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## Current Account Balance and Economic Growth in Nigeria: An Empirical Investigation

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## **Current Account Balance and Economic Growth in Nigeria: An Empirical Investigation**

### **Cover Page Footnote**

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# Current Account Balance and Economic Growth in Nigeria: An Empirical Investigation

Sanni, G. K., Musa, A. U. and Sani, Z. \*

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## Abstract

*This study examined the relationship between current account balance and economic growth in Nigeria. Auto Regressive Distributed Lag (ARDL) Bounds Testing methodology was employed to investigate the relationship, using annual data spanning from 1970 – 2016. The study found a long-run relationship between the current account balance, the real gross domestic product (GDP) growth and bilateral real exchange rate in Nigeria. The positive relationship between real GDP growth and the current account balance implies that increase in real GDP growth would lead to an improvement in the current account balance. However, the study found a negative relationship between real exchange rate and current account balance. Depreciation in the exchange rate would lead to the deterioration in the current account balance. This latter result has implications for the CBN's exchange rate management strategy. Specifically, maintaining a stable exchange rate should continue to be a priority for the CBN given the debilitating effect of a depreciating exchange rate on the current account, and by extension, economic growth.*

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**Keywords:** Current Account Balance, Economic Growth

**JEL Classification:** F32, F43

## I. Introduction

In recent times, the current account balance, and its effect on economic growth, have been at the centre of debate among policy makers, due to the growing global imbalances, particularly with the United States of America, recording persistent current account deficit while China is recording sustained current account surplus. The current account plays an important role in long-term economic growth, especially for the developing countries, due to the importance of trade as a major source of foreign exchange earnings. The dependence of developing countries on international trade has increased over the years due to: the increase in trade openness; advancement in information and communication technology; global paradigm shift to trade; commodity price boom; and the increasing role of developing countries in the global economy (Moussa, 2016).

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Empirical studies had established a positive relationship between real output growth and current account balance (Osakwe and Verick, 2007). This suggests that policy makers should be interested in the drivers of current account balance for policy adjustment to correct undesirable effects. It is equally important for a country to take advantage of the opportunities provided by global trade to improve the general well-being of the populace.

The sustainability of current account balance or imbalance is an indicator, which provides information on the state of the economy, the level of productivity, and the extent of the susceptibility of the economy or otherwise to external shocks that could trigger economic crisis.

Nigeria is one of the countries whose current account position should be a source of concern to policy makers. This is because the Nigerian economy is external sector driven, which suggests the dependence of the economy on external sector to generate foreign exchange to import capital goods for increased economic activities in the real sector. In addition, export proceeds, particularly from oil, have constituted more than 60.0 per cent of government revenue in the last two decades. Thus, the capacity of the government to provide good infrastructure, such as road network, railway and stable power supply, has a direct link on performance of the external sector of the economy.

Thus, a study on Nigeria's current account balance and economic growth is desirable to establish their relationship and highlight the policy issues required to put the economy on a sustainable economic growth trajectory. Consequently, this paper seeks to empirically investigate the relationship between current account balance and economic growth in Nigeria, and highlight policy issues to improve current account balance in Nigeria. This study contributes to the literature by examining the relationship between current account and economic growth on country-specific basis, as most literature focused on cross-country, regional and global studies, whose findings could not be applied to country-specific issues.

Following the introduction, are the conceptual and theoretical issues in Section 2. Section 3 surveys the empirical literature, while stylised facts on current account and economic growth in Nigeria are presented in Section 4. Section 5 discusses empirical analysis, findings and policy implication, while Section six concludes the paper with useful recommendations to guide policy on current account and economic growth in Nigeria.

## **II. Literature Review**

### **II.1 Conceptual Issues**

The current account balance measures the inflow and outflow of goods and services as well as investment incomes (primary and secondary), unrequited transfers and compensation of employees, usually in domestic currency. It is one of the two major accounts in the balance of payments account.

The current account balance mirrors a country's performance in foreign trade in goods and services and could be in surplus or deficit. A surplus position indicates that a country is exporting more goods and services than is importing; while a deficit shows that a country's import from the rest of the world exceeds its exports. Current account balance can also be expressed as the difference between national savings and investment, known as the savings-investment gap. In other words, it is the difference between income and absorption in the economy. In this case, a country is said to have a deficit in current account if it is absorbing more than it produces; indicating that the country's greater portion of domestic investment is financed by foreign savings. It signifies low levels of national savings, which triggers depletion of external reserves for financing economic activities. On the other hand, a country is said to have a current account surplus, if it is producing more than it absorbs. This reflects a high level of national savings relative to national investments.

The current account balance is an important indicator of competitiveness. The balance is used by international creditors, to determine the creditworthiness of a particular economy. It guides investment decisions of non-residents as it helps to gauge the viability of the economy, assists policymakers to determine the efficacy of macroeconomic policies, especially growth-stimulating and export promotion policies. It also, shows, at a glance, which sector of the economy deserves attention. However, an evaluation based on the robustness of the current account position is necessary but not sufficient to determine sustainability because of the specific characteristics of different economies. What is sustainable for one economy may not be sustainable for others. Studies have been conducted to develop other measures of sustainability, such as solvency and excessiveness of current account (Aysu and Fazil, 2012).

However, the key measure of the overall health of an economy is the size and direction of its economic growth, often measured by the change in GDP from one period to another. Economic growth can be defined as the increase in goods and services produced by an economy or a nation within a given or measurable period of time. It is a positive and sustained increase in aggregate goods and services produced in an economy within a given period. The gross

domestic product (GDP) is used to proxy for economic growth; and when it is adjusted for inflation, it is called the real GDP, which stands as a value for all final goods and services produced in a country.

