Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Impact of Government Capital Expenditure on Economic Growth in Nigeria: 1980-2020

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Abstract

Despite the ever growing capital budgetary expenditure, the Nigerian economic growth has been slow and below expectation. It is against this back drop that the study investigated the impact of capital expenditure on economic growth in Nigeria using time series data. A unit root test was conducted on the data because of the time series nature of it The model used in this study is Auto Regressive Distributed Lag (ARDL).The results appeared mixed. This is because while the lag value of Capital expenditure on defense (CED) appeared positive and statistically significant, Capital Expenditure on health (CEH), but the coefficient of Capital Expenditure on education (CEE) and Capital Expenditure on transport and communication (CETC) appeared positive. The implication of this finding is that achieving quality education depends on government investment to the sector. Since economic growth is closely linked with human capital development, academic underperformance can slow growth. With the impact of Corona virus (Covid-19) on socio-economic status of households in Nigeria. Covid-19 has severe impact on health, education, employment and income of Nigerian citizen. The study recommends that governments should increase funds to national centre for disease control to enable it perform better, for prevention of disease. The paper therefore, recommended Government should ensure that capital Expenditure are properly managed in a manner that it will raise the nation's productive capacity and by extension accelerate economic growth.

Keywords: Capital expenditure, Economic growth.

JEL: 017,011

1. Introduction

The theories of public expenditure emerged out of the seeming failure of the market economy to allocate scarce resources equitably so as to promote social and economic infrastructure. This is because; market economy or Laissez-faire emphasizes the absence of government (Donijo,2004). To the laissez-faire, economic activity should be left to the free market; government's role is to ensure that the society is protected against internal disruption. However, for public goods such as defense, roads, light among others whose social marginal benefit far exceeds its social marginal cost and which also exhibits three main characteristics of non-rivalry in consumption, non-excludability and non-depletion, imply that market will not be able to provide these goods efficiently since markets function by excluding individuals who cannot pay for the good (Ulbrich,2003).

Therefore, government provision of public goods is required in the presence of market failure. Also, this failure brought about the emergence of welfare economics that precipitated state intervention in economic activities (Modebe, Okafor, Onwumer& Ibe,2012). Consequent upon this is the rapid growth of the government sector and by extension, the growth in government expenditures. These growths necessitated the need for a proper system or mechanism that would allocate resources equitably (Onakoya&Somole, 2013). To fill this void, the budget that contain a planned public expenditure and revenue of the government on yearly basis becomes a valid tool for controlling, monitoring and relating government planned budgetary allocation to macroeconomic objective of ensuring sustainable economic growth (Fan &Saukar, 2012).

However, budgetary allocation, being a dynamic process, has been changing with the historical and political conditions of the country. Indeed, the issue of budgetary allocation in Nigeria came to sharp focus with the granting of political independence and the freedom to exercise independent budgetary powers. Therefore, since the time of Nigeria's political independence, the budget has developed and grown, not only into an instrument of economic management but also as a tool of economic development and growth. The budget which consists of government fiscal policy measures of taxation and expenditure as well as borrowing has always been a potent instrument of economic development and growth.

In Nigeria, government capital budgetary expenditurehave continued to grow owing to the huge revenues derivable from crude oil, non-oil, federal government independent revenue and the rising demand for public goods and services like education, transport and communication and health. In addition, there is also increasing need in the face of rising insurgence to provide both internal and external security to protect life and property. Available statistics have shown that total government capital budgetary expenditure and its components have continued to grow in the last six decades or so. For instance, while government capital expenditure in 1980 to defense stood at ₦127.50 million, education was ₦952.60 million, transport and communication was ₦2,349.30 million and health was ₦147.20 million, it rose to ₦196.40 million, ₦331.70 million, ₦877.00 million and ₦257.00 million for the afore mentioned components in 1990, ₦6,954.90 million, ₦23,342.60 million, ₦3,021.00 million and ₦6,569.20 million in 2000 to ₦232,044,871,801 million, ₦24,086,254,059 million and ₦161,845,511,090 in 2010 to ₦24,525,795,702, ₦369,556,376,895, ₦237,145,224,960 and ₦221,712,151,46 in 2016 respectively(National Bureau of Statistics,2016). However, despite budgetary capital expenditure, Nigerian economic growth has been described as slow and of crisis proportion (Oziengbe, 2013). For instance, Nigerian Gross Domestic Product (GDP) fell to 3 percent in 2009 compared with 6 percent in 2008 (National Bureau of Statistics, 2010). Furthermore, Nigerian economic growth entered into technical recession in 2016 as its Gross Domestic Product (GDP) declined by 3.16 (National Bureau of Statistics, 2017).Also, investment in people for productive purposes that contribute to growth has been disappointing (Arimah, 2001). Apart from the above, national, regional and international organizations have established a downward trend in some selected indicators that are endogenous to economic growth. For instance, the United Nations' most recent multi-dimensional poverty index (2015) has it that over 67 percent of Nigerians lives below poverty line. The average Nigerian life expectancy is 38.3 percent (World Health Report, 2014), its human development index has been consistently on less than 0.6

percent(World Health Report, 2015), its school enrollment which fell from 64.5 percent in 2000 to 57.6 percent in 2013 is still one of the lowest in Sub-Sahara Africa (African Development Indicators, 2013).

The recent corona virus (Covid-19) outbreak was caused by the severe acute respiratory syndrome (SARS) corona virus. The outbreak was reported in December 2019 in Wuhan city in Hubei province of china (Mckibbin and Fernando 2020). Covid-19 continues to spread across the world. Another move corona virus causes mild, non-specific symptoms including fever, cough and shortness of breath, muscle pain and tiredness, the acute respiratory, distress syndrome, sepsis and septic lead to death. The virus is transmitted via respiratory droplets its estimated period is 2-14 days (Delivorias and Scholz, 2020). At global level, the world health organization (WHO 2020) declared a public health emergency of international concern at the end of January, as infections spread rapidly within china currently, it is being discovered that covid-19 has escalated to all over the world (Mckibbin and Fernando, 2020)

This dismal Nigerian economic growth performance has not only been brought to the front burner but has remained dominant and most contentious in existing literatures (Abu & Abdullahi, 2010, Oziengbe, 2013,Oyakhilomen, Abdulsalam &Rekwot, 2013). However, a not well – synthesized fact in the extant literatures is the impact government capital budgetary allocation on economic growth. It is against this backdrop that this paper is out to investigate the impact of government capital budgetary allocation on economic growth. To achieve this objective, this paper is structured as follows:

2. Conceptual Review

2.1 Capital Expenditure

This is conceptualized here as the expenditure made to acquire fixed assets whose useful life span expands beyond one fiscal year (Ulbrich, 2003). It can also been seen as expenditure made to upgrade or improve the already existing fixed assets or infrastructure such as roads, machines and equipment, buildings, researches among others. These expenditures usually create future benefits and there are often some time lags between when they are allocated and when they take effect on the economy. It is these capital budgetary expenditure that driver the economy. This is because no economy can achieve meaningful economic growth without investment in infrastructure like roads, buildings, health facilities, educations. This can only be made possible through capital budgetary allocation.

2.2. Economic Growth

The concept of economic growth belongs to the main topics in economics discipline. The interests result from the principles of human being, the necessity of satisfaction of unlimited needs.In economics “economic growth” or “economic growth theory” typically refers to growth of potential output, i.e production at “full employment” (Sayi, 2011) Alsoaccording to Ibn Khaldum (1376) the idea of economic growth was that increasing either population or tax rate could generate more surplus money for the crown or the country. Adam Smith (1776) saw economic growth (output) to depend on the amount of input (land, labour and capital) and the output is determined by population growth, increase in investment and land and total labour productivity growth, Ricardo (1931) approach to growth was that growth was gained through advantageous trade but to trade with other nation on equal term was disadvantageous. Solow (1956) in his growth model emphasizes that capital accumulation and exogenous rate of change in population and technological progress as the sources of growth. Similarly, Romer (1986) based his idea that long run growth is determined by economic incentives. In view of the above, the concept of economic growth refers to growth of potential output. That is production at full

employment which is caused by growth in aggregate demand or observed output. It is theoretically defined as the increased in the value of good and service produced by an economy. It is conventionally measured as the percent rate of increases in real Gross Domestic Product (GDP)

3. Theoretical Framwork

This paper is anchored on the following theories the Wagner's law of expanding state activities, Peacock and Wise manhypothesis and Keynesian growth theory.

3.1 Wagner's law of increasing Government activity.

This law was formulated by Adolph Wagner in 1908. Wagner, a famous German political Economist who based his law of increasing state activities on historical facts, primarily German, opined that there are inherent tendencies for the activities of different layers of a government such as Central and state governments to increase both intensively and extensively. That is, there is a functional relationship between the growth of an economy and the growth of the government activities so that the government sector grows faster than the economy. Thus, all kinds of governments irrespective of their level, intentions (peaceful or warlike), and size etc indicate the same tendency of increasing public expenditure. In other words, Wagner argued that a functional, cause and effect relationship exists between the growth of an industrializing economy and the relative growth of its public sector. Therefore, Wagner, opined that the relative growth of the public sector is an inherent feature of industrializing economies. This secular (long-term) hypothesis believes that social progress was the basic cause of the relative growth of government in industrializing economies. The chain reaction circumstances are that social progress leads to a growth in government functions which, in turn, leads to the absolute and relative growth of government economic activity. Wagner distinguished certain forms of government activities in an attempt to validate this viz: (a) law and order and (b) participation in the material production of economic goods, including the provision of certain social products such as education, roads, machine and equipment, monetary-banking arrangements, etc, in the face of market failure. Government corporations must produce certain economic goods requiring large fixed investment, since private companies cannot undertake such investment on a profitable basis. Thus, apart from the traditional State functions which were expanding, the state activities were increasing in coverage (e.g subsidies and other welfare measures) and hence the increasing need to provide and expand the sphere of public goods. Other forces behind the tendency of increasing government capital budgetary allocation are rising population, urbanization and pressure on civic amenities, higher prices, the need to provide increasingly qualitative services, provision of welfare and social security measures, rising cost of servicing debt and debt payments.

