR) model covering the period 2000:Q1 and 2008:Q4. The outcome of the VAR model and Pearson correlation revealed that oil price shocks largely influence the performances of the Nigerian external sector. Reserves (RES) exhibit upward trend right from the first quarter to the sixth quarter. After the sixth quarter it started moving toward the origin. External reserves increased by 0.05 per cent in the third quarter and, thereafter, continued to increase. The positive response of external reserves to oil price shocks persisted in the subsequent quarters. This implies that the level of external reserves was influenced by oil price shocks. However, the response of current account balance to oil price shocks revealed that the current account balance declined by about 0.05 per cent in the eighth quarter and remained negative due to oil price crash in 2008.

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I. Introduction

Primary commodity producing countries most often face large swings in the price of goods they export. Such fluctuations contribute to increased volatility in their revenue profile which eventually affects the growth of output (GDP). Macroeconomic effects of terms of trade shocks can be very significant in developing countries, as documented by Agenor, et al. (2000). These shocks are major sources of aggregate economic volatility and they have large impact on both private and public savings, in part

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because of their large income effects (Agenor and Azenman, 2003). They are also associated with global business cycles manifested by sharp volatility in foreign exchange earnings of primary producing economies such as Nigeria. Such developments usually result in macroeconomic instability, inefficient allocation of resources and low output growth.

Oil price shocks have preceded several global economic recessions notably 1974-1975, 1980-1981, 1990-1991, 2001 and 2007-2009. Oil price shocks may have a stagflationary effect on the macro economy of an oil importing country. The effect of such shocks is determined by the size and persistence of the shock, the dependency of the economy on primary products and the policy response of monetary and fiscal authorities (Roubini and Setser, 2004). The sharp rise in the price of crude oil in the past two years has resulted in positive terms of trade to the oil exporters in emerging markets.

Nigeria is the 8th largest producer of crude oil in the world and the 6th largest producer of natural gas with abundant deposit of solid minerals which are largely untapped, including coal, limestone, marble, columbite, iron ore and gold. The Nigerian economy is largely driven by the external sector, as the share of oil in total exports averaged 92.4 percent between 1990 and 2009. Thus, developments in the global economy such as oil price shocks have serious implications for the economy. In Nigeria, oil receipts constitute more than 75.0 per cent of total revenue, thereby, providing an enormous opportunity for growth. It is evident that at times of high oil prices the accrued revenue promoted higher levels of consumption, which are unsustainable due to the volatile nature of these prices.

Nigeria experienced another oil boom from 2006 – 2008 before the oil price crash, which began in June 2008, among other factors. A major outcome of the boom is an unprecedented growth of stock of external reserves from US$42.3 billion in 2006 to US$53.0 billion at end-December 2008 and subsequent appreciation of the nominal average exchange rate of the Naira to N118.53 per US$1 in 2008 from N132.15 per US$1 in 2005. The boom and burst cycle of the oil sector have serious implications for Nigeria's external sector viability, which is the main focus of the paper.

The main objective of the paper, therefore, is to analyse the implications of global oil price shocks on the external sector for the period 2000Q1-2008Q4 with a view to drawing policy issues for strengthening the external sector. The rest of the paper is divided into five parts. Part 2 presents the theoretical issues and review of relevant literature. Part 3 analyses the trends in selected external sector indicators. Part 4 focuses on the empirical investigation, while Part 5 highlights the lessons for the Nigerian external sector viability. Part 6 concludes the paper and proffers some policy recommendations.

II. Theoretical Background and Literature Review

No country is immune to unexpected external economic shocks which cause fluctuations in national income, output and employment. The term business or economic cycle refers to economy-wide **fluctuations** in production or economic activity over several months or years. These fluctuations occur around a long-term growth trend, and typically involve shifts over time between periods of relatively rapid economic growth (**expansion** or **boom**), and periods of relative stagnation or decline (contraction or **recession**). These fluctuations are often measured using the growth rate of **real gross domestic product**. Despite being termed **cycles**, most of these fluctuations in economic activity do not follow a mechanical or predictable periodic pattern.

A shock is an event that causes an outcome radically different from what was generally expected. In this respect, the global oil shock could be supply, demand or price shocks. There are two types of shock viz: demand and supply side shocks. External demand shocks arise from the economic difficulties of a country's major trading partners. In other words, it is associated with an economy that is largely driven by external sector. Thus, the recession of a trading partner can have serious impact on aggregate exports and imports and could impact on trading performance of its trading partners.