## II.2 Theoretical Framework

The Absorption Approach to balance of payments serves as the main approach to understanding the relationship between current account and economic growth. The approach views the Balance of Payment (BOP) from national income perspective, highlighting those changes in domestic spending relative to domestic absorptive capacity, that affect the trade balance of a country. Therefore, trade balance is viewed as the difference between goods and services produced and consumed in the economy. The relationship between aggregate income and demand, and the external current account balance is expressed in the following equations:

$$\text{Gross domestic product: } GDP = C + I + (X - M) = A + (X - M) \quad (1)$$

$$\begin{aligned} \text{Gross national income: } GNI &= GDP + Yf \\ &C + I + (X - M + Yf) = A + (X - M + Yf) \end{aligned} \quad (2)$$

$$\begin{aligned} \text{Gross national disposable income: } GNDI &= GNI + TRf \\ &C + I + (X - M + Yf + TRf) \\ &A + (X - M + Yf + TRf) \end{aligned} \quad (3)$$

$$\begin{aligned} \text{Hence: } GNDI - A &= X - M + Yf + TRf \\ CAB & \end{aligned} \quad (4)$$

$$\begin{aligned} \text{Since: } GNDI - C &= S, \text{ by definition,} \\ \text{and: } GNDI - C &= I + X - M + Yf + TRf, \text{ from (3)} \\ \text{it follows that: } S - I &= X - M + Yf + TRf = CAB \end{aligned} \quad (5)$$

where:

A = Domestic absorption ( $A = C + I$ ) or domestic demand

X = Exports of goods and nonfactor services

M = Imports of goods and nonfactor services

Yf = Net primary income from abroad

TRf = Net secondary income from abroad

C = Final consumption

I = Gross investment (including changes in inventories)

S = Gross national saving

CAB = Current account balance

Source: IMF Institute (2001): Financial Programmings and Policies, *Institute of capacity Development*, IMF, Washington, DC.

Equation (5) shows that trade balance or current account balance is the difference between national income and domestic absorption. Whenever national income exceeds domestic absorption, the trade balance is expected to be in a favourable position, as there will be excess of export over import. The reverse will be the case whenever national income is less than domestic absorption, as import will exceed export, thereby resulting in a deficit trade balance.

Finch and Michalopoulos (1988) threw more light on the link between foreign trade and economic growth. According to them, the nexus between trade and economic growth is not only a demand-driven link, whereby increased export stimulates income and output to the rest of the economy, effective participation in international trade also encourages a more efficient utilisation of resources and greater growth in productivity in the entire economy. More so, open trading policies permit quicker adaptation to new technologies and greater flexibility in responding to international economic developments.

### **II.3 Empirical Literature Review**

Studies have focused on current account balance and its effect on economic growth due to the growing global imbalances. Yurdakul and Ucar (2015) explored the relationship between the current account deficit and economic growth in Turkey using Granger causality and VAR analysis. The paper showed that economic growth induced an increase in current account deficit, thus establishing an inverse relationship between economic growth and balance of payment. It also establishes a unidirectional correlation from growth rate to current account deficit, using the Granger causality test. Also, the impulse-response functions obtained through VAR analysis revealed a negative response of the current account to a shock one standard deviation to the growth rate variable, which persisted for ten periods.

Akbas et al. (2014) analysed the relationship between economic growth, current account deficit, and short-term capital flows in emerging market economies using panel data. They found a causal relationship among the variables, with bidirectional causality between economic growth and current account deficit; and a unidirectional causality from short-term capital flows to current account deficit and GDP. Their result also established a relationship between current account deficit and GDP in emerging markets. This was found to be consistent with a study by Bagnai and Manzcchi (1999) that established an inverse relationship between current account deficits and a set of macroeconomic variables, using panel-data regression technique on 49 developing countries. In their study of over 20 developed countries, covering the period between 1971

and 1993, Debelle and Faruqee (1996) showed that there was a causal relationship between economic growth and current account deficit.

Hepaktan and Cinar (2012) used a panel data co-integration analysis to establish the relationship between economic growth and current account deficit in 27 OECD countries. Their result established a co-integration and a long-run relationship between economic growth and current account deficit. Telatar and Terzi (2009), Yilmaz and Merter (2011) and Kostakoğlu and Dibo (2011), used Granger causality and VAR analysis to test the relationship between economic growth and current account deficit in Turkey. Their findings confirmed that a negative relationship exists between the two variables. They further found a unidirectional causal relationship from gross domestic product to current account deficit. Even for countries with large and persistent current account surpluses like China and other Asian countries, it was established that maintaining high current account surplus could be detrimental to economic growth (Park and Shin, 2009).

Erbaykal (2007) examined the causality between the current account deficit, economic growth and exchange rate in Turkey, using Toda Yamamoto causality analysis. His result showed causality from both economic growth and exchange rate to current account deficit. Aristovnik (2007) used a dynamic panel regression technique to determine the short- and medium-term linkages between current account balance and other variables in the Middle East and North Africa (MENA). His result showed that higher GDP growth impacted positively on the current account balance. His findings were contrary to the theoretical expectations of an inverse relationship between economic growth and current account deficit. Herwartz and Siendenburg (2007) employed panel data econometric technique to identify the determinants of current account balance in sixteen (16) Organisation for Economic Cooperation and Development (OECD) countries. They found domestic output as a significant determinant of current account balance. Other determinants included lagged current account balance, fiscal balance, and terms of trade.

Kandil and Green (2002) used co-integration analysis to examine the relationship between the US current account deficit and economic growth. They found that changes in real GDP affected current account deficit in the US and confirmed the existence of a long-run relationship between real GDP and current account deficit. They found that higher growth rates had a negative effect on current account balance. This was in line with the findings of Chinn and Prasad (2003) and Freund (2000) whose results found that strong economic growth worsened current account balance. Calderon et al. (2000) investigated the linkage between current account deficit and some economic variables in 44

developing countries using panel data analysis and generalised moment methods (GMM). Their result indicated that increase in domestic output growth rate had the effect of widening current account deficit. They linked the development to higher correlation with investment rate, which worsened current account deficit.