3.2 Peacock-Wiseman Hypothesis of Displacement, Inspection and Concentration Effects.

In their study of the UK economy between 1890-1955, Jack Wiseman and Allan Peacock(1961) formulated their hypothesis to fill the void in Wagner;s law. They concluded that public expenditure does not increase in a smooth and continuous manner, but in jerks or step like fashion. In other words, government fiscal activities rise step by step to successive new plateau. Sometimes, some social or other disturbances such as war or depression take place which the existing public revenue cannot meet. The public expenditure rises and makes the inadequacy of the present revenue quite clear to everyone. The movement from the older level of expenditure and taxation to a new and higher level is called the 'displacement effect'. The insufficiency of the

revenue as compared with the required public expenditure creates an 'inspection effect'. That is war or other social disturbances force people and the government to seek solutions to important problems which previously had been neglected. The people and the government review the revenue position and the need to find a solution of the important problems that have emerged and thus agree to make the needed adjustments to finance the increased expenditure. This results in the attainment of a new level of 'tax tolerance'. That is they are prepared to tolerate a greater tax burden hence both the general level revenue and expenditure rise. In this manner, public expenditure and revenue stabilize at a new level till another disturbance result in a displacement effect. In addition, since each major disturbance causes the government to assume a large proportion of the total national economic activities, the net result is the 'concentration effect or the scale effect'. This refers to the apparent tendency for central/ national government economic activity to become an increasing proportion of total public sector economic activity when a society is experiencing economic growth. That is the apparent tendency for central economic activity to grow faster than that of the state and local levels of governments. This means that sub-national government necessarily will decline in relative importance within the public sector, a finding consistent with British economy's empirical evidence.

3.3.Keynesian Growth Theory.

The Keynesian growth theory pounded by Keynes (1939) provided the theoretical basis for the relationship between budgetary allocation by difference tiers of governments and economic growth. It also, provides an appealing set of models for investigating the relationship between economic growth and different components of government capital budgetary allocations such as budgetary capital allocation to defense, health, transport and communication, education among others. The model assumes that economic growth is influenced by policy variables other than the technical relationship between capital and labour (Ram, 1986; Barro, 1990; Aigbokhan, 1999). This flexibility introduced by policy variables has made the model popular in the analysis of economic growth of nations especially developing countries (Aigbokhan, 1999).

Therefore, the Keynesian growth model employed in this study is an extension from other studies like (Ram, 1986 and Aigbokhan, 1996; 1999). The model assumes that the economy consists of two broad sectors, public (G) and private (P) whose output depends on labour (L) and capital (K). In addition, the output of G exercises some externality effect on output in P. The production function of the economy is thus:

$Y = f(L, K_P, K_G)$ ----------(1)

where the subscripts denote sectoral inputs:

K_P= private capital per labor

K_G = public capital per labor

The production functions of the respective sectors are thus:

$Y_P = P(L_P, K_P, G)$ ----------(2)

$Y_G = G(L_G, K_G)$ ----------(3)

Total inputs are given as:

$L_T = L_P + L_G$ ----------(4)

$K_T = K_P + K_G$ ----------(5)

Total output Y is given as the sum of sectoral output or a function of sectoral inputs:

$Y = Y_P + Y_G$, or ----------(6)

$Y = P(L_P, K_P) + G(L_G, K_G)$, or ---------- (7)

$Y = f(L_T, K_T, G_T)$----------(8)

Drawing on the foregoing evidence, the study postulates that capital budgetary allocation has an impact on economic growth. Theoretically, capital budgetary allocation is expected to foster growth through allocative efficiency. However there is no consensus in the empirical literature on the direction of impact. Thus, the

impact of capital budgetary allocation on growth is an empirical issue.

4. Empirical Review

Loizides and Vamvoukas (2005), employing the trivariate causality test to examine the relationship between government expenditure and economic growth, using data set on Greece, United Kingdom and Ireland. The authors found that government size granger causes economic growth in all the countries they studied. The finding was true for Ireland and the United Kingdom both in the long run and short run. The results also indicated that economic growth granger causes public expenditure for Greece and United Kingdom, when inflation is included.

Komain and Brasmasrene (2007), studied the relationship between public expenditure and economic growth in Thailand. Applying granger causality and co-integration technique, the study, found that public expenditure and economic growth are not co integrated but there exists a significant positive effect of public expenditure on economic growth. On this basis, they recommended that public expenditure should be closely monitored to avoid rent seeking behavior.

Liu Chih-HL, Hsu and Younis (2008) examined the causal relationship between GDP and public budgetary expenditure for the US data during the period 1947-2002. The causality results revealed that total government expenditure causes growth of GDP. On the other hand, growth of GDP does not cause expansion of government expenditure. Moreover, the estimation results indicated that public expenditure raises the US economic growth. The authors concluded that, judging from the causality test Keynesian hypothesis exerts more influence than the Wagner's law in US.

Olorunfemi, (2008) studied the direction and strength of the relationship between public investment and economic growth in Nigeria. Using time series data from 1975 to 2004 and multiple regression analysis, the study found that public expenditure impacted positively on economic growth and that there was no link between gross fixed capital formation and Gross Domestic Product. The study affirmed that from disaggregated analysis, the result reveal that only 37.1% of government expenditure is devoted to capital expenditure while 62.9% share is to current expenditure. On the basis of the findings, the study recommended that to ensure sustained economic growth more fund should be made available for capital expenditure.

Bingxn, Fan and Sauker (2009) examined the impact of the composition of public expenditure on economic growth in developing countries. Using a dynamic generalized method of moment (GMM) model and a panel data set for 44 developing countries, they found that different types of government spending have various impact on economic growth. That in Africa, human capital expenditure contributes to economic growth while in Asia, capital formation, agriculture and education expenditure had strong growth enhancing effect. In Latin America, none of the public expenditure items have significant impact on growth. They therefore, recommended more to be given to various expenditure items that have more impact on growth of different countries.

Zheng, Li and Li (2010) investigated the relationship between the size of Chinese government and the growth rate of the economy with more emphasis on the applicability of Wagner's law to the Chinese economy. Using Auto regressive distributed lag (ARDL) on Chinese time series data, the study found no evidence in support of the validity of Wagner's law for Chinese economy. They therefore, recommended a proactive government programmed expenditure that will promote and sustained economic growth.

Edame and Akpan (2013) studied the structure and growth of public expenditure in Nigeria. Employing Ordinary Least Square technique, they found that factors such as fiscal deficit, Gross Domestic Product, government revenue and debt servicing were identified as some of the factors causing the growth of public expenditure in Nigeria. The study therefore recommended sound fiscal discipline, productive use of government revenue and increasing productivity to help reduce the growth of public expenditure in Nigeria.

In Nigeria, Oziengbe (2013), studied the impact of federal capital and recurrent expenditure on Nigerian economy. Exploiting co integration and error correction mechanism, he found that long-run relationship existed between the variables and that the short run impact on each explanatory variable on Gross Domestic Product (GDP) was statistically not significant contemporaneously but statistically significant with a lag with recurrent expenditure having more impact on GDP than the capital expenditure. On the basis of this findings, recommended that larger share of government expenditure should go into the provision of infrastructure and other capital project.

Ukwueze (2014) examined the impact of public expenditure on output growth in Nigeria. Using granger causality and impulse response function, he found that public expenditure has strong impact on output growth and that public expenditure granger cause output. The study also find that in the short run, public expenditures on education, agriculture, all have both positive and significant impact on output growth while expenditures on health and construction have negative impact on output growth. On the basis of the findings recommended that public debt should be curtailed and revenue base expanded to provide avenue for private sector investment that will promote economic growth.

5. Methodology

5.1 Nature and sources of data

The paper utilized secondary data obtained from the Central Bank of Nigeria statistical bulletin (2016), National Bureau of Statistics, Annual reports and approved estimates for various years from 1980-2016.

5.2 Model specification

This paper adopted Auto Regressive Distributed Lag (ARDL). Auto Regressive Distributed Lag (ARDL) was introduced by Dave (2013), to incorporate 1(0) and 1(1) variable. This specified below thus

RGDP=f (CBAD, CBAH, CBAE, CBA TC)----------(9)

Where, RGDP = Real Gross Domestic Product, CBAD = Capital Budgetary Allocation to defense, CBAH = Capital Budgetary Allocation to health, CBAE = Capital Budgetary Allocation to education and CBA TC= Capital Budgetary Allocation to Allocation to transport and communication. Stating equation (3.1) on the basis of ARDL form, gives:

$\Delta y_t=\alpha_0+\alpha_1 y_{t-1}+\sum_{j=1}^{L} \propto_j \Delta D_{t-j}+\sum_{j=1}^{L} \alpha_2 \Delta E_{t-j} +\sum_{j=1}^{L} \alpha_3 \Delta H_{t-j} +\sum_{j=1}^{L} \alpha_4 \Delta TC_{t-j} \mu_t$----------(10)

$\Delta H_t =\lambda_0 + \lambda_1 H_{t-1} + \sum_{j=1}^{L} \lambda_j \Delta y_{t-j} +\sum_{j=1}^{L} \lambda_2 \Delta D_{t-j}+\sum_{j=1}^{L} \lambda_3 \Delta E_{t-j}+ \sum_{j=1}^{L} \lambda_4 \Delta TC_{t-j}+ \mu_t$----------(11)

$\Delta D_t =\lambda_0 + \lambda_1 D_{t-1} + \sum_{j=1}^{L} \lambda_j \Delta y_{t-j} +\sum_{j=1}^{L} \lambda_2 \Delta H_{t-j} +\sum_{j=1}^{L} \lambda_3 \Delta E_{t-j} + \sum_{j=1}^{L} \lambda_4 \Delta TC_{t-j} +\mu_t$ ---------- -(12)

$\Delta E_t =\lambda_0 + \lambda_1 E_{t-1} + \sum_{j=1}^{L} \lambda_j \Delta y_{t-j} +\sum_{j=1}^{L} \lambda_2 \Delta H_{t-j} +\sum_{j=1}^{L} \lambda_3 \Delta D_{t-j} + \sum_{j=1}^{L} \lambda_4 \Delta TC_{t-j} + \mu_t$ ----------(13)

$\Delta TC_t =\lambda_0 + \lambda_1 TC_{t-1} + \sum_{j=1}^{L} \lambda_j \Delta y_{t-j} +\sum_{j=1}^{L} \lambda_2 \Delta H_{t-j} +\sum_{j=1}^{L} \lambda_3 \Delta D_{t-j} + \sum_{j=1}^{L} \lambda_4 \Delta E_{t-j} + \mu_t$ ----------(14)

Where Y= Gross Domestic Product (GDP), D= Capital Budgetary Allocation to defense(CBAD) H= Capital Budgetary Allocation to health (CBAH), E= Capital Budgetary Allocation to education (CBAE) and TC= Capital Budgetary Allocation to Allocation to transport and communication (CBA TC) .Δ = first difference, and L= maximum lag length. Equations 3.2-3.6 intends to find out the impact of fiscal CBAD, CBAH,CBAE and CBATC on economic growth proxied by GDP and to test the hypothesis that all the above mentioned variables do impact on economic growth.

6. Results and Discussion

6.1 ADF unit root test

The unit root was conducted in order to ascertain the stationarity properties of the series used in the study. This was conducted using Augmented Dick-fuller (ADF) unit root test. Apart from avoiding spurious regression result, ADF unit root helped to establish the order of integration of the variables. The ADF unit root results are shown in table .1.