The transmission mechanisms through which oil prices impact on real economic

activity include both supply and demand channels. The supply-side effects are related to the fact that crude oil is a basic input to production and, consequently, an increase in oil price leads to a rise in production costs that induces firms to lower output. The wider impact of a supply-side shock is similarly dependent on how producers and consumers respond to changing economic circumstances. On the other hand, demand shock is a sudden event that increases or decreases demand for goods or services temporarily. A positive demand shock increases demand and a negative demand shock decreases demand. Change in oil prices also affects demand-side through its effects on consumption and investment and, thus, the disposable income. The presence of demand and supply side shocks require the use of appropriate monetary and/or fiscal policy to actively manage aggregate demand and maintain macroeconomic equilibrium.

Cashin and Pattillo (2000) posits that terms of trade shocks tend to last longer for countries with large shares of petroleum imports in total imports since the duration of oil shocks seems to be larger with small shares of non-fuel commodity exports in total exports (because many non-fuel exports are agricultural commodities, which tend to be subject to short-lived, weather-related supply shocks); and whose exports are highly concentrated in commodities subject to long-lived price shocks. Consequently, a country that is an intensive exporter of non-fuel commodities, is a relatively small-scale importer of petroleum products, and will experience short-lived price shocks. Alternatively, oil-exporting countries will typically experience long - lived shocks to their terms of trade, because oil is subject to long-lived price shocks.

Jin (2008) compared the effects of oil price and real effective exchange rate on the real economic activity in Russia, Japan and China using quarterly data on real GDP, the real effective exchange rate and the international price of crude oil from 1999:01 to 2007:04. The study employed a lag augmented vector autoregressive (LA -VAR), VAR and Vector Error Correction (VECM) models to investigate: oil price shock and exchange rate volatility on economic growth, oil price shocks on real GDP and the short-run dynamics or real GDP. He found that oil price increases negatively impacted economic growth in Japan and China and positively

impacted economic growth in Russia. He further pointed out that an appreciation of the real exchange rate led to a positive GDP growth in Russia and a negative GDP growth in Japan and China.

Ito (2008) tested the effect of oil prices on the Russian economy, particularly real GDP and inflation using the VEC model covering the period between 1997:Q1 and 2007:Q4. The study revealed that a 1.0 per cent increase in oil prices contributes to real GDP growth by 0.25 per cent over the next 12 quarters, whereas that to inflation by 0.36 per cent over the corresponding periods. In addition, the study showed that the monetary shock through interest rate channel immediately affects real GDP and inflation.

On the Philippines economy, Raguindin and Reyes (2005) analyzed the effect of oil price shocks on five key macroeconomic variables: real gross domestic product, consumer price index, real effective exchange rates, real wages and money supply using two sets of vector autoregressive (VAR) models - linear and non-linear oil price specifications. The linear VAR model used oil price measured as the log – first-difference of crude oil price while the non-linear VAR model included separate oil price variables for price increases and decreases. Findings from the linear oil price specification (impulse response) revealed that oil price movements caused significant reduction in aggregate output and increased inflation while the variance decomposition showed that crude oil prices significantly contributed to the variability in real GDP and inflation. On the other hand, the non-linear specifications showed a more persistent contraction in economic activity and worsened inflation.

In analyzing oil price shocks on the Nigerian economy, Omisakin (2008) employed the forecast error variance decomposition from the Vector Autoregressive (VAR) model of seven key macroeconomic variables- real gross domestic product, consumer price index, real oil revenue, real money supply, real government recurrent expenditure, real government capital expenditure and real oil price. Annual data for the periods 1970-2005 were employed in the study. The findings

showed that oil price shocks contribution to the variability in the macroeconomic variables were very minimal. The study also pointed out that the variability in the oil price, apart from its own shock, were explained by output and money supply shocks. Omisakin's work focused more on "internal" macroeconomic variables in order to gauge internal balance. This study is in furtherance to his work as it concentrated on the external sector as a complement to the earlier study.