Studies on Nigeria focused mainly on examining the determinants and sustainability of current account balance. Adedeji (2001) examined the excessiveness and sustainability of the Nigerian current account imbalance using the inter-temporal model of the current account and macroeconomic indicators. He found that the Nigerian economy appeared to satisfy the inter-temporal budget constraint during the period of excessive current account deficit, characterized by macroeconomic instability and structural weakness. Idowu et al., (2012) examined the nexus between the fiscal and current account deficits in Nigeria, using Granger causality and VAR techniques. The paper found that current account deficits influenced fiscal balance in Nigeria because of the over reliance of the Nigerian economy on foreign exchange resources from oil proceeds for financing development.

Oshota and Adeleka (2015) studied the determinants of current account balance in Nigeria, Ghana, and Cote d'Ivoire, using the VAR approach. They found real income to be significant in explaining the current account balance. In addition, their result established a long-run relationship between real income and current account balance in all the three countries. Oshota and Badejo (2015) used Panel ARDL to estimate the long-run relationship between current account balance and its key drivers in West African states. Their result showed that GDP impacted positively on the current account balance in the long-run.

### **III. Current Account Balance and Economic Growth in Nigeria**

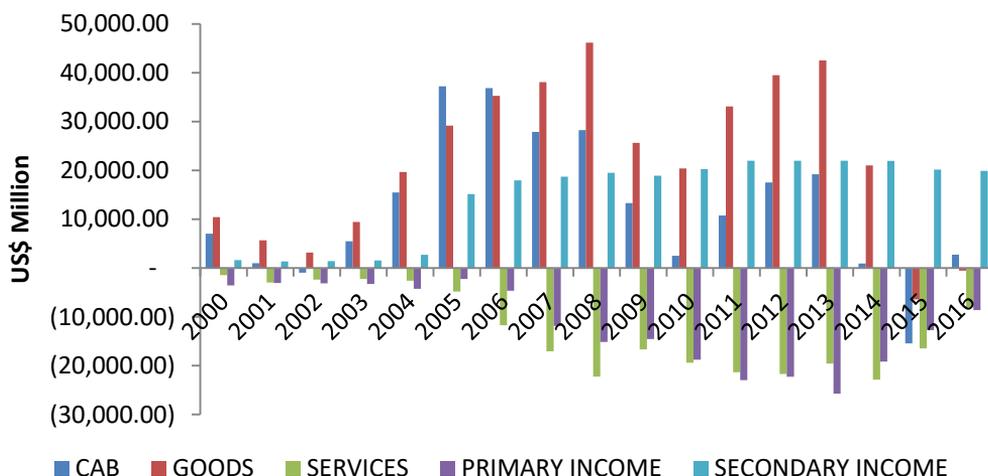
#### **III.1 Current Account Balance**

In accordance with the 6<sup>th</sup> IMF manual on balance of payment, Nigeria's current account balance is made up of four sub-accounts: the goods account, services account, primary and secondary income accounts. The current account position has been influenced, largely by the balances in the goods and the secondary income accounts.

The trend in current account balance showed mixed developments. While the account was in deficit during most of the periods before the 2000s, it recorded surpluses for most of the periods succeeding year 2000 except for 2015. The surplus or deficit presentation is influenced largely by developments in global oil market in terms of the prices and output. Nigeria's current account are in surplus

when there are favourable developments in the global oil market. This has been the trend during the period of high crude oil prices. The deficits or lower surpluses in current account had been the trend during low prices. In addition, the huge inflow of workers remittance from Nigerians in the diaspora in the 2000s influenced the favourable position in the current account. Other factors are favourable macroeconomic environment and global economic conditions.

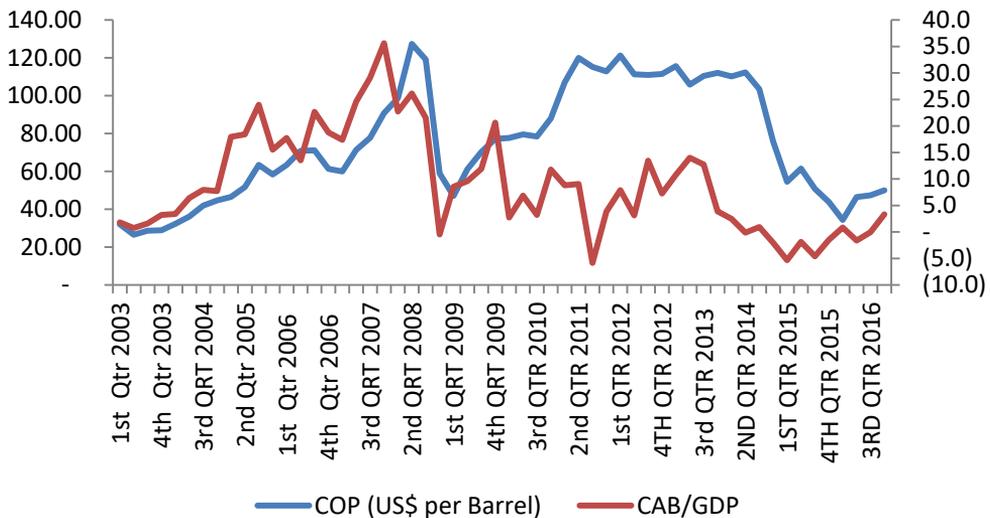
**Figure 1: Nigeria's Current Account Composition (2000-2016)**



Source: CBN

In value terms, the current account recorded net surplus ranging from US\$7.01 billion in 2000 to US\$25.57 billion in 2005 and further to US\$29.34 billion in 2008. However, with growing import bills and higher net deficits in the services and income accounts, as well as the declining value of exports, the surplus in the current account declined to US\$10.75 billion in 2011. It further fell to US\$1.28 billion in 2014, but swung into a deficit of US\$15.44 billion in 2015, as a result of the slump in crude oil prices at the international market which adversely affected the performance of exports. The current account rebounded, however, to a surplus of US\$2.72 billion in 2016, attributable to lower import bills on goods and services, and a reduction in deficit in the income account.