Table 1. ADF unit root

variables	ADF STATISTICS	CRITICAL VALUE (5%)	ORDER OF INTEGRATION
RGDP	-5.079487	-2.981038	1(1)
CBAD	-6.379446	-2.948404	I(1)
CBAE	-4.679123	-2.945842	1(0)
CBAH	-3.342693	-2.954021	1(0)
CBATC	-4.256191	-2.945842	1(0)

SOURCE: Author's computation using E-View

The result of the ADF unit root test in table 1.showed that all the variables except RGDP and CBAD were not stationary at level. However, after first difference RGDP and CBAD became stationary. This was achieved by comparing the ADF test statistics with their respective critical values at 5 %. This gives the order of integration of purely I(0) and I(1). This difference in order of integration of the variables connote that there may be long run relationship between and among the variables. Furthermore, the results of the ADF statistics confirmed Auto Regressive Distributed Lag (ARDL) and

ARDL Bound test will provide a better estimate.

6.2 ARDL Results

To evaluate the impact of different components of government capital budgetary allocation on economic growth in Nigeria proxied by RGDP, Auto Regressive Distributed Lag (ARDL) was used and the result is presented in table 2

Table .2 Auto Regressive Distributed Lag (ARDL) regression Result

Number of models evalulated: 162
Selected Model: ARDL(2, 1, 0, 2, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	0.304315	0.175998	1.729078	0.0992
RGDP(-2)	-0.266113	0.120505	-2.208310	0.0391
CBAD	-3.515516	280.7946	-0.012520	0.9901
CBAD(-1)	753.8753	380.1913	1.982884	0.0613
CBAE	-21833.14	51513.63	-0.423832	0.6762
CBAH	243577.4	108003.6	2.255271	0.0355
CBAH(-1)	-261429.1	279365.8	-0.935795	0.3605
CBAH(-2)	277795.4	144602.1	1.921102	0.0691
CBATC	-291.2133	181.3890	-1.605463	0.1241
CBATC(-1)	-897.8249	221.6974	-4.049777	0.0006
CBATC(-2)	-897.7759	139.2756	-6.446038	0.0000
C	-25607727	6171049.	-4.149655	0.0005

R-squared	0.979166	Mean dependent var	11429040
Adjusted R-squared	0.967707	S.D. dependent var	23543225
S.E. of regression	4230745.	Akaike info criterion	33.63365
Sum squared resid	3.58E+14	Schwarz criterion	34.18330
Log likelihood	-526.1384	Hannan-Quinn criter.	33.81584
F-statistic	85.45228	Durbin-Watson stat	1.250767
Prob(F-statistic)	0.000000		

Source: E-View output

9.0

The result of the Auto Regressive Distributed Lag (ARDL) on the impact of Capital Budgetary Allocation to defense (CBAD),Capital Budgetary Allocation to health (CBAH), Capital Budgetary Allocation to education (CBAE) and Capital Budgetary Allocation to Allocation to transport and communication (CBA TC) on RGDP appeared mixed. This is because while the lag value of Capital Budgetary Allocation to defense (CBAD) appeared positive, that Capital Budgetary Allocation to health (CBAH), Capital Budgetary Allocation to education (CBAE) and Capital Budgetary Allocation to Allocation to transport and communication (CBA TC) appeared positive. The implication of this finding is that achieving quality education depends on government investment/ allocation to the sector. Since economic growth is closely linked with human capital development, academic underperformance can slow

growth. This is because, education leads to increase in productivity, increase the stock of human capabilities and efficiency of workers by increasing the level of their cognitive skills. The implication of this findings also, suggests that provision of education is a productive investment in human capital which equals or even more worthwhile than that of physical capital. Also, the negative sign of the lag value of Capital Budgetary Allocation to health (CBAH) justifies the low average life expectancies, high infant and maternal mortality rate that have compromise sustained economic growth in Nigeria. Furthermore, the negative lag value of Capital Budgetary Allocation to Allocation to transport and communication (CBA TC) revealed that Nigeria transport and communication sector is still largely underdeveloped. To underscore, the nature of the relationship, the paper conducted ARDL bound test shown in the table 4.3.

Table .3 ARDL bound test result

EC = RGDP - (780.1630*CBAD -22700.3191*CBAE + 270268.3179*CBAH
-2169.6995*CBATC -26624830.0822)

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	14.56068	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: E-View output

Here, two sets of asymptotic critical values are provided for the two polar cases which assumethat all the regression are, on the one hand, purely I(1) and, on the other, purely I(0). Since the study variables of interest fall purely intoI(1) and I(0), the study conducted a bounds test to ascertain if a long run relationship exist between or among the variables under investigation. This is because, if the computed F-statistic falls outside the critical value bounds, a conclusive inference can be drawn that a long run relationship exists. However, if the F-statistic falls inside these bounds, inference is inconclusive. In this study, the F-statistic falls outsides the critical bounds revealing co integration between RDGP and Capital Budgetary Allocation to health (CBAH), Capital Budgetary Allocation to education (CBAE), Capital Budgetary Allocation to Allocation to transport and communication (CBA TC) and Capital Budgetary Allocation to defense (CBAD). The implication of this is that since there is a long run relationship between capital expenditure and economic growth, if concise effort is not made to ensure the productivity of capital expenditure which will ensure appropriate investment in human capital, sustained economic growth may remain elusive in Nigeria.

7. Conclusion and Recommendations

Capital budgetary allocationsuppose to be the bedrock of economic growth by providing infrastructural facilities that have the tendency of promoting and sustaining economic growth. However, over the years, despite the increasing government budgetary

allocation to these key sectors, there contribution to economic growth appeared to be negative. On this basis, the paper recommended thatgovernment should ensure that capital budgetary allocation are properly monitored and managed in a manner that it will raise the nation's productive capacity via investment in human capital that will ultimately accelerate economic growth. There is need for strong monitoring of capital budgetary allocation to avoid missing revenue between allocation, disbursement and execution.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Impact of Selected Macroeconomic Variableson Economic Growth in Nigeria: 1990 -2020

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Abstract

Due to the immense contribution of some selected macroeconomic variables to the economic growth and development in Nigeria, this research investigates the impact of selected macroeconomic variables on economic growth in Nigeria from 1990-2020. Auto-regressive distribution lags model (ARDL) based on the Unit root test was used to determine the effect of three major factors; interest rate (INTR), exchange rate (EXR) and inflation (INFR) on real gross domestic product (RGDP) which proxies' economic growth The findings from the empirical point of view show a positive relationship of gross domestic product (GDP) with Interest rate while exchange rate inflation rate have a negative relationship with real Gross domestic Product (RGDP) also, interest rate, exchange rate and inflation are all significant at all levels of significance.

Keywords*:* Interest rate, Exchange rate, Inflationrate, Economic growth
JEL: 010,011

*1.0*Introduction

Manufacturing Sector Report, (2015). Statedthat Nigeriathe largest economy in Africa with an emerging market, mixed economy, middle-income earning, with increasingindustrialized, fiscal, service, communications, technology and entertainment sectors is ranked as the 27th- in terms of nominal GDP, and the 22nd-largest in terms of purchasing power parity. Nigeria as thelargest economy in Africa, it produces a large proportion of goods and services in the West African sub region. As at the end of the first quarter of 2019, Nigeria's population is put at 188.7million with a gross domestic product of $1.1 trillion at 0.8% growth, unemployment rate of 7.0% and Inflation rateof Consumer Price Index (CPI) was estimated as 16.5%.

The impact of selected macroeconomic variables (MEVs) over the years has remained grossly insufficient to meet theexpanding social political and public spending needed in the fostering of economic growth. Forinstance inflation rate, interest rateand exchange rate

This study examined theextent economic growth has been impacted by selected

macroeconomic variables.Indeveloping and developed nations, economic growth isthe continuous responsibility of government on her economy. The need to carry out this study isanchored in the fact that MEVs like interest rate, inflation rate and exchange rate areconsidered the major engine or drivers of economic growth in Nigeria. The fluctuating rate of exchange against major international trading currencies has causedinflation to gallop in Nigeria while exchange rate, interest rate and inflation worth an empirical examination.

It is in the light of the above that thisquestionis raised: Does government policies that impactMacroeconomicVariables hinder economic growth inNigeria? If participants in the global market experience somelevels of macroeconomic stability, then it is true that other nations or nationals face similarconditions but at various levels. Since oil and gas dominate the country's economy as it accounts forover 83% of the country's revenue base thereby making government to lose its sense of reasoningin exploring other revenue sources, this present government have come up with diversificationplan which need serious political will.

In addition, former military leaderGen. Ibrahim Babangida, came up with the Structural Adjustment Programme (SAP) with the broad intent of diversifying the economy, did not achieve itsobjective. The over dependent on oil and gas has led to low GDP and economic retardation whichhas affected the Macroeconomic variables under consideration in this study. Impact of selected Macroeconomic variables needsspecial understanding for economic growth by both the private and publicsectors. The implication of export and import on Nigerian economy its felt as a continuousdepreciation of the naira exchange rate for other hard currencies like the European Euro or USDollar and weakening CBN's relentless effort at attaining and sustaining a single digit headline rateof inflation to double digit through her monetary policy rate.

2.0 Literature Review

Conceptual Framework

Danso,Ganesh&moses (2012), opined that real exchange rate determine how much residents of a country receive for goods and services imported and how much they receive as payment for exported goods and services.

Emenike (2014). States that interest rate changes are transmission mechanism via monetary policy effects on prices of assets

Ismaila &Affoi (2015), defined economic growth as the quantity of goods and services produced in a nation real gross domestic product mostly measure.

Empirical Review

Philip (2010) studied and identified a unidirectional causality and no co-integratingrelationship between Inflation and economic growth through Co-integration and Granger causality test in Nigeriabetween 1970 and 2005.

Ayyoub et al (2011) studied the relationship between inflation and economic growth ofPakistan between 1972 and 2010 using the Ordinary Least Squares (OLS) regression and concluded that asignificantly inverse relationship exists between inflation and economic growth.

Mamo (2012) identified a negative significant relationshipbetween inflation and economic growth while studying 13 Sub Saharan Africa (SSA) countries for 1969 to 2009, Ina study of twenty-two countries between 2004 and 2010,

Karim etal, (2012) used the structural vector error correction model (SVECM) approach to study the relationship betweeneconomic growth, fixed investment, and household consumption in Malaysia and found out that

householdconsumption and foreign direct investment impact significantly on GDP in short run only and in the long run,economic growth had a permanent impact on household consumption and investment.

Agalega and Antwi (2013) studiedthe economy of Ghana from 1980-2010 to examine the impact of inflation andinterest on GDP. By running multiple linear regressions, a strong positive correlation between GDP, interest rate andinflation was identified by them and the variance of interest rate and inflation explained about 44% of the variabilityof GDP. They further added that GDP and inflation have a positive coefficient where interest rate and GDP have anegative coefficient.