III. Trends in Selected External Sector Indicators

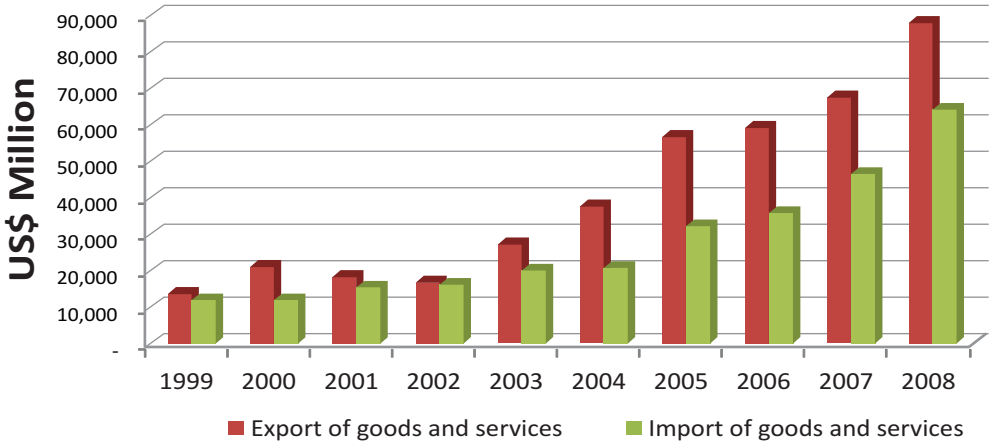
III.1 Developments in the External Sector 1999-2008

The period 1999-2008 recorded appreciable growth in some of the major external sector indicators such as total trade, overall balance of payments, trade openness, foreign exchange reserves, foreign capital flows, current account to GDP ratio, external debt to GDP ratio, external debt stock, external debt service as well as exchange rate. However, most of the indicators plummeted in 2008 owing to the global financial meltdown.

III.1.1 Total Trade

Total trade valued at US$22.22 billion in 1999 rose to US$26.92 billion in 2004 and to US$76.46 billion, US$84.20 billion and US$102.71 billion in 2005, 2006 and 2007, respectively. Export of goods and services averaged US$39.39 billion owing largely to the surge in crude oil prices. The aggregate exports of goods and services in 2007 increased significantly over its level in 2006 from US$61.45 billion to US$71.46 billion following a rise of 13.08 per cent in crude oil exports in 2007. The development was largely due to increased demand for commodities. Similarly, import of goods and services rose by US$24.51 billion between 1999 and 2007. During this period, imports analyzed by end-user category, revealed that capital goods and raw materials were the two largest categories closely followed by consumer goods.

Figure 1: Value of Exports and Imports



III.1.2. Overall Balance of Payments

The favourable development in the international oil market relieved the pressure on the balance of payments. In 1999, the overall balance of payments which recorded a deficit of US$3.547 billion swung to a surplus of US$3.09 billion in 2000 although the surplus shrank to US$0.22 billion in 2001. The surpluses turned to deficits in 2002 and 2003. However, the deficits were reversed and the overall balance of payments resulted in surpluses of US$11.32 billion, US$14.02 billion, US$9.04 billion and US$1.67 billion in 2005, 2006, 2007 and 2008, respectively. This development was largely attributable to the current account surplus reflected in the goods account, particularly oil exports receipts. In addition, invisible inflows particularly home remittances and interest earned on reserves buoyed up the overall balance.

III.1.3 Trade Openness

The total trade as a percentage of GDP (which measures trade openness) was 8.53 per cent in 1999 but rose to 13.27 per cent in 2002. The huge oil revenue inflows further improved the ratio of total trade to GDP to 71.57 per cent in 2005 although this ratio declined to 61.42 and 56.26 per cent in 2006 and 2007, respectively. However, it increased to 68.0 per cent in 2008 reflecting trade liberalization and integration of the economy into the global market.

III.1.4 Foreign Exchange Reserves

The external reserves at US$5.4 billion in 1999 rose to US$7.47 billion, US$16.96 billion, US$28.28 billion, US$42.29 billion, US$51.33 billion and US$53.0 billion during 2003 - 2008. The accretion to external reserves was largely due to the improved performance of the oil sector. The number of months of imports cover which averaged 5.0 months during 1986 -1998 rose to an average of 11.6 months during 1999 - 2007 which exceeded the minimum requirement. The buoyant external reserves necessitated the need for an effective external reserve management which influenced the decision of the CBN to allow the deposit money banks to partner with reputable foreign investment managers to manage a portion of the country's external reserves.

III.1.5 Current Account

The current account deficits recorded in 1998 swung to a surplus from 1999 to 2008. The current account surplus as a ratio of GDP was 1.40 per cent in 1999 but rose to 13.7 per cent in 2003. The current account remained impressive owing to positive developments in the international oil market and huge inward current transfers. In value terms, the current account surplus declined from US$37.23 billion in 2005, to US$28.57 billion in 2006, rose to US$31.19 billion in 2007 and further to US$42.26 billion in 2008.