**Figure 2: Current Account (as a Percentage of GDP) and Crude Oil Prices (US\$)**



Source: CBN

The trade balance has been in surplus due to the overwhelming influence of oil exports on imports. The non-oil export has remained very low because it is largely comprised of primary products which are not competitive in global trade. In addition, imports have been on the increase until recently in 2015 when deliberate effort was made, by the government, to reduce imports bills, due to dwindling foreign exchange reserves. Imports had trended upward from US\$8.72 billion in 2000 to US\$17.24 billion in 2005 and further to US\$40.10 billion in 2008. It further increased to US\$66.78 billion in 2011, but declined to US\$61.59 billion in 2014 and further to US\$52.33 billion and US\$35.24 billion in 2015 and 2016, respectively. Further analysis revealed that capital goods import averaged 61.0 per cent between 2011 and 2016, while consumer goods import averaged 25.2 per cent for the same period. Although the composition of import is dominated by capital goods and raw materials, the somewhat huge bill on consumer goods has been a drag on the growth of the Nigerian economy.

Further analysis indicated that Nigeria has been a net importer of international services. The services account was in deficit throughout the study period, recording US\$1.47 billion, US\$3.15 billion, US\$22.25 billion, US\$22.86 billion, US\$16.45 billion and US\$8.01 billion in 2000, 2005, 2008, 2014, 2015 and 2016, respectively. The development is an indication that the participation of Nigerians in the services sub-sector is very low, due to lack of qualitative education and technological advancement required for the economy to effectively compete in trade in international services. Disaggregation of service payments indicated that freight charges and foreign travels remained dominant, due to the

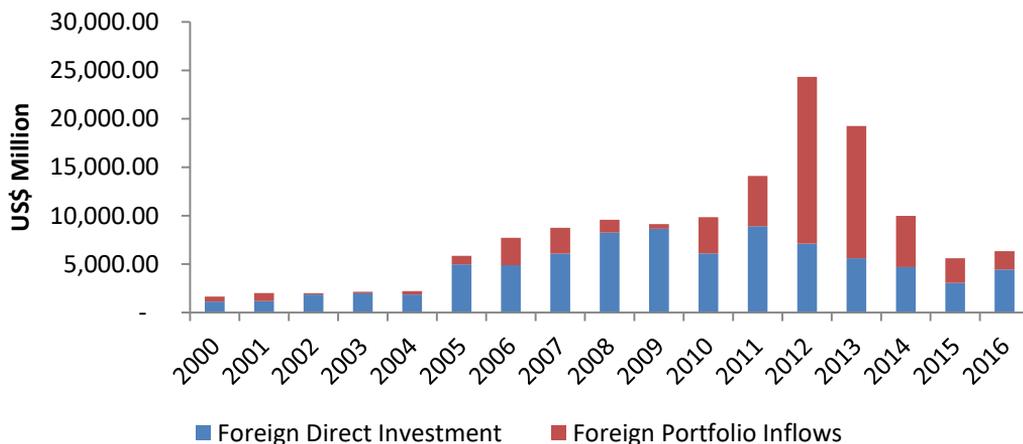
increased volume of import over the years; low level of participation of domestic carriers in freight business and increased volume of both personal and business travels, particularly in respect of health and education.

The primary income account has also been in deficit due to increased debt service payments and remittances of dividend, income and profits by foreign-owned companies. The huge outflow constitutes a drag in the development of the account and undermines the productivity of the real sector as foreign exchange resources, which ought to have been used to develop the economy are used to service external debt. In addition, the profit, which ought to have been ploughed back to generate increased economic activities, is being remitted to overseas countries by foreign-owned companies in Nigeria. The net deficit in the income account grew over the years, increasing from US\$3.57 billion in 2000 to US\$5.37 billion, US\$15.15 billion, and US\$22.97 billion in 2005, 2008 and 2011, respectively. It, however, declined to US\$19.16 billion, US\$12.71 billion and US\$8.62 billion in 2014, 2015 and 2016, respectively, due to lower out-payments of dividends and distributed branch profit and other interest payments.

The secondary income or current transfers account witnessed significant improvement since the liberalisation of the foreign exchange market in 1986. This was as a result of the huge inflow of workers remittances from Nigerians in the diaspora. In the last decade, Nigeria has remained within the top ten remittance recipient countries, globally, with an average of US\$19.50 billion between 2006 and 2015. The sustained inflow of home remittances could be attributed to the sound and stable macroeconomic environment and improvement in the payments system driven by advancement in information technology.

The current account balance has been financed by an inflow of foreign capital in the form of direct investment, portfolio and other investment liabilities. Figure 3 showed that inflow of foreign direct investment has continually been reducing, reflecting unsavory development in both global and domestic economies.

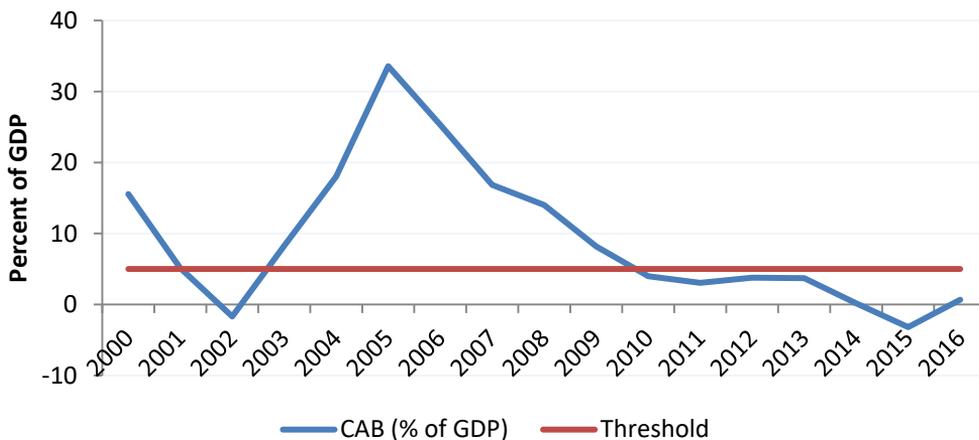
**Figure 3: Foreign Direct and Portfolio Investment Flows (US\$ Million)**



Source: CBN

Nigeria's current account balance has been sustainable over the years as the balances fell within the sustainable threshold of 5 per cent of GDP though there were periods of excessive current account surplus as indicated in Figure 4.