Rahman (2014) examined the inflation and economic growth relationship in Bangladesh during 1976 to 2011usingvector auto-regression (VAR) and discovered a statistically significant negative relationship between inflation andeconomic growth while a study covering the period of 2000-2012 concluded that inflation rate and GDP growthwere positively correlated in Bangladesh

Ismaila and Imoughele (2015) examined macroeconomic determinants of economic growth inNigeria measured by real gross domestic product (RGDP) from 1986 to 2012. The ADF unit root test and Johansen's co-integration wereused to test for both short and long run relationship between economic growth and macroeconomicdeterminants. The study recommended that there is need for government to consciously developthe business environment by provision of the necessary business infrastructure which will lowerthe cost of doing business in Nigeria. There is also the need for government to retain tight broadmoney supply and fiscal policies in order to fight inflation

Oshodi (2018) examined empirical analysis of macroeconomic indicators on economic growth inNigeria and China. Both countries rediscovered themselves in the late 70s and put in placesustainable economic trajectory to take a leadership position but still Nigeria revolves around sameposition after 50 years of independence. This analysis examined the major development indicatorsand compares the two countries to appreciate empirical trends and put in place strategic effortswhere necessary with 22 year time series data from 1994 to 2015 was considered. The AugmentedDickey Fuller (ADF) test to determine the mean and variance of the data are consistence over time.While the ordinary least square was used to ascertain the extent of relationship existing betweenthe macroeconomic indicators. The study concluded with empirical evidences that trends inmacroeconomic variables can be used to predict the economic growth of these countries.

Research GAP: No single study has examined the combined impact of all the three selected macroeconomic variables considered in this paper (Interest Rate, Inflation Rate, and Exchange Rate, on the economy of Nigeria

Theoretical Framework

This work adopted Neo classical of theory of interest as its theoretical base and guide, because the theory gives the ground upon which the relationship between interests rate on loanable fund, money supply, inflation and economic growth can be tested and analyze.

3.0 Methodology

Model specification

Model specification explains the functional relationship between macroeconomic variables. The study adopted the model of

Zekeri& James (2020), which was modified to achieve the objectives of the study

The functional form of the model is expressed as:

$RGDP_t$= F($INTR_t$, EXR_t, $INFR_t$)…… (1)

The linear form of the model can be expressed as follows;

$RGDP_t$:$\alpha_o + \beta_1 INTR_t + \beta_2 EXR_t - \beta_3 INFR_t$……(2)

In order to allow for the inexact relationship among the variables as in the case of most economic variables, stochastic error term 'μ_t' is added to the equation. Thus, we can express the economic form of the model as:

$RGDP_t=\alpha_o + \beta_1 INTR_t + \beta_2 EXR_t + \beta_3 INFR_t + \mu_t$ ……. (3)

Where;

$RGDP_t$= real gross domestic product

INTR =Interest Rate

EXR_t = Exchange Rate

$INFR_t$ =Inflation Rate

μ = the stochastic error term

In order to properly estimate the parameters of the postulated model, we rescale the dependent variable by logging it, thus, transforming it into a log-linear model as follows:

$LOG(RGDP_t)$: $\alpha_o + \beta_1 LOG(INTR_t) + \beta_2 LOG(EXR_t) + \beta_3 LOG(INFR)_t + U_t$……...(4)

Apriori Expectations

By theoretical postulation, the coefficients of Interest Rate (INTR)is expected to be positive while the coefficient of exchange rate (EXR) and Inflation Rate (INFR) are expected to be negative.

$$\alpha_o, \beta_1, > 0, \beta_2, \beta_3 < 0$$

Nature and Sources of Data

The research relied mainly on secondary data published by the Central Bank of Nigeria (CBN). These annual time series data for analysis related to key macroeconomic variables and economic growth in Nigeria. The annual time series data with respect to Domestic product (RGDP), Intrestrate(INTR), Exchange rates (EXR), as well as Inflation rate (INFR) were obtained from the statistical bulletin of the Central Bank of Nigeria (CBN) and National Bureau of Statistic (NBS). The period covered for this study is from 1990 to 2020

Methods of data analysis

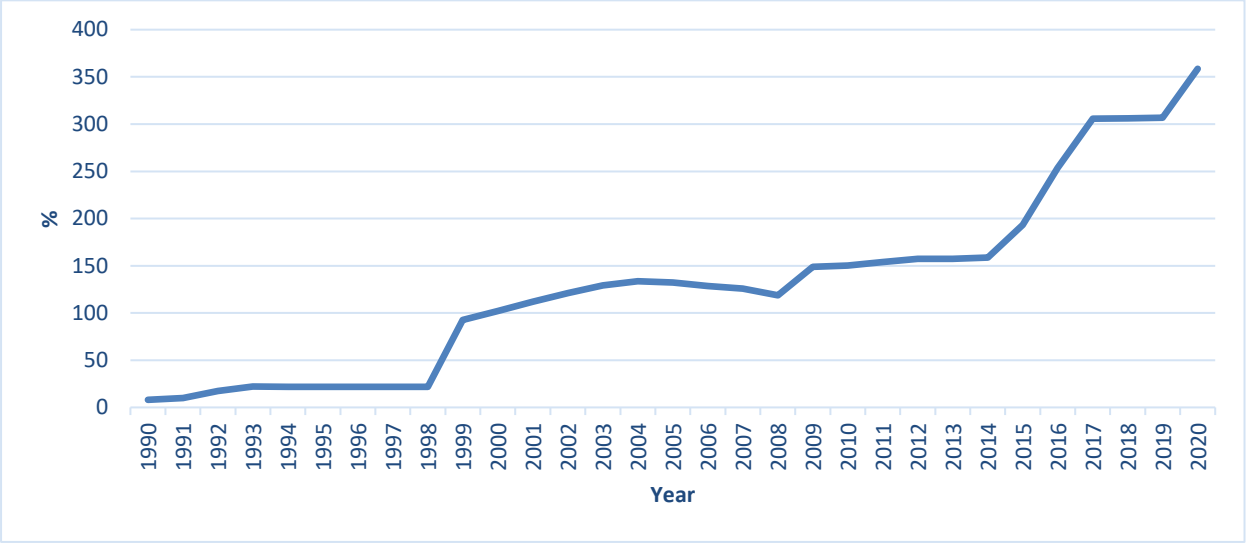
The analysis of the data collected for the purpose of this research shall be carried out using quantitative, analytical techniques which involves running a regression of the specified economic model using appropriate estimation techniques. In a bid to avoid the phenomenon of spurious regression, the data were subjected to diagnostic investigation to determine their stationary status as well as the trend trajectory or the data.

4.0 Data Presentation

4.1: Trend Analysis

The trends in the variables are captured in separate figures below. This is to give an insight regarding the existence of any unique characterization of the variables over the stud

Figure 4.1 (a): A line chart showing distribution of trends of Nigeria's real Gross Domestic Product (=N= Million) from 1990 -2020



Source: Author's computation, 2021 using E-views 9.0

An examination of fig. 4.1 (a) above showed that real gross domestic product (RGDP) is in upward trend. The figure also reveals that GDP is generally stable during the period 1990-2020. The time series data on appendix 1 underscore the upward trend in RGDP. The data showed that real gross domestic product (RGDP) which stood at =N=21,462,733.73.28 million in 1990 rose consistently to =N=70, 014, 371.85 million in 2020. This indicates that GDP has an upward trend (see appendix 1 attached).

Figure 4.1 (b): Trend in Interest rate (%) from

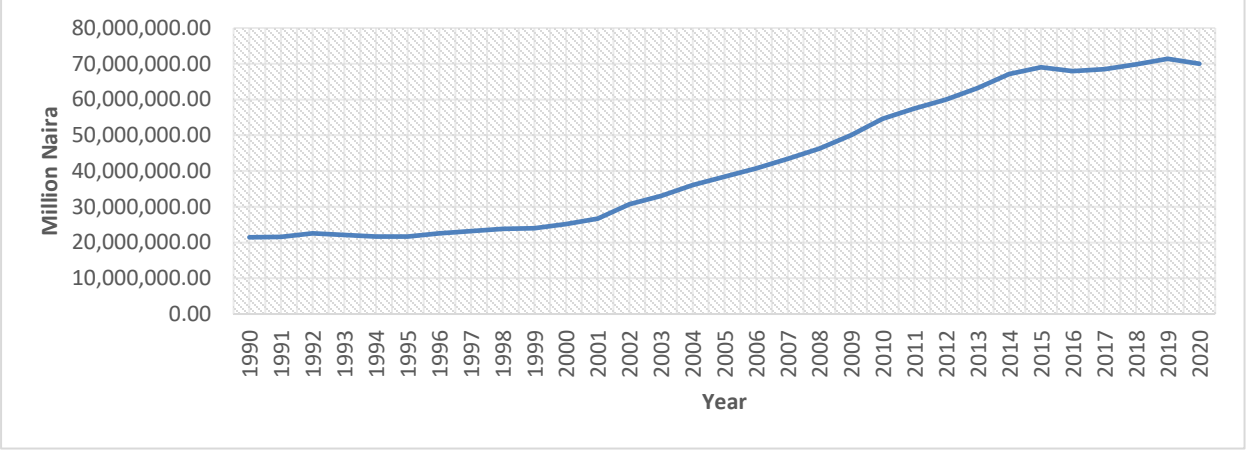
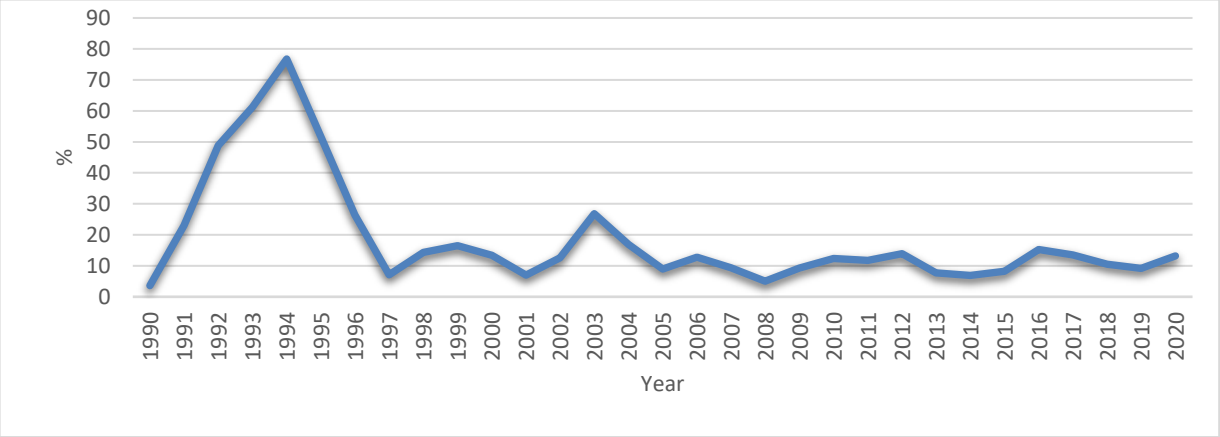


Fig. 4.1(b) above showed that interest rate (INTR) is generally in zigzag trend, reaching its maximum in 2003. The figure shows that INTR in Nigeria was not stable between 1990 and 2020 while becamestable from 2004 - 2020.The initial instability in INTRexperienced in Nigeria could be due to macroeconomic environment in the country arising from monetary policies instruments by the central bank of Nigeria (CBN).