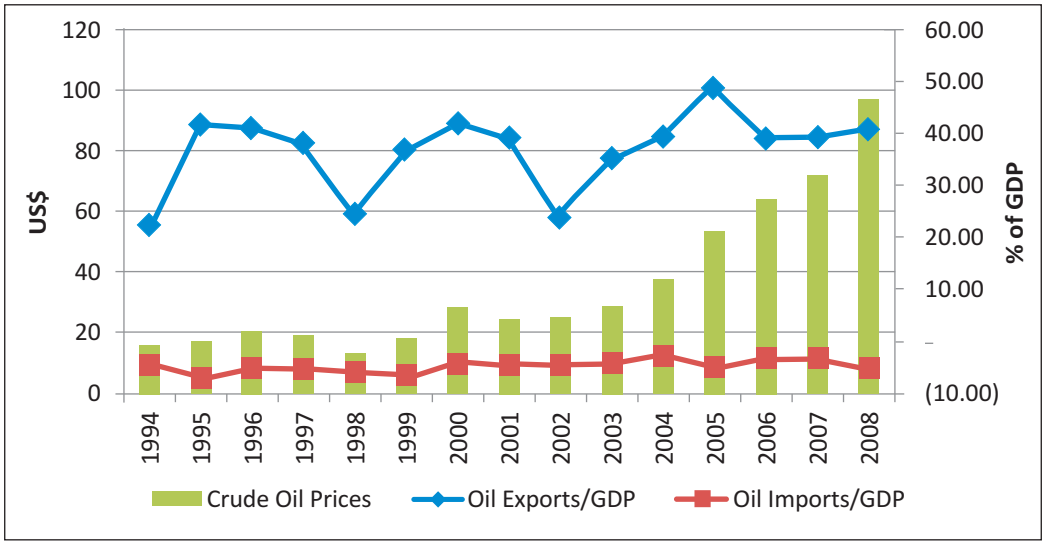
III.1.6 Oil Prices Movements and Selected External Sector Indicators

Oil prices have been found to be more volatile than the prices of any other commodity or asset prices. The recent movement in oil prices can, therefore, be traced to the following factors including the continued crisis in the Middle East, global demand which is influenced by the development in the global scene, emerging markets and developing economies economic growth, supply variations by the members of oil producing countries (OPEC) as well as the crisis in the Niger Delta region of Nigeria. Other factors include gradual erosion of OPEC spare capacity, which incapacitate OPEC to stabilize oil markets and act as a swing producer; shift in the strategy of inventory management by international oil companies - cutting inventories to their lowest level, backwardation (discounting

the value of crude oil in the future); increasing importance of the oil futures market in the current oil pricing system - market expectations about future supply and demand of crude; and deterioration in the quality and timeliness of data on oil-related factors - production and consumption data not ascertained.

Figure 2 reveals that, the Nigerian economy has continued to be more reliant on oil earnings. The oil prices which were US$13.5/barrel in 1994 had risen to US$25.5/barrel in 2000. From 2000 to 2001, oil revenue rose rapidly following increased quota allocation by OPEC, but fell in 2002 as a result of the reduction in OPEC quota. The period 2003 to 2008 witnessed a remarkable improvement in oil revenue due to the persistent rise in the international price of crude oil. From an average price of US$31.16 per barrel in 2003, crude oil price averaged US$38.25 per barrel in 2005 and rose to an average of US$56.97 per barrel in 2006. The price continued its upward trend reaching an average of US$63.28 per barrel and an unprecedented level of about US$98.52 per barrel in 2007 and 2008, respectively. This sky-rocketing oil prices was as a result of the energy crisis and increased demand in the industrial countries. Similarly, the figure reveals that, the contribution of oil export to GDP continued to grow from 22.3 per cent in 1994 to 39.8 per cent by 1996, while oil imports to GDP maintained a low level at 4.7 per cent in 1994 and reduced to 3.4 per cent in 2007.

Figure 2: Crude Oil Prices, Oil Exports and Imports



As the international price of crude oil increases, the earnings from crude oil exports increases leading to robust external reserves and subsequent appreciation of the Naira exchange rate (figure 3). Figure 4 indicates that Nigeria's external sector is wholly driven by trends in the movements in oil prices as current account balance and overall balance of payments depicted same trend with oil prices. This lends credence to the vulnerability of the Nigerian economy to oil price shocks. Therefore, for the economy to grow the dependence on oil exports should be substantially reduced.