**Figure 4: Sustainability of Nigeria's Current Account Balance**



Source: CBN and Authors Computation

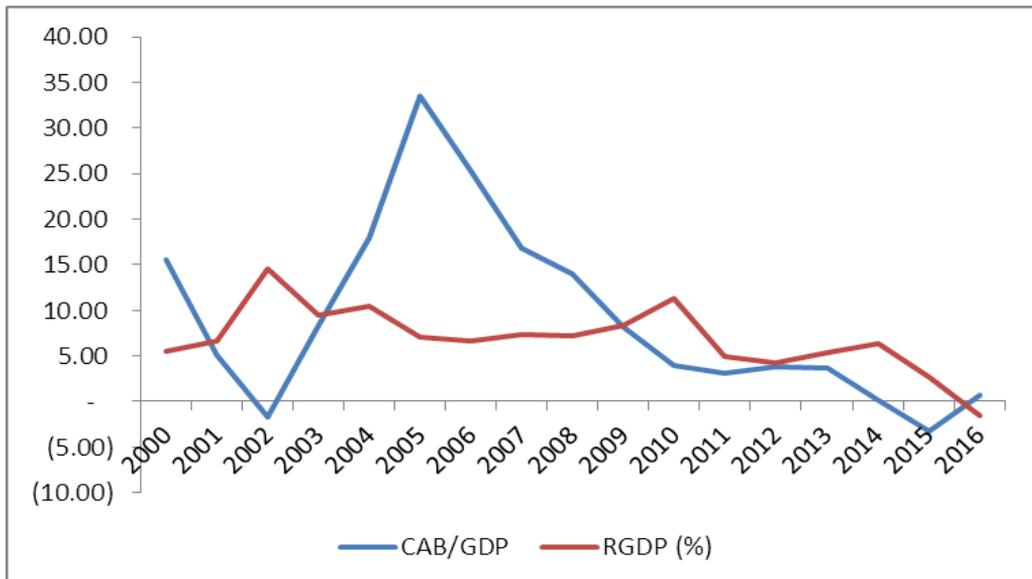
### III.2 Current Account Balance and Economic Growth in Nigeria

The trend in output growth showed that the real GDP had been positive until 2015 when it contracted to negative 0.7, 2.1, 2.24, and 1.7 per cent in Q1, Q2, Q3 and Q4 2016, respectively. The trend in real GDP has been influenced largely

by the performance of the non-oil GDP, including the agriculture, industry, trade, services and communication. Nigeria recorded highest growth rates of 14.6 and 11.3 in 2002 and 2010, respectively, and had the least growth of 2.7 per cent in 2015 before slipping into recession in 2016.

The relationship between current account balance and economic growth in Nigeria tend to be inverse with lower growth rates in times of high current account surplus (see Figure 5). For instance, in 2000, current account surplus as a percentage of GDP was high at 14.3 per cent, while real GDP growth rate of 5.5 per cent was recorded during the same period. However, in 2002, when current account deficit of 3.4 per cent of GDP was recorded, a real GDP growth rate of 14.6 per cent was recorded. In addition, in 2005, a current account surplus of 27.3 per cent of GDP was recorded, while real GDP growth rate was only 7.0 per cent during the same period. Furthermore, as current account surplus to GDP ratio declined to 3.6 per cent in 2010, real GDP growth increased to 9.5 per cent. By 2014 when current account surplus as a share of GDP was 0.2 per cent, real GDP grew to 6.2 per cent. This development could be attributed to high level of importation of goods and services for development, which stimulated aggregate domestic demand and, by extension, increased the level of economic activities.

**Figure 5: Current Account Balance (Percentage of GDP) and Real GDP Growth Rate**



Source: CBN Annual Report (Various Issues)

## IV. Empirical Analysis

### IV.1 Data and Variables

The current account balance has already been defined in this study as the net flow of goods (trade balance), services, income and current transfers. These flows mirror productive economic activities in the real, financial and fiscal sectors of the economy. It is hypothesized in this study that a relationship exists between the growth of economic activities in the domestic economy and the current account balance.

Therefore, two key variables, namely: the growth rate of real GDP and the current account balance; and one control variable, representing the real exchange rate (the naira-US\$ bilateral real exchange rate is used as a proxy) was used to estimate the hypothesised relationship. Table 1 presented the variables and their definition.

**Table 1: Variables and Definitions**

VARIABLE	Symbol	Definition
<b>Current Account Balance</b>	<i>cab_gdp</i>	Nigeria's Current Account Balance-GDP ratio
<b>Real GDP Growth</b>	<i>gdp_real_g</i>	The Growth Rate of Nigeria's Real GDP
<b>NGN-USD Bilateral RER</b>	<i>rer_nig</i>	Nigeria-US Bilateral Real Exchange Rate

The series were transformed as follows:

Real GDP growth was computed as a percentage as:

$$gdp\_real\_g = (((gdp\_real)/(gdp\_real(-1) )) - 1) \cdot 100 \quad (6)$$

The current account variable was computed as the ratio of the current account balance and the GDP, while the NGN-USD bilateral exchange rate variable was calculated using the following formula:

$$rer_{a,f} = (e_a * \delta_f) / \delta_a \quad (7)$$

Where:

$rer_{a,f}$ ,  $e_a$ ,  $\delta_f$  and  $\delta_a$  represented bilateral real exchange rate (NGN-USD), domestic nominal exchange rate (NGN-USD), foreign (US) GDP deflator and domestic (Nigeria) GDP deflator, respectively. The study employed annual data spanning, 1970 – 2016. The GDP and GDP deflator data were sourced from the world development indicators (WDI) database of the World Bank, while the

current account balance and the exchange rate data were obtained from the International Financial Statistics (IFS) database of the IMF.