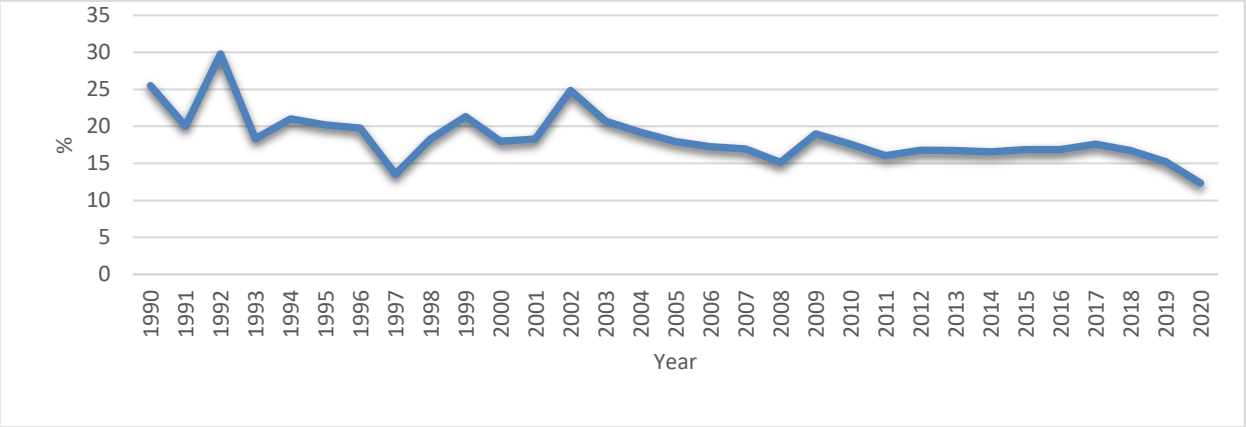
Fig. 4.1 (c) Trend in Exchange Rate (EXHR)



Source: Author's computation, 2021 using E-views 9.0

An examination of fig. 4.(c) above showed that exchange rate (EXHR) is generally in zigzag upward trend. The figure also showed that foreign exchange rate in Nigeria was not stable between 1990 and 2020. Exchange rate (EXHR) increases consistently from =N= 8.04 per U S dollar in 1990 to =N= 358.56 per one dollar in 2020 (i.e, the exchange value of naira in terms of U. S dollar falls consistently in the 1990-2020). It has an upward trend (see appendix 1 attached).

Fig. 4.1 (d) Trend Inflation Rate (INFR)



Source: Author's computation, 2021 using E-views 9.0

Fig. 4.1 (d) above showed that inflation (INF) is generally in zigzag trend, reaching its maximum in 1994. The figure also shows that inflation in Nigeria was not stable between 1990 and 2020.Inflation rate (INF) rose from 76.76 percent in 1994. It falls to 5.06 percent in 2008, and rose sharply to 15.24 percent 2016. It falls again to 9.16 percent in 2019, and rose to 13.21 percent in 2020. It has zigzag trend (see appendix 1 attached).

Table 4.2: Summary of Descriptive Statistics

Descriptive Statistics	RGDP	INTR	EXHR	INFR	GDP_{t-1}
Mean	7.582193	18.52290	129.4529	18.51484	7.329122
Median	7.584091	17.95000	128.6500	12.79000	7.556998
Maximum	7.853624	29.80000	358.5600	76.76000	7.853624
Minimum	7.331685	12.32000	8.040000	3.610000	0.000000
Std. Dev.	0.203179	3.460566	97.15631	17.42377	1.374452
Skewness	0.051351	1.299783	0.680894	2.067617	-5.120470
Kurtosis	1.368520	5.461759	2.832745	6.390045	27.85486
Jarque-Bera	3.451688	16.55659	2.431487	36.93207	933.4111
Probability	0.178023	0.000254	0.296490	0.000000	0.000000
Sum	235.0480	574.2100	4013.040	573.9600	227.2028
Sum Sq. Dev.	1.238452	359.2654	283180.5	9107.634	56.67355
Observations	31	31	31	31	31

Source: Author's computation, 2021 using E-views 9.0

The table 4.2 reveals that Gross domestic product (GDP) has a mean of 7.582193and varies from a minimum of 7.331685to a maximum of 7.853624and a standard deviation of 0.203179with a probability value of 0.0178023. interest rate (INTR) has a mean of 18.52290and varies from a minimum of 12.32000to a maximum of 29.80000and a standard deviation of 3.460566with a probability value of 0.000254. Exchange rate (EXR) has a mean of 129.9484and varies from the minimum of 8.040000to a maximum of 358.5600with a standard deviation of 97.15631and probability of 0.296490. Furthermore, inflation rate (INFR) has a mean of 18.51484and varies from the minimum of 3.610000to a maximum of 76.76000 with a standard deviation of 17.42377 and probability value of 0.0000. Lastly, lagged value of gross domestic product (GDP_{t-1}) has a mean of 7.329122and varied from a minimum of 0.000000to a maximum of 7.853624and a standard deviation of 0.43277 with a probability value of 0.000000. Consequently, real gross domestic product, foreign direct investment, exchange, degree of openness, trade balance and lagged value of real gross domestic product, were positively skewed while lagged value of real gross domestic product has negative skewness.

4.3 Results of Tests Conducted

The results of tests conducted are summarized, presented in tabular form and analyzed below: The tests conducted are: unit root, and autoregressive distributive lag (ARDL) Model.

4.3.1 Unit Root Test

Dickey-Fuller (1979) stated that there is likelihood of obtaining spurious results if the series that generated the results are non-stationary. This is why this study investigated the time series properties of the data by conducting unit root test for stationarity using Augmented Dickey-Fuller (ADF) method. The results are presented on table 4.3 below.

Table 4.3: Summary of the description of variables and their corresponding unit and sources

Variable	Description	Unit	Source
RGDP	Real Gross Domestic Product	Million Naira	NBS
INTR	Interest rate	Percentage	CBN
EXHR	Exchange rate	US$	CBN
INFR	Inflation rate	Percentage	NBS

Source: Researcher's own computation

Table 4.2: Augmented Dickey-Fuller (ADF) Unit Root Test

Series	ADF Test Statistics	5% Critical Value	Probability Value	Order of Cointegration
GDP***	-7.147897	-2.971853	0.0000	1(2)
INTR	-3.984840	-2.963972	0.0046	1(0)
EXHR	-3.794726	-2.967767	0.0076	1(1)
INFR	-4.371840	-2.971853	0.0019	1(1)

Source: Author's computation, 2019 using E-views 9.0

The results of unit root test shown on table 4.2 above revealed that all the absolute values of ADF test statistics for RGDP, INTR, EXHR and INFR are greater that their critical values at 5% implying that RGDP, INTR, EXHR and INFR are stationary at 5%, It is integrated of order 1, 2 and 0 that is, I(1), 1(2) and 1(0). The results also showed that all the variables are stationary at both 5% since their absolute value of ADF statistics are respectively greater than their critical values at 5%.

Table 4.3: Regression of RGDP =F($INTR_t$, EXR_t, $INFR_t$)**from 1990-2020**

Dependent Variable: RGDP
Method: ARDL
Date: 10/07/21 Time: 03:35
Sample (adjusted): 1992 2020
Included observations: 29 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INTR EXHR INFR
Fixed regressors: C
Number of models evalulated: 54
Selected Model: ARDL(2, 0, 1, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	0.335229	0.101970	13.09429	0.0000
RGDP(-2)	-0.341725	0.103935	-3.287863	0.0034
INTR	0.003151	0.000550	5.725094	0.0000
EXHR	-0.000312	0.310005	-4.267867	0.0003
EXHR(-1)	0.000328	0.930005	4.130925	0.0004
INFR	-0.000631	0.000109	-5.806258	0.0000
C	0.016968	0.124994	0.135748	0.8933

R-squared	0.998888	Mean dependent var	7.599416
Adjusted R-squared	0.998584	S.D. dependent var	0.198667
S.E. of regression	0.007475	Akaike info criterion	-6.747887
Sum squared resid	0.001229	Schwarz criterion	-6.417850
Log likelihood	104.8444	Hannan-Quinn criter.	-6.644523
F-statistic	3292.321	Durbin-Watson stat	2.074591
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Source: Output of E-Views 9.0, 2021.

Model:

LRGDP= 0.01697+0.00315INTR-0.00031EXHR-0.00063INFR+U_t

(0.13575) (0.5.7251) (-4.26767) (-5.80626)

Where;

RGDP = Real Gross Domestic Product

INTR = Interest rate

EXHR = Exchange rate

INFR = Inflation rate

4.3 Discussion of Results

The result on table 4.3 above revealed the following:

The equation shows that $\alpha = 0.016797$ which is the intercept. This is the base level of prediction for the dependent variable when all the independent variables are equal to zero. The coefficients of the independent variables measure how a percentage change in independent variables affect the dependent variable.

(i.) 1 percent decrease in interest rate leads to about 0.0.00315% increase in real gross domestic product (RGDP). It was found that coefficient of INTR is positive, indicating positive relationship between INTR and RGDP in the periods 1990-2020, and this is in line with a priori. This result is statistically significant at 5 percent as the p-value of 0.0000. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the more statistical noise in the estimates. The standard error is 0.000550percent which is small or significant and thus shows that FDI is statistically reliable to predict RGDP in Nigeria.

(ii.) 1 percent increase in exchange rate (EXHR) leads to about 0.00031% increase in real gross domestic product (RGDP). It was found that coefficient of EXHR is negative, indicating negative relationship between EXHR and RGDP in the periods 1990-2020, and this is in line with a priori. This result is statistically significant at 5 percent as the p-value of 0.0003. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the more statistical noise in the estimates. The standard error is 0.310005percent which is small or significant and thus shows that EXHR is statistically reliable to predict RGDP in Nigeria.

(iii.) 1 percent increase in inflation rate (INFR) leads to about 0.000164 percent increase in real gross domestic product (RGDP). It was found that coefficient of INFRisnegative, indicating positive relationship between INFR and RGDP in the periods 1990-2020, and this is in with a priori expectation. This result is statistically significant at 5 percent level as the p-value of 0.0000. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the more statistical noise in the estimates. The standard error is 0.000109 percent which is small or significant and thus shows that INFRis statistically reliable to predict RGDP proxies for sustainable development in Nigeria.