Figure 3: External Reserves, Oil Prices and exchange Rate

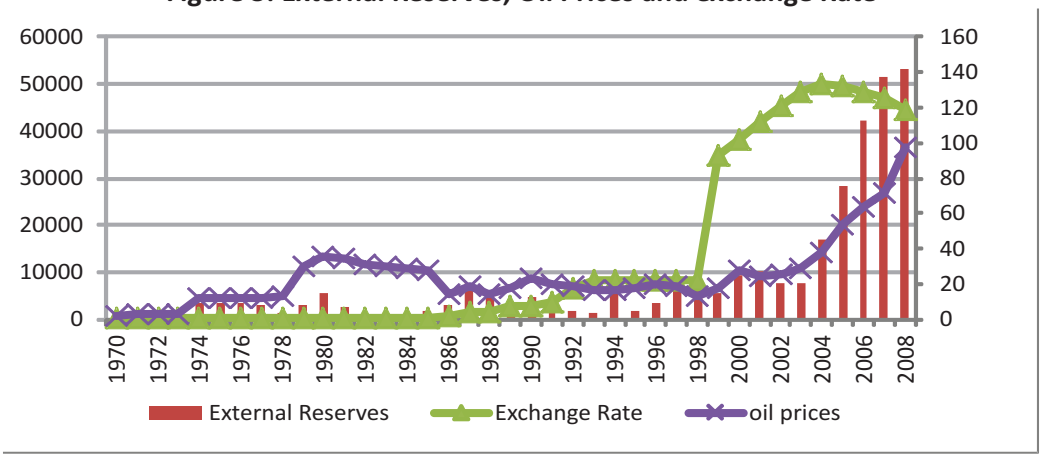
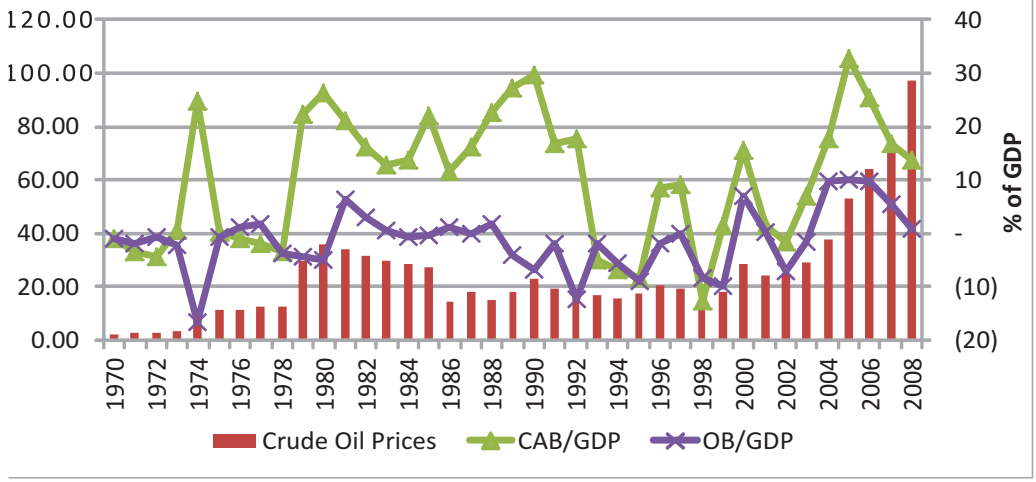


Figure 4: Crude Oil Prices, Current Account Balance (CAB) and Overall Balance (OB)



IV. Empirical Study

IV.1 Methodology

This study empirically investigates the effects of oil price shocks on Nigeria's external sector using the Vector Autoregressive (VAR) model covering the period between 2000:Q1 and 2008:Q4. In order to investigate the effect of oil price shocks on the Nigerian external sector, the study used four variables in their log forms namely: international price of crude oil (OIP), exchange rate (EXR), external reserves (RES) and the current account balance (CAB).

IV.1.1 VAR Framework

The time series analysis employed in the VAR framework, as proposed by Sims (1980), can be written as follows:

$$Y_t = k + A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots + A_p Y_{t-p} + u_t ; u_t \approx i.i.d.(0, \Sigma) \qquad (1)$$

where Y_t is an (n x1) vector of variables, k is an (n x1) vector of intercept terms, A is an (n x n) matrix of coefficients, p is the number of lags, u_t is an (n x1) vector of error terms for t= 1,2,..,T. In addition, u_t is independently and identically distributed (*i.i.d*) with zero mean, *i.e.* $E(u_t)$=0 and an (n x n) symmetric variance-covariance matrix Σ, *i.e.*

$$E(u_t u_t') = \sum \qquad (2)$$

However, if the variables are non-stationary, a vector error correction (VEC) model is generally employed. This is because the VAR in differences contains only information on short-run relationships between the variables. The VEC model developed by Johansen (1988) can be written as follows:

$$\Delta Y = k + \Gamma_1 \Delta Y_{t-1} + \ldots + \Gamma_{p-1} \Delta Y_{t-p+1} + \Pi Y_{t-1} + u_t \qquad (3)$$