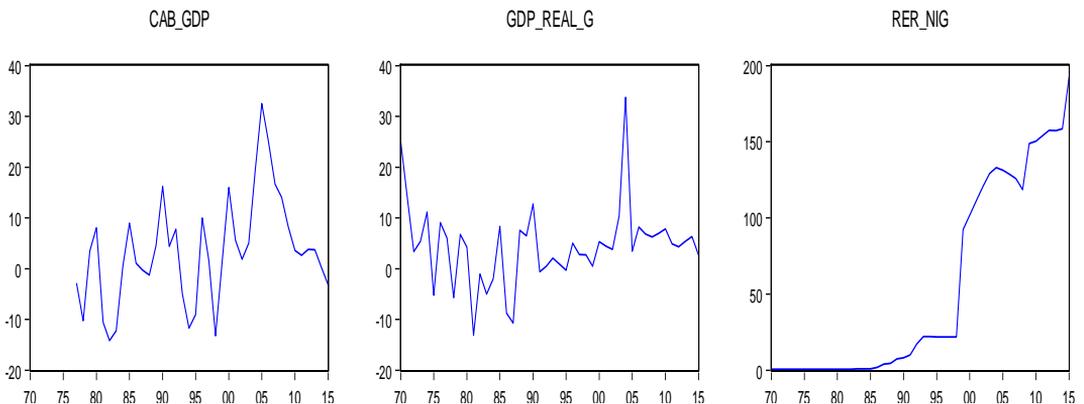
## IV.2 Pre-Estimation Analysis

This section analysed the properties of the series, beginning with a visual inspection. It also analysed the moments, and compliance with the normal probability distribution of the series. Unit root tests and tests for breaks were carried out. The purpose of these is to guide the choice of assumptions, while estimating the model.

### IV.2.1 Graphical Analysis and Breakpoints

Figures 6a, 6b and 6c show the graphs: current account balance, real GDP growth rate and NGN-USD bilateral real exchange rate. A cursory examination of the current account balance (Figure 7a) revealed no clear breaks, as the variable appeared to oscillate around a constant non-trending straight line. However, it was possible that a non-zero intercept exists. The real GDP growth rate (Figure 6b) displayed similar characteristics, with the current account balance, but a clear outlier in 2005.

**Figure 6 (a-c): Graphs of Current Account Balance, Real GDP Growth and Bilateral Real Exchange Rate**



The real exchange rate, however, showed a clear upward trend and a sharp exponential-type jump in 1998. This constituted a structural break, arising from the decision, in January 1999, to abandon the dual exchange rate in favour of a market-driven exchange rate regime. A unit root test with break would shed more light on that.

## IV.2.2 Data Description

Table 2 presented the descriptive statistics, namely: current account balance, real GDP growth rate and NGN-USD bilateral real exchange rate. All the three variables seemed to exhibit large variation around their respective means, with the real exchange rate having the highest at 66.28. However, the large standard deviation of real exchange rate may not be unconnected with the policy shift in 1999 which led to the abandonment of the dual exchange rate system in favour of a market-driven one. This led to a sharp rise in the exchange rate from about ₦22 to about ₦92/US\$1 with the steady upward trend maintained to the end of the sample period. A sub-sample analysis revealed that the period 1970 – 1997 had a standard deviation of just 8.99 with a mean of 8.04, while the period 1998 – 2016 showed a standard deviation of 36.02 with a mean of 129.61. This clearly pointed to the volatility associated with the latter part of the sample after the collapse of the dual system. Thus, this variable was subjected to a breakpoint unit root test.

**Table 2: Summary Statistics**

Series	cab_gdp	gdp_real_g	rer_nig
Mean	3.38	3.58	64.15
Standard Deviation	10.45	7.44	66.28
Skewness	0.50	1.14	0.40
Kurtosis	3.39	8.77	1.44
Coefficient of Variation	3.09	2.08	1.03
Jarque-Bera Prob.	0.39	0.00	0.08

Source: Authors Computation

Despite the significance of the four degrees of moments of the series and the useful information they contained, the Jarque-Bera probabilities, which store approximate information about the moments, gave an indication of the likely probability distribution of the variables. Using a null hypothesis of normal distribution at 5 per cent level of significance, the current account balance had a probability of 0.39, indicating that the series was drawn from a normally distributed population. The exchange rate, despite its wide variability, also followed a pattern, at 0.08 similar to the current account balance. The real GDP growth rate, however, had a probability of 0.00, suggesting that the variables were not drawn from a normally distributed population. This result could have been influenced by the high kurtosis value of 8.77, revealing the fact that growth rates in Nigeria, over the sample period, were often clustered.

### IV.2.3 Correlation Matrix

A look at the possible paired association in the variables was conducted, using the Spearman Rank-order Correlation (SRC) coefficient. The ability of the SRC to apply the ordinary correlation to a rank-transformed data made it more robust than the latter, and such a simple analysis is expected to shed some light, albeit not conclusive, on the possible apriori expectations for the coefficients of the models. Table 3 below presented a summary of the SRC coefficients.

**Table 3: Correlation Matrix**

Pair	SRC Coefficient	t-Statistic	Probability
<i>gdp_real_g, cab_gdp</i>	0.64	5.04	0.00
<i>rer_nig, cab_gdp</i>	0.34	2.17	0.04
<i>gdp_real_g, rer_nig</i>	0.39	2.59	0.01

Source: Authors Computation

The correlation between real GDP growth rate and the current account balance was 0.64, indicating that real growth and the current account balance co-moved in the same direction, while that of real GDP growth and the real exchange rate was 0.39. The sign of the coefficient of the pair of real exchange rate and the current account balance was, however, positive; one would have expected a negative correlation between the two.

### IV.2.4 Unit Root Test

In this section, a unit root test was conducted to ascertain the stationarity properties of the series using the Augmented Dickey Fuller (ADF) test. Table 4 below presented the results of the ADF tests.