5.0 Conclusion and Recommendations

This research study has so far examined the effects ofsome selected macroeconomic variables on economic growth in Nigeria employing Unit root test and ARDL approach. Specific references were made to the relevant macroeconomic variables complementary to foreign exchange rates such as interest rates and inflation rates. Empirical results reveal that exchange rates and other related variables considered for the analysis jointly had significant effect on

economic growth in Nigeria during the period under review, implying that interest rate, exchange rate and inflation rate are an important determinant of productivity in Nigeria.The real Gross Domestic Product is the dependent variable proxied by economic growth. The result shows that there is positive and significant impact of INTR whileEXRand INFR have negative impact on economic growth in Nigeria.The study therefore recommended that, government should provide enabling macroeconomic environment particularlyright monetary policies in place in terms of providing policies that will boast the local production in order to increase output to cushion effects of high cost of the goods and servicesas well as increase forex supply in to maintain stability of the exchange rate.

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Appendix 1: Original Data Sourced on selected variables

Year	RGDP (=N= Million)	INTR (%)	INFR (%)	EXHR (%)

1990	21,462,733.72	25.5	3.61	8.04
1991	21,539,613.83	20.01	22.96	9.91
1992	22,537,095.78	29.8	48.8	17.3
1993	22,078,072.14	18.32	61.26	22.05
1994	21,676,851.42	21.23	76.76	21.89
1995	21,660,487.07	20.18	51.59	21.89
1996	22,568,866.73	19.74	26.45	21.89
1997	23,231,123.13	13.54	7.07	21.89
1998	23,829,758.43	18.29	14.32	21.89
1999	23,967,591.42	21.32	16.51	92.69
2000	25,169,538.79	17.98	13.45	102.11
2001	26,658,621.29	18.29	6.95	111.94
2002	30,745,192.06	24.85	12.53	120.97
2003	33,004,796.34	20.71	26.83	129.36
2004	36,057,737.78	19.18	16.94	133.5
2005	38,378,796.06	17.95	8.99	132.15
2006	40,703,681.38	17.26	12.79	128.65
2007	43,385,877.08	16.94	9.35	125.83
2008	46,320,014.94	15.14	5.06	118.57
2009	50,042,360.65	18.99	9.24	148.88
2010	54,612,264.18	17.59	12.4	150.3
2011	57,511,041.77	16.02	11.73	153.86
2012	59,929,893.04	16.79	13.87	157.5
2013	63,218,721.73	16.72	7.73	157.31

2014	67,152,785.84	16.55	6.86	158.55
2015	69,023,929.94	16.85	8.21	193.28
2016	67,931,235.93	16.87	15.24	253.49
2017	68,490,980.34	17.58	13.55	305.79
2018	69,799,941.95	16.72	10.54	306.08
2019	71,387,826.67	15.21	9.16	306.92
2020	70,014,371.85	12.32	13.21	358.56

Source: National Bureau of Statistics and Central Bank of Nigeria's Bulletin, 2020

Appendix 2: Transformed Data

Year	RGDP	INTR	INFR	EXHR
1990	7.33	25.5	3.61	8.04
1991	7.33	20.01	22.96	9.91
1992	7.35	29.8	48.8	17.3
1993	7.34	18.32	61.26	22.05
1994	7.34	21.23	76.76	21.89
1995	7.34	20.18	51.59	21.89
1996	7.35	19.74	26.45	21.89
1997	7.37	13.54	7.07	21.89
1998	7.38	18.29	14.32	21.89
1999	7.38	21.32	16.51	92.69
2000	7.40	17.98	13.45	102.11
2001	7.43	18.29	6.95	111.94
2002	7.49	24.85	12.53	120.97
2003	7.52	20.71	26.83	129.36
2004	7.56	19.18	16.94	133.5
2005	7.58	17.95	8.99	132.15
2006	7.61	17.26	12.79	128.65
2007	7.64	16.94	9.35	125.83
2008	7.67	15.14	5.06	118.57
2009	7.70	18.99	9.24	148.88
2010	7.74	17.59	12.4	150.3
2011	7.76	16.02	11.73	153.86

2012	7.78	16.79	13.87	157.5
2013	7.80	16.72	7.73	157.31
2014	7.83	16.55	6.86	158.55
2015	7.84	16.85	8.21	193.28
2016	7.83	16.87	15.24	253.49
2017	7.84	17.58	13.55	305.79
2018	7.84	16.72	10.54	306.08
2019	7.85	15.21	9.16	306.92
2020	7.85	12.32	13.21	358.56

Source: Researcher's own computation

Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Assessment of the Effects of Financial Development on Poverty Reduction in Nigeria

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Abstract

This study examines the effect of Financial Sector Development on Poverty Reduction in Nigeria. The study used annual time series data from 1980 to 2018 with Poverty as the Dependent variable while the ratios of credit to the private sector, total micro-credits and stock market capitalization to GDP are the proxies of financial development. Government expenditure is used as a control variable. Autoregressive and distributive lag model (ARDL) was employed as estimation techniques. The study revealed that credits to private sector, stock market capitalization and poverty reduction are cointegrated implying that financial sector development has a long run relationship with poverty reduction but money supply has only a short run effect on poverty reduction. Government expenditure does not have significant effect on poverty reduction both in short and long run. The study also recommends for the need for government to facilitate the development of the financial sector by setting appropriate regulatory and macroeconomic policies that will bring about improvement in institutional quality, and avoid instability in the sector.

Keywords: credit to the private sector, financial development, micro-credits, poverty reduction

JEL Classification*:* G21, G23, I32

1. Introduction

Financial sector serves as an intermediation channel through which surplus spending units lend money to deficit spending units. The sector increases productivity by increasing level of investment in human and physical capital (Juzohong, 2009). The development of financial sector comes in two ways, either by increasing and enhancing the intermediary function or through credit expansion or boom. It is worthwhile to note that the linkage between financial development and poverty reduction can be direct or indirect. Financial development can lead to poverty reduction since access to finance for the poor can be widened through offering of credits (Hafiz, Abdul, Arif and

Awais, 2011 and Juzohong, 2009). One of the instruments of financial development that could directly reduce poverty is micro credits. This tremendously influences wellbeing since beneficiaries from this credit scheme are mostly low-income earners or rather small-scale entrepreneurs and rural communities who are predominantly rural households. On the other hand, the indirect channel comes through the "trickle-down" effect where the financial development depicts a positive impact on economic growth which normally leads to reduction in poverty.

Financial development can only lead to poverty reduction by establishing strong inter-sectoral linkages with the other sectors including the government sector. Expressly, government investments have a spillover effect on poverty. Moreover, government needs to introduce effective policies that will tackle corrupt practices as to a large extent; these practices have an adverse effect on the contribution of financial development to poverty reduction in the country. Despite various programmes by successive governments in Nigeria to trim down poverty, abject poverty is still evident as the economy has been experiencing high poverty level (NBS, 2016). These programmes include the creation of Bank of Agriculture, Small and Medium Enterprise Equity Investment Scheme (SMEEIS), Rural Banking Programmes, Microfinance Scheme, Banking Reforms, National Poverty Eradication Programmes (NAPEP) etc.

Data on key financial development measures increased substantially through 1980 to 2019. For instance, in 1981 credit to the private sector as a percentage of GDP stood at 6.15%, 6.78% in 1990, 9.29% in 2000, 18.96% in 2010 and 17.63% in 2019 while in 1981 money supply as a percentage of GDP stood at 10.39%, 9.59% in 1990, 12.44% in 2000, 20.01% in 2010 and 23.52% in 2019 (CBN, 2020). Comparatively, despite the significant increase in the financial development measures, the proportion of Nigeria's population living below the poverty line significantly increased between 1980 and 2018. A survey conducted by the Nigeria Bureau of Statistics NBS, (2012) shows that the Nigeria's poverty profile increased from 54.4% in 2004 to 69% in 2010 and World Bank, (2014) shows that poverty level increase from 35% in 2011 to 33.1% in 2013 and 2014 indicating that poverty has been on the increase in Nigeria but dropped only between 2011 and 2014. Moreover, according to the World Bank (2020), the poverty and inequality of Nigeria as released by NBS, shows that in 2019, 40% of the total population or almost 83 million Nigerians live below the poverty line.

Several studies have examined both theoretical and empirical link of financial development to poverty reduction. Specifically, in the case of Nigeria, these studies have examined the effects of financial development on economic growth and poverty reduction (Odhiambo, 2009; Rudra, 2010; Samson and Elias, 2010; Dandume, 2014; Donghuyun and Kwanho, 2015). However, they concentrated more attention on the bank measures of financial development ignoring micro-credits and other variables from non-bank's sub-sectors despite the fact that they are very crucial in capturing financial development. Thus, this constitutes a wide gap in the literature as such more studies are required in this area. This paper therefore, employed both bank (Credits to the Private Sector and Micro-Credits) and non-bank (Stock Market Capitalization) measures of financial development in its analysis as well as extending its scope to 2018. In light of the foregoing, the study has addressed the following research question: Does financial development have any significant effects on poverty reduction in Nigeria? Thus, the objective of this paper is

to evaluate the effect of financial development on poverty reduction and examine the direction of causality between poverty reduction and financial development.

2. Literature Review

Financial Sector Development: A Conceptual Review

There is no single definition as to what constitute financial development. Rather, scholars have advanced different aspects as to when financial development is said to have occurred. To Levine (2005), occurrence of financial development come when the effect of imperfect information, transaction costs are lessened by the financial instruments, markets and intermediaries. This definition is limited to information asymmetry making it narrow in explaining the actual functions of financial system to the economy. Other scholars have developed broader definitions that explicitly bring out the meaning of financial development. For instance, Merton (1992), Merton and Bodie (2004) in Levine (2004) defined financial development in terms of improvement in the key functions the economy can derive from the system. Some of these functions include among others producing and processing of information about possible investments, monitoring of individuals and firms through good corporate governance and facilitation of exchange of goods and services.

From the foregoing definitions, financial development is a situation, where the financial sector offers effectively intermediary functions and enhances the banking habit of the public through significant reduction of information asymmetry and restoration of public confidence in the financial institutions. Since, what constitute financial sector consists of whole sales and retails, both formal and informal institutions rendering financial services which include commercial banks, stock market exchange, microfinance banks, mortgage banks, development banks, insurance firms, discount houses and so on (DFID, 2004).

2.1 Poverty: A Conceptual Review

One of the oldest and unresolved social problems of human society is poverty (Yakubu and Abbas, 2013). In every society, there are groups of people who are well to do consider to be rich and those who lack considered as poor. According to United Nations Development Programme UNDP (2006) poverty has been conceptualized within four different clusters. These clusters are seen from the perspectives of income and consumption tying poverty with inability to meet the basic needs of consumption, poor shelter or poorly equipped shelter without the needed furniture together with lack of some audio-visual materials that can help in making people well informed about the opportunities available in the society.