Where Δ is the difference operator while denotes an (n x n) matrix of coefficients and contains information that reflects the short-run relationships among the variables. is an (n x n) coefficient matrix decomposed as $\Pi=\alpha\beta'$, where α and β are (n x r) adjustment and co-integration matrices, respectively. VAR results are generally analyzed from three standpoints; the regression output, variance decomposition and impulse response functions. The variance decomposition and

impulse response functions provide information about the relative importance of each random innovation in affecting the variables and the effects of a shock to one endogenous variable on the other variables in the VAR respectively. Gujarati (2003) observed that because VAR uses several lags of the variable, each estimated coefficient will not be statistically significant, possibly because of multicollinearity, but, collectively they may be by recourse to F-statistic and R-square.

The choice of measure of oil price shock has been a matter for empirical discourse over the years. The volatility measure is conditional variance of the percentage of the nominal oil price. The conditional volatility of oil price is extracted and modeled as:

$$Z_t = \sigma \varepsilon_t^{(1/2)} h_t; \varepsilon_t \sim iid(0,1) \quad (4)$$

Where

$$h_{t-1} = \pi h_t + \mu_t - NID(0, \sigma^2 \mu) |\pi| \leq 1 \quad (5)$$

The term σ^2 is a scale factor and subsumes the effect of a constant in the regression of h_t. π_t is a parameter and μ_t is a disturbance term that is uncorrelated with ε_t. ε_t are random disturbances symmetrically distributed about zero. The h_t equation is a transition equation in the autoregressive form where the absolute value of is less than unity to ensure that the process is stationary. Thus, equations (4) and (5) represent the stochastic volatility model that generates the conditional volatility of oil price to be used in the VAR.

IV.2 Empirical Results and Findings

IV.2.1 Unit Root Tests

The unit root tests employing Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) methodologies were used to test the stationarity of the time series data. Consequently, the ADF and PP tests with and without assumptions of significant drift revealed that all the time series were stationary at first difference (Table 1).

Table 1: Unit Root Test

Variables	ADF				PP			
	Without trend		With trend		Without trend		With trend	
	Level	FD	Level	FD	Level	FD	Level	FD
OIP	-1.3222	-3.1639	-2.0325	-2.9856	-1.3811	-2.9065	-2.0019	-2.7785
ER	-2.3318	-3.6489	-1.7731	-3.6651	-2.3134	-3.6679	-1.7855	-3.6600
RES	-0.6531	-3.3420	-1.6651	-3.2432	-0.4104	-3.2111	-1.5331	-3.1016
CAB	2.7825	-5.3636	1.0398	-6.1322	-1.8637	-5.2181	-4.2732	-6.2186

FD=First Difference
McKinnon (1991) Critical Values without trend – 3.6329 (1%), -2.9484 (5%) and -2.6128 (10%)
McKinnon (1991) Critical Values with trend – 4.2528 (1%), -3.5484 (5%) and -3.2070 (10%)

IV.2.2 Correlation Matrix Results

The correlation between oil prices, exchange rate, external reserves and current account balance are presented in table 2. The results show that oil price is positively associated with external reserves and current account balance. Therefore, the result of the correlation is in line with the assertion that oil price shocks impact strongly on oil dependent economies.

Table 2: Pearson Correlation Matrix

	LOIP	LER	LRES	LCAB
LOIP	1.000			
LER	0.249	1.000		
LRES	0.959	0.254	1.000	
LCAB	0.820	0.333	0.770	1.000

IV.2.3 Impulse Response

The estimation of a VAR model requires the explicit choice of lag length. The Akaike Information Criterion (AIC) is used to determine the optimum lag length which selected two lag lengths.

The impulse response functions trace the effect of a one-standard innovation (± 2 standard error) to a variable on the current and future values of the other variables. Figure 1 presents the impulse response functions of the VAR model, indicating the impact of oil price shocks on exchange rate, external reserves and current account balance.