**Table 4: Unit Root Test**

Variable	Obs	Test (Assumptions)	Statistic	5% CV	Prob.	Conclusion
<i>cab_gdp</i>	38	ADF (Constant)	-2.99	-2.94	0.04	I(0)**
<i>gdp_real_g</i>	45	ADF (Constant)	-5.78	-2.92	0.00	I(0)*
<i>rer_nig</i>	36	Breakpoint ADF (Intercept)	-6.70	-4.44	0.00	I(0)*

Note: \*, \*\* & \*\*\* = 1%, 5% & 10%. Conclusion was based on 5% level of significance.

Source: Authors Computation

The null hypothesis of a unit root in the series was rejected at the 5 per cent and 1 per cent levels of significance for the current account balance and the real

GDP growth rate, using the ADF. Furthermore, the test for the NGN-USD bilateral real exchange rate failed to reject the null. Recalling that the visual inspection of the data and the analysis of its moments had revealed a possible break at around 1998/1999, a breakpoint unit root test was further conducted on the data. The result indicated that, based on a break date of 1998, the series was, in fact,  $I(0)$ .

## V. Methodology

### V.1 Choice of Methodology

The pre-estimation analysis carried out this far, indicates, that the real GDP growth and exchange rate were  $I(0)$  based on the ADF. However, the divergence in the two tests on the current account balance suggested an inconclusive unit root property of the series. Pesaran, Shin and Smith (2001), in formulating the ARDL methodology, argued that the ARDL is suitable for establishing a relationship in levels, where such inconclusive unit root tests occur and that the method is applicable irrespective of whether the underlying regressors are purely  $I(0)$ , purely  $I(1)$  or mutually co-integrated. The general ARDL specification was given as:

$$y_t = \alpha + \sum_{i=1}^p \gamma_i y_{t-i} + \sum_{j=1}^k \sum_{i=0}^{q_j} X'_{j,t-i} \beta_{j,i} + \epsilon_t \quad (8)$$

Where:

$y_t, y_{t-i}$  = dependent variable and its lags.

$X_j$  = matrix of regressors.

$\gamma_i, \beta_j$  = vectors of coefficients.

$\epsilon_t$  = error term.

$\alpha$  = constant term.

$i = 1, 2, \dots, p$ .

To estimate the co-integrating relationships, the co-integrating regression form of the ARDL model was obtained by transforming the general specification for Equation (8) to specific equation in Equation (9):

$$\Delta y_t = -\sum_{i=1}^{p-1} \gamma_i^* \Delta y_{t-i} + \sum_{j=1}^k \sum_{i=0}^{q_j-1} \Delta X'_{j,t-i} \beta_{j,i}^* - \hat{\theta} EC_{t-1} + \epsilon_t \quad (9)$$

The Bounds test procedure transformed Equation (8) to the following representation:

$$\Delta y_t = -\sum_{i=1}^{p-1} \gamma_i^* \Delta y_{t-i} + \sum_{j=1}^k \sum_{i=0}^{q_j-1} \Delta X'_{j,t-i} \beta_{j,i}^* - \rho y_{t-1} - \alpha$$

$$- \sum_{j=1}^k X'_{j,t-1} \theta_j + \epsilon_t \quad (10)$$

The test for the existence of the level relationship is then simply a test of the null hypothesis that:

$$\begin{aligned} \rho &= 0 \\ \theta_1 &= \theta_2 = \theta_3 = \dots = \theta_k = 0 \end{aligned}$$

## V.2 Granger-Causality Test

As earlier stated, the Spearman rank-order correlation coefficient is not a measure of causality but just an indication of an association between two variables. To ascertain the nature and direction of causality (if any) among the variables, a Granger-causality test was conducted and the results of the test were presented in Table 5 below.

The key assumption made here is that the maximum lag to be tested is 2, due to the annual frequency of the series. The one-lag test's null hypothesis was rejected at 10 per cent level of significance, while the two-lag test, at 5 per cent. The results supported the proposition that causality existed between the two variables, and that it flowed from real GDP growth to the current account balance.

**Table 5: Granger Causality**

Null Hypothesis	Lag	F-Stat	Prob.
gdp_real_g does not Granger Cause cab_gdp	1	3.60	0.06
cab_gdp does not Granger Cause gdp_real_g	1	0.37	0.55
gdp_real_g does not Granger Cause cab_gdp	2	3.45	0.04
cab_gdp does not Granger Cause gdp_real_g	2	0.05	0.95
cab_gdp does not Granger Cause rer_nig	1	3.32	0.08
Rer_nig does not Granger Cause gdp_real_g	1	4.56	0.04

Source: Authors Computation

### V.3 Model Specification

Based on the pre-estimation analysis, including the Granger causality test, this section outlined the model that would enable the extraction of the long-run coefficients of the relationship between current account balance and real GDP growth. The specification of the model was given as:

$$\Delta cab\_gdp_t = -\sum_{i=1}^{p-1} \gamma_i^* \Delta cab\_gdp_{t-i} + \sum_{j=1}^2 \sum_{i=0}^{qj-1} \Delta X'_{j,t-i} \beta_{j,i}^* - \rho cab\_gdp_{t-1} - \alpha - \sum_{j=1}^2 X'_{j,t-1} \delta_j + \epsilon_t \tag{11}$$

Where:

$$X' = \begin{pmatrix} gdp\_real\_g \\ rer\_nig \\ dum1998 \end{pmatrix}$$

### V.4 Model Estimation and Diagnostics: Serial Correlation, Heteroscedasticity and Normality

A key advantage of the ARDL methodology, aside establishing an intertemporal dynamic relation and the presence of a long-run relationship, is the ability to extract long-run coefficients, which could be used to measure the parameters of the long-run relationship. In order to guarantee that the estimated long-run coefficients are robust, it is necessary to examine whether they are unbiased and efficient, as these would have implications for the reliability or the finding.