The Organization for Economic Cooperation and Development OECD (2013) opines that in most societies the notion of what constitutes poverty varies greatly as such, it is hard to arrive at one definition that encompasses the full meaning of poverty. However, some perspectives of the concept have emerged. Ebong (2013) defined poverty in terms of income/consumption perspective, the basic needs perspective and capability perspective as well as incapacitation in terms of human resource formation. Poverty can be absolute or relative, meaning that poverty in one place may not be poverty elsewhere. However, in absolute term, inability to satisfy the basic or minimum needs economic or social like food needs, medical and shelter is poverty irrespective of one's geographical environment.

In the context of this research, poverty is conceptualized in terms of income/consumption perspective as it is generally believed and observed as well that low level of income is the major and most

visible symptom of poverty. It is also based on the level of income that poverty line is constructed to determine a minimum level of income below which a person is considered to be absolutely poor. Also, the study lays more emphasis based on the Nigeria's context as relative poverty relate more to developed countries because absolute level of poverty in those countries has been wiped out (Brian-Vincent, 2009). Poverty is also multidimensional relating to income, deprivation, culture and even the psychology of people.

2.2 Financial Sector Development and Poverty Reduction

Financial development gives rise to poverty reduction in two ways. The first way signifies direct relationship running from the former to the latter by providing the poor opportunities to secure credits from banks, enjoy insurance services and mortgage financing all of which can affect the income of the poor positively. The second way is through the benefits that can be derived from rise in economic growth resulting from financial development (Holden & Prokopenko, 2001 in Abdelhafidh, 2013). This means, economic growth is enhanced by financial development and trickles down to the poor as a result of increased economic activities triggered by economic growth. This is also known as the indirect channel while the form is known as the direct channel. The usefulness of financial institutions to the poor is derived in form of savings and capital accumulation (Mckinnon, 1973).

This study premised linkage between the financial development and poverty reduction within the framework of Levine (2008) theoretical hypothesis. According to the theory, finance may alleviate poverty and lower inequality through intergenerational mobility. If the poor are offered financial access, then by funding educational and business endeavors, they may escape poverty over a generation. In modeling the theory, Levine (2008) incorporates dynasties and generations and shows how the income of a dynasty may be affected by financial development. The income of a dynasty is affected by its human capital wealth of assets. Human capital is a function of ability and schooling, where both are complimentary inputs in human capital production. The returns to opening a business depend positively on entrepreneurial talent. To become an entrepreneur it requires the payment of a fixed cost.

Also, with market imperfection, poor individuals with great ideas do not receive funding, whilst wealthy rich individuals, with average ideas have their projects funded and remain rich. This situation limit ability to bring efficient innovation in which case equitable income distribution is prevented. With perfect financial markets, no dynasties are cut off from external finance due to greater financial development; the rate of return on savings is purely determined by entrepreneurial ability. This reduces income inequality and the prevalence of poverty. Over several generations, accumulated savings may provide enough wealth so that the poor may be able to self-finance business ventures or even human capital investments.

2.3 Empirical Review

Sule and Momoh (2009) used a time series data from 1980 to 2007 on per capita income as dependent variable, stock market capitalization, price earnings ratio, dividends and listed securities as independent variables. From the cointegration and ECM results to the data there is the existence of long run connection among the variables while number of securities listed and time trend are in the long run inversely related to poverty.

Jegede, Kehinde J. and Akinlabi (2011) examined the empirical relationship between microfinance loan disbursement and poverty alleviation in a survey conducted in 2011.

The method employed in this study is the descriptive survey method with chi-square test, F-test and T-test. The study shows that microfinance have positive impact on poverty reduction through raising the income level of those who bank with them. The conclusion of this study shows that microfinance credit is a viable tool for poverty alleviation.

Taiwo and Ismail (2013) examined the relationship between sustainable financial services and poverty reduction in Nigeria from 1965 – 2010. The model of the study was estimated using Error Correction Model (ECM) to test for the short run dynamism and OLS method of estimation. The study found that financial deepening co-integrates with all the explanatory variables.

Dandume (2014) conducted similar study in this regard with annual time series data on the GDP as a dependent variable, ratios of bank deposit liabilities and credit to the private sector to GDP as well as poverty, trade openness and real interest rate as independent variables. The data is from Nigeria spanning period from 1970 to 2011. Using Two approaches of autoregressive distributive lag and Toda and Yamamoto Granger Non causality, the study found the existence of cointegration among the variables and financial development does not cause poverty reduction However, this study did not include the roles of government spending, investment (FDI), micro credits to the private sector and corruption which are very important factors that affect all the three major variables under study.

Oladoyin and Kayode (2014) using a time series data on head count ratio, per capita GDP, ratio to GDP of the value of credits granted, inflation rate and openness from 1980 to 2010.The study adopted a two-step procedure of estimation technique, vector autoregression (VAR) estimate and impulse-response analysis. They found Financialdeepening (M2) has a statistically significant negative effect on current level of poverty ratio in Nigeria. The results also show that past level of poverty is significant in explaining current level of poverty implying that poverty is affected by the shock to its past while poverty shock to financial deepening as measured by M2 as a percentage of GDP is also significant and positive in the short run but turns negative in the long run. Thus, the study concludes that the relationship between poverty and financial development is negative and credit to private sector has failed to cause a reduction in poverty.

Sylviane and Kangni (2008) similarly conducted a study also with a panel data from sixty five developing countries for a period of 1980 to 2002. The study used the percentage of the population leaving below one dollar per day as a measure of poverty and as a dependent variable with proxies of financial development as independent variables to establish the relationship in line with the Mckinnon conduit effect. The findings reveal that through the banking services acceptance of deposits, the poor derive the benefits and their well-being is reinforced. However, there is no significant improvement in the well-being of the poor through credits offered to the private sector. The conclusion drawn shows support for the Mckinnon conduit effect and indirect relationship between financial development and poverty reduction.

Rudra (2010) conducted a study with a time series data covering period from 1951 to 2008 in India. Cointegration and Granger causality tests were established from the VAR model and the results indicate the existence of cointegration among all the variables with the direction of causality flowing only from poverty reduction to economic growth and from economic growth to financial development, no causality from financial development to poverty reduction.

Selim, Yiyang and Kevin (2010) in their study conducted over time period from 1993 to 2004 used Head Count Index (HCI) as a proxy of poverty, Credit-GDP ratio and the M3-GDP ratio as proxies of financial development and financial instability. The study employed an efficient panel data estimation technique called fixed effect vector decomposition (FEVD) and pooled ordinary least square method for analysis. The results show that poverty falls as the level of financial development enhances. The study concludes that financial development facilitates poverty reduction while instability is detrimental to the poor.

Abdelhafidh (2013) used a panel data on household final consumption expenditure as a proxy of index of poverty, growth of GDP per capita. INQ is income inequality measured by the Theil index covering period from 1990 to 2011 for a sample of eighty nine countries. Based on three staged least square method the study found the direct channel effect of financial development on poverty is robust while the indirect channel is not.

Leila (2014) studied the nexus among financial development and poverty reduction using ARDL for 8 MENA countries with a panel data from 1990 to 2012. The study employed an auto-regressive distributive lag as the analytical technique. The estimates obtained show cointegration between household final consumption expenditure per capita in the first specification and ratio of domestic credit to the private sector to GDP for Algeria, Iran, Jordan and Tunisia. However, in the second specification, the ratio of liquid liabilities (M3) to GDP is positive and significant for all the countries. The study concludes that that financial development can lead to poverty.

Joyna (2016) in a similar study used data on headcount and cost of basic needs to proxy poverty reduction, GDP per capita, ratios of liquid assets and credit to private sector for period between 1974 and 2013 in Bangladesh. By using OLS and GMM methods of analysis, the study found the impact of financial development on poverty reduction to be positive implying a direct relationship between them. On the other hand instability impacts negatively on the income of the poor.

Johan (2017) investigated whether financial development is conducive in poverty reduction or not. Separating financial development into four categories and using newly available data, he found that both financial deepening and greater physical access is beneficial in reducing the proportion of people below the poverty line. Using alternative measures of financial instability, the results also challenge existing findings that it may increase the incidence of poverty. In addition, the results remain robust even when controlling for mobile money, providing a further valuable contribution to the literature.

3.0 Methodology

Description, Definition and Measurement of Variables

The data for this study were obtained from the Central Bank of Nigeria (CBN) and World Bank Financial Development Data.

Measure of Poverty

Final Households' Consumption Expenditure is used as a proxy of poverty reduction as used by Leila (2014). Thus, this study has employed final households' consumption expenditure (private consumption expenditure) as a proxy of poverty reduction. This is in line with the recommendation or rather definition of poverty by the World Bank that poverty can be measured in terms of ability to satisfy basic consumption needs or Dollar per day.

Measures of Financial Development:

A. **Bank Measures:**

i. **Ratio of credit to private sector to GDP (CPS)** measures the capacity of the financial sector ability to source productive investment and ensure that risk is properly managed as used by Samson and Elias, (2010), Anne and Kevin (2013) and Dandume (2014).

ii. **Ratio of Total Micro Credits to GDP (TMC).** Total Micro Credits in this study refers to the credits offered by the rural banks, community banks and micro finance banks as used by Nwakanma, Nnamdi and Omojefe (2014) in their study.

B. **Non Bank Measure:**

iii. **Ratio of Stock Market Capitalization to GDP**: According to Rajan and Zingales (1998) financial development can be measured by the ratio of Stock market capitalization to GDP. Ratio of Stock market capitalization to GDP (SMC) measures the size of stock market and it is equal to the value of listed shares divided by GDP. Fantessi and Kiprop (2015) also applied this ratio in their study.

Control Variable

i. **Government Expenditure:** This has been used as a control variable in the model as employed by Abdelhafidh (2013). The ratio of government expenditure to GDP will stand as the size of government or public sector in the economy. The importance of government expenditure in the model of this study is evident especially when one considers how the banking sector was affected by implementation of treasury single account.

Model Specification: Effects of Financial Development on Poverty Reduction

This study focuses only on the direct channel which assumes that financial development has a positive relationship or impact on the income of the poor. The model here was modified from the work of Sylviane and Kangni (2008). For the model, the study focused on two indicators of financial development (bank and nonbank indicators) and also considered government expenditure as a control variable as follows:

$$\Delta LPR_t = \beta_0 + \sum_{i=1}^{n} \propto_i LPR_{t-1} + \sum_{i=1}^{n} b_i LCP_{t-1} + \sum_{i=1}^{n} c_i LTMC_{t-1} + \sum_{i=1}^{n} d_i LMC_{t-1} + \sum_{i=1}^{n} \mu_i LGE_{t-1} + l_1 LPR_{t-1} + l_2 LCPS_{t-1} + l_3 LTMC_{t-1} + l_4 LMC_{t-1} + l_5 LGE_{t-1} + \varepsilon_t \ldots\ldots\ldots(1)$$

Where; β0= the intercept while, $\propto_i$,b_i, c_i, d_i, μ_i are the slopes (short run coefficients) of the ARDL model. They are the parameters capturing the short run dynamics. Thus, in the ARDL, the error correction model (ECM) is denoted by $\beta_0 + \sum_{i=1}^{n} \propto_i LPR_{t-1} + \ldots + \sum_{i=1}^{n} \mu_i GE_{t-1}$ in equation (2). Still in the equation, the cointegratin part is denoted by $l_1 PR_{t-1} + \cdots + l_6 GE_{t-1}$representing long run relationship. Where, l_2, l_3, l_4 and l_5 are the long run coefficients while, ε_t = the error term.