IV.2.3.1 The Response of International Reserves to Oil Price Shocks

The impulse response of external reserves to oil prices shocks indicated that reserves responded in the same direction with oil prices movement. The variable

reserves (RES) exhibit upward trend right from the first quarter to the sixth quarter. After the sixth quarter it started moving toward the origin. External reserves increased by 0.05 per cent in the third quarter and thereafter continued to increase. The positive response of external reserves to oil price shocks persisted in the subsequent quarters. This implies that the level of external reserves was influenced by oil price shocks.

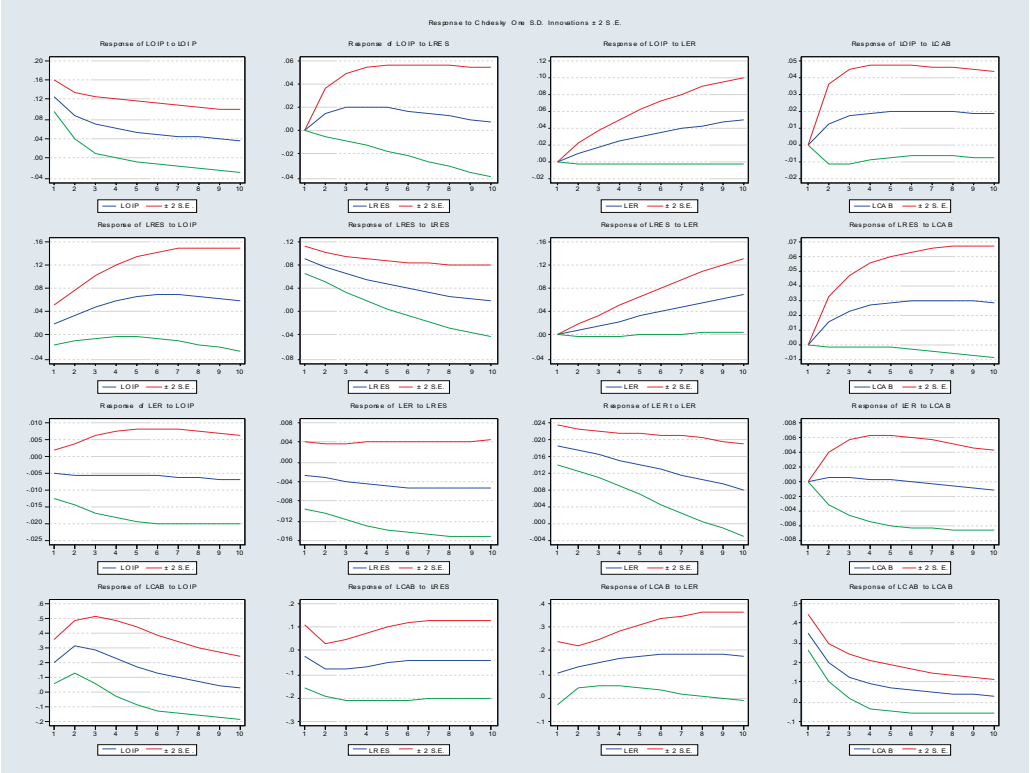
IV.2.3.2 The Response of Current Account Balance (CAB) to Oil Price Shocks

The impulse response of CAB to oil price shocks began from the first quarter. The CAB responded positively to oil price shocks, in a quick fashion, up to the second quarter, before trending down to the origin. The speed of adjustment is one year as the current account position was plunged into deficit after the eighth quarter. In other words, the current account balance worsened by about 0.07 per cent in the eighth quarter. This implies that the current account position reflects developments in the international oil market such that Nigeria attain current account surplus when there was positive terms of trade shocks which corresponded to the period of high prices of crude oil.

IV.2.3.3 The Impulse Response of Exchange Rate to Oil Price Shocks

The result showed that the exchange rate response to oil price shock in Nigeria was in line with theoretical prepositions. The response of exchange rate was according to expectation, because positive oil price shocks that enhanced foreign exchange inflows resulted in the appreciation of the nominal exchange rate. Thus, a one-standard deviation shock in oil prices led to the exchange rate appreciation of about 0.005 per cent in the second quarter before stabilizing in the fourth quarter and later dampened out in the preceding quarters. This showed that exchange rate responds almost instantaneously to oil price shocks. This outcome reflected the recent experience of Nigeria when the country witnessed huge foreign exchange earnings from crude oil exports for the period of 2006Q1 – 2008Q2 owing to the unprecedented high prices of oil in the global market. However, after 2008Q3, the exchange rate depreciated due to the crash in oil prices from US$140 per barrel to almost US$50 per barrel that culminated into lower foreign exchange inflows from oil exports.