**Table 6: Post Estimation Results**

Estimated Equation	Assumptions	B-G SC prob. (I=2)	B-P-G Hetero Test	J-B prob.	Conclusion
cab_gdp = f(gdp_real_g, rer_nig, dum1998); Model 1	No Constant & No Trend	0.83	0.44	0.89	Spherical & Normal
cab_gdp = f(gdp_real_g, rer_nig, dum1998); Model 2	Unrestricted constant & Unrestricted Trend	0.83	0.35	0.89	Spherical & Normal

B-G SC = Breusch-Godfrey Serial Correlation LM Test; Null: Residuals are Serially Uncorrelated.

B-P-G Hetero = Breusch-Pagan-Godfrey Heteroskedasticity Test; Null: Residuals are Homoskedastic.

J-B = Jarque-Bera Statistic Test for Normality of Series; Null: Residuals are Normally Distributed.

Two models were estimated: the first assumed no constant and no trend in the conditional error correction regression, while the second assumes unrestricted constant and trend. We conducted three post-estimation diagnostic tests on each model, namely: tests for serial correlation, heteroskedasticity and normality of the residuals, using the Breusch-Godfrey (B-G) LM test, the Breusch-Pagan-Godfrey (B-P-G) test and the Jarque-Bera test, respectively, with their null hypotheses, as stated in the notes and the results contained in Table 6.

The residual diagnostic tests showed that both the first and second models were well specified and robust. The residuals were spherical (serially uncorrelated and homoscedastic) and normal. Thus, these models were good for inference.

#### **V.4 Discussion of Results and Policy Implications**

Table 7 showed the two models estimated, using the Eviews ARDL routine. Model 1 was the basic model and was estimated with the assumptions that there were no constant and trend. Model 2 assumed unrestricted constant and trend. Both models revealed that all coefficients were statistically significant, except the constant and the trend variables in model 2. The long-run coefficients in both models were essentially the same, indicating that model 1 was adequate. The Bounds tests, in both models, confirmed that, based on the sample employed, a long-run relationship existed between the current account balance, the real GDP growth and the bilateral real exchange rate in Nigeria.

The real GDP coefficient was positive, indicating a positive relationship between the real GDP growth and the current account balance. An additional 1 per cent growth in real GDP induced a 1.47 per cent improvement in the current account balance. An inference of this result was that factors that spur growth were important to enhance current account position in Nigeria. Thus, the on-going peace deal in the Niger Delta region is important to enhance crude oil production and improve current account balance. Also, investment in infrastructure will boost productivity and improve current account position in Nigeria. A negative coefficient of the bilateral real exchange rate (real exchange rate indicates how much of the actual goods and services in the domestic economy can be exchanged for the goods and services in the counterpart foreign economy) implied that a one unit real depreciation of the naira would result in 0.18 per cent deterioration in the current account balance.

**Table 7: Estimation Results**

<b>ARDL Bounds Test (Null Hypothesis: No Long-run Relationship)</b>		
	Model 1 (No Constant, No Trend)	Model 2 (Unrestricted Constant & Trend)
<b>Selected Model</b>	ARDL (2,2,0)	ARDL (2,2,0)
<b>Observations</b>	37	37
<b>F-Statistic</b>	17.25	14.11
<b>1% Lower Bound</b>	3.88	6.34
<b>1% Upper Bound</b>	5.30	7.52
<b>Conclusion</b>	Null Rejected	Null Rejected
<b>Error Correction Model Regression</b>		
<b>Dependent Variable</b>	D(cab_gdp)	D(cab_gdp)
<b>Explanatory Variables</b>		
D(cab_gdp(-1))	0.29 (0.01)*	0.28 (0.02)*
D(gdp_real_g)	0.55 (0.00)*	0.55 (0.00)*
D(gdp_real_g(-1))	-0.41 (0.00)*	-0.42 (0.01)*
Dum1998	22.08 (0.00)*	21.81 (0.00)*
Co-intEq(-1)	-0.93 (0.00)*	-0.92 (0.00)*
C	-	0.45 (0.90)
@Trend	-	-0.02 (0.89)
<b>R<sup>2</sup></b>	0.69	0.70
<b>Long-run Coefficients</b>		
<b>Dependent variable</b>	cab_gdp	cab_gdp
<b>Explanatory Variables</b>		
gdp_real_g	1.47 (0.00)	1.47 (0.00)
rer_nig	-0.18 (0.00)	-0.18 (0.03)

Note: \* represented 1% level of significance. Probability values in parenthesis.

This result was contrary to expectation that a real depreciation is expected to improve the current account in Nigeria. This finding had implication for exchange rate management, and established the validity of the Marshall Lerner condition in Nigeria. However, it is not surprising in view of the fact that the issue of external competitiveness extends beyond exchange rate depreciation. Thus, other determinants such as the structural factors, factor productivity and ease of doing business could be important in tackling Nigeria's export competitiveness. Furthermore, given the minimal contribution of non-oil export and the high import dependency nature of the economy, a real depreciation in the exchange rate could have a negative impact on the current account, as witnessed in 2016 when the depreciation of the naira could not reduce the import bill.

## **VI. Conclusion and Areas of Further Research**

The study investigated empirically the relationship between current account balance and economic growth in Nigeria. The study found a long-run relationship between the current account balance, the real GDP growth and the bilateral real exchange rate. The study also found a positive relationship between the real GDP growth rate and the current account balance. This implies that increase in real GDP growth rate would lead to an improvement in the current account balance. However, the study found a negative relationship between the real exchange rate and current account balance. A real depreciation of the naira would lead to the deterioration in the current account balance. Given the Marshall Lerner condition, the study, therefore, suggests a further research on the relationship between real exchange rate movement and the behaviour of the current account in Nigeria.

From the foregoing analysis, it is evident that economic growth impacts current account balance in Nigeria, which suggests that all factors influencing real GDP growth, has direct consequences on improving the current account position. Therefore, to improve domestic output growth and current account balance in Nigeria, policy must address issues of low productivity, external competitiveness and factor productivity. To this end, we recommend that huge investment should be channeled to infrastructure development to generate more economic activities, reduce the cost of doing business and improve factor productivity in Nigeria. By doing this, the external sector performance would be boosted by higher productivity and robust current account balance.

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