Figure 5: Impulse Response Function (IRF)



IV.2.4 Variance Decomposition Interpretation

The variance decomposition analysis is presented in Table 3:

Table 3 Oil Price Variance Decomposition

Period	*SE*	*OIP*	*ER*	*RES*	CAB
1	0.12	100.00	0.00	0.00	0.00
2	0.15	98.14	0.34	0.94	0.56
3	0.17	95.26	1.20	2.12	1.40
4	0.18	92.09	2.59	3.06	2.24
5	0.19	88.89	4.44	3.67	2.98

Exchange Rate Variance Decomposition

Period	*SE*	*OIP*	*ER*	*RES*	CAB
1	0.01	7.10	91.12	1.77	0.00
2	0.02	7.71	89.84	2.40	0.03
3	0.03	8.14	88.61	3.18	0.05
4	0.03	8.59	87.29	4.04	0.05
5	0.03	9.16	85.85	4.93	0.05

External Reserves Variance Decomposition

Period	*SE*	*OIP*	*ER*	*RES*	*CAB*
1	0.09	3.92	0.00	96.07	0.00
2	0.12	9.45	0.38	88.76	1.39
3	0.15	16.81	1.39	78.65	3.13
4	0.17	24.03	3.02	68.31	4.62
5	0.19	29.94	5.20	59.11	5.73

Current Account Balance Variance Decomposition

Period	*SE*	*OIP*	*ER*	*RES*	*CAB*
1	0.42	23.45	6.19	0.26	70.08
2	0.58	40.51	8.27	1.99	49.22
3	0.68	46.99	10.87	2.82	39.29
4	0.74	48.71	13.97	3.15	34.16
5	1.19	48.27	17.34	3.26	31.11

The oil price variance decomposition analysis revealed that the variation in oil price, apart from its own shock is explained to some extent by external reserves. In the fifth period, oil price accounted for 88.8 per cent while external reserves accounted for about 3.6 per cent. Exchange rate contributed 2.5 and 4.4 per cent to the variation in oil price in the fourth and fifth periods, respectively. Current account balance contributed 2.2 and 2.9 per cent in the fourth and fifth periods, respectively. The variance decomposition of exchange rate is largely explained by itself which accounted for 85.8 per cent in the fifth year and by oil price which contributed 9.1 per cent to the variation in exchange rate in the fifth period.

Variations in external reserves are largely explained by itself and variations in oil price. In the fifth period, external reserves accounted for 59.1 per cent while oil price accounted for 29.9 per cent in the variance decomposition of external reserves. Finally, the variations in current account balance, apart from its own shock which accounted for 31.1 per cent in the fifth period is explained by oil price. In the fifth period, oil price shocks contributed 48.2 per cent to variations in the current account balance. This indicates that oil price shocks significantly affects Nigeria's terms of trade.

V. Policy Implications and Lessons for the Nigerian Economy

The results of the VAR model and Pearson correlation have shown that oil price

shocks largely influence the performances of Nigeria's external sector proxied by current account balance, exchange rate and external reserves. For instance, a one-standard deviation shock to the oil price led to an exchange rate appreciation of about 0.01 per cent in the second quarter and this revealed that exchange rate responded almost instantaneously to oil price shocks. The external reserves also increased by about 0.05 per cent in the third quarter and thereafter continued to increase due to the oil price shocks. However, the response of current account balance to oil price shocks revealed that the current account balance declined by about 0.05 per cent in the eighth quarter.

This finding is complemented by the result of the Pearson Correlation analysis which indicated a strong positive relationship between these variables and oil prices. The implication of these results therefore is that unless something is done very quickly to reduce the high dependence on oil, the Nigerian economy will remain susceptible to the vagaries of oil price shocks in the international market. The lesson from this analysis is that the viability of the external sector is contingent upon developments in the global oil market and unless the inflows from the oil exports are judiciously utilized on pro-poor programmes that are in line with the Millennium Development Goals (MDG), growth in the economy may be depressed and the poverty level heightened.

VI. Conclusion and Recommendations

The paper has shown that the viability of the external sector is largely dependent on the developments in the oil sector. This has been empirically proven by the results of the VAR model complemented by Pearson correlation analysis. In order to reduce the dependence on oil there is need to use the petro-dollar receipts to develop infrastructure which has been the bane of the poor performances of the non-oil sector. Provision of adequate infrastructure will also encourage the inflows of foreign capital to bridge the financing gap required for optimal output growth.

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