Methods of Analysis

This section consists of estimation diagnostic tests and data estimation techniques.

Estimation Diagnostic Tests

This study conducted multicollinearity test to trace whether or not, there is existence of correlation between the predictor variables in its models. Multicollinearity occurs when there is high correlation (linear dependency) between any two variables in the same model. This commonly happens when a

regression model is made up of several independent variables. Post estimation diagnostic test was also performed using Normality and stability tests.

Unit Root Test

Most financial time series are not stationary and using them like that could result to a problem of spurious regression result. According to Granger and Newbold (1974), prediction based on spurious regression is misleading and unreliable. To avoid the problem of spurious regression, unit root tests were conducted on the time series data since the mentioned problem arises basically when such tests are not conducted to ascertain the stationarity of the data.

ARDL Bound Cointegration Test

F-test was used to determine the existence of co-integration among the variables. This is achieved by examining the critical values obtained from the Pesaran Critical table based on I(0) and I(1). The results of the computed F- test is used to determine whether there is long run co-integration by comparing the two sets of critical values extracted from the Pesaran critical tables which are based on 1(0) and 1(1).

Methods of Data Analysis

This study used Autoregressive Distributed Lag Model (ARDL) and Granger Causality Test as its methods of analysis.

RESULTS AND DISCUSSION

The multicollinearity tests results are shown in tables 4.1

Table 4.1: Pairwise Correlation

	LOG(CPS)	LOG(TMC)	LOG(MC)	LOG(GE)
LOG(CPS)	1.000000	0.563694	0.627274	0.690661
LOG(TMC)	0.563694	1.000000	0.172173	0.367711
LOG(MC)	0.627274	0.172173	1.000000	0.539368
LOG(GE)	0.690661	0.367711	0.539368	1.000000

Source: Author's computation using E-views 10, 2020.

Tables 4.1 shows the results of the pairwise correlations among the variables under study. The results indicate absence of multicollinearity in all the variables. Thus, there is no evidence of the existence of severe multicollinearity. This again indicates absence of multicollinearity among the variables of interest.

Unit Root Test

The unit root tests were assessed using intercept and trend models at both level and first Difference. The result of the unit root test is shown in table 4.2:

Table 4.2:Unit Root Tests

	ADF		PP		
Variables	**Level**	**1st Difference**	**Level**	**1st Difference**	**Stationarity**

LPR	-3.366121**	-9.625403***	-3.546121**	-9.297257***	I(0)
LCPS	-1.840210	-4.782057***	-1.033220	-14.17608***	1(1)
LTMC	-2.044194	-4.785420***	-2.004322	-6.704843***	1(1)
LMC	-0.707817	-5.686348***	-0.654440	-5.454786***	1(1)
LGE	-6.967543***	-6.347146***	-5.566551***	-8.919805***	1(0)

***, ** and * indicate 1%, 5% and 10% levels of significant respectively.

Source: Author's computation using E-views 10, 2020.

Tables 4.2 presents the results of the ADF and PP tests at levels and first Difference. The results revealed that all the variables were integrated at first difference I(1) except (LPR) and (LGE) which were integrated at levels I(0). This result shows that only the log of final households consumption expenditure (LPR) and log of Government expenditure are stationary at levels while the remaining variables are stationary at the first difference I(1).This implies that none of the variables is integrated at second difference I(2). Hence, it satisfies the condition for Autoregressive Distributive lag model (ARDL) Bound Cointegration tests.

ARDL Bound Test

This paper employed Autoregressive Distributed lag Model ARDL developed by Pesaran (2001) to analyze the effect of financial development on poverty reduction in Nigeria. This technique can be applied on time series data whether they are stationary at level I(0) or at first difference I(1) of fractionally co integrated. It is important to note that the pre- conditions for employing ARDL technique are that the dependent variable must be non-stationary at level and none of the variables should be integrated at second order (I(2)) in the ADF test. The ARDL model is sensitive to the lag length which was selected on the basis of Akaike information criteria (AIC) for this study.

The ARDL bound co-integration test results are presented in table 4.3. In the table, the F-statistics is 3.558793 and is greater than upper critical value at 5% and 10% levels of significance. This result suggests that we can reject the null hypothesis of no long run relationship. By implication, this result is indicative of the fact that the co-integrating form and long run coefficients can be evaluated and ARDL (short run) be estimated.

Table 4.3: ARDL Bound Co-integration Test

F-Statistics: 3.558793	
Critical Value Bounds	
Sgf.	**Lower Bound I(0)** **Upper Bound I(1)**

10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Source: Author's computation using E-views 10, 2020.

Estimation of Short Run Results

The results of the ARDL Bound co-integration tests indicate the presence of co-integration among the variables. Hence ARDL short and long run can be estimated. The short run results are presented in table 4.4 below.

Table 4.4: Short Run Results

Dependent Variable=LogPR			
Variable	**Coefficient.**	**t-stat**	**p-value**
LOGPR(-1)***	-0.601921	-3.584605	0.0012
LOGCPS(-1)***	0.313677	2.764517	0.0097
LOGTMC	-0.024537	-0.793361	0.4338
LOGMC **	0.035539	2.380145	0.0239
LOGGE	-0.036903	-0.648985	0.5213
D(LOGCPS)	-0.076018	-0.266725	0.7915
CointEq(-1)***	-0.601921	-4.490713	0.0001

Source: Author's computation using E-views 10, 2020.

Table 4.4 presents the ARDL short run result which reveals that the coefficients of the lagged value of PR (households final consumption expenditure) is negative but statistically significant at 1%, lagged log of credit to the private sector and log of stock market capitalization are statistically significant in the short run at 1% and 5% levels of significance. This implies that a percentage increase in the lagged FHC, lagged log(CPS) and log MC will result to 60% reduction in FHC, 31% and 3.5% increase in FHC respectively. The results do not show any evidence of any significant impact of total micro-credits and government expenditure on poverty reduction. However, the result is indicative of a positive impact of nonbank financial development measure on poverty reduction in the short run.

Estimation of Long Run Results

The results of the estimated long run coefficients for objective 1 are presented in table 4.5.

Table 4.5: Long Run Results for Objective 1

EC = LOG(PR) - (0.5211*LOG(CPS) -0.0408*LOG(TMC) + 0.0590*LOG(MC) – 0.0613*LOG(GE)

Variable	**Coefficient.**	**t-stat**	**p-valu**

LOGCPS***	0.521127	5.102967	0.0000
LOGTMC	-0.040764	-0.876960	0.3875
LOGMC**	0.059042	2.188292	0.0366
LOGGE	-0.061309	-0.650268	0.5205

Source: Author's computation using E-views 10, 2020.

Table 4.5 presents the long run coefficients and shows that coefficients of two out of the three financial development variables in the model are statistically significant at 1% and 5%. This suggests that in the long run credit to the private sector and market capitalization are positively and significantly related to poverty reduction. Thus, the results reveal that a percentage change in the credit to the private sector will account for 52% increase in household consumption expenditure and a 5% increase in stock market capitalization will results into 5.9% increase in PR respectively. However, there is no there is no evidence that government expenditure has a significant effect on poverty reduction.

Post-Estimation Diagnostic Tests

These include the normality test. Serial correlation (LM), heteroscedasticity, and stability test

Table 4.7: Normality Test, Serial Correlation LM Test and Heteroscedasticity Test:

Normality Test		**Serial Correlation LM Test H0: No Serial Correlation**		**Heteroscedasticity Test Ho: Homoscedastic**	
Statistics	**Results**	**Statistics**	**Results**	**Statistics**	**Results**
Skwenes s	**0.069**	**F-Stat**	**1.740751**	**F-Stat**	**1.598505**
JarqueB era	**0.5596**	**Prob.**	**0.1818**	**Prob.**	**0.1820**
Kurtosis	**2.413**				
Prob.	**0.7559**				

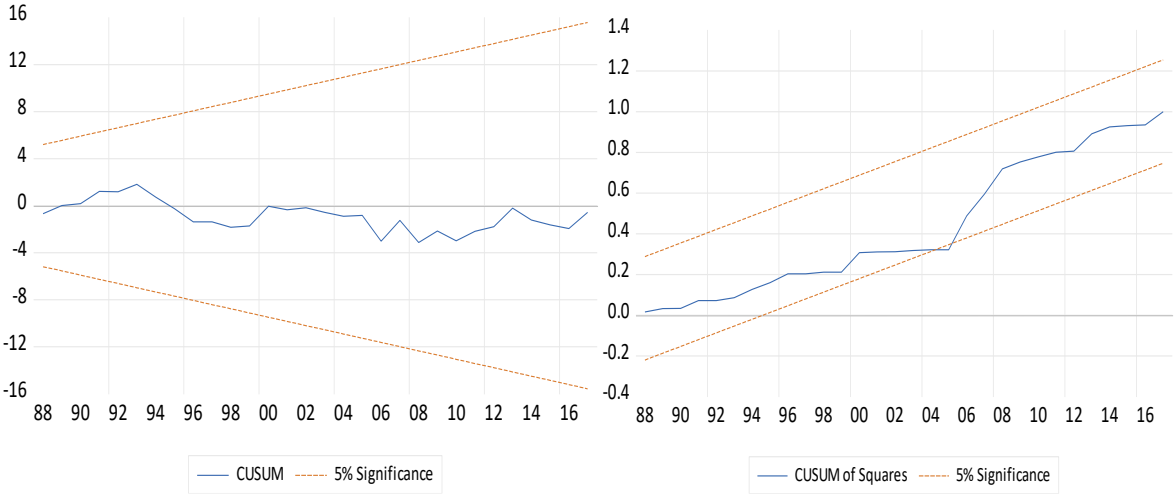
Source: Author's computation using E-views 10, 2020.

The diagnostic tests indicate that the residuals are normally distributed. The F statistics (1.740751) and probability value of 0.1818 indicate that the null hypothesis of no serial correlation cannot be rejected. In the heteroscedasticity test also the null hypothesis of Homoscedasticity cannot be rejected. There is no serial correlation and the series are homoscedastic. The results confirm that the models are well behaved.

Stability Test

Stability tests were conducted for all the models of the study using cumulative sum

(CUSUM) and cumulative sum of squares (CUSUMSQ). These tests are presented in figure I.



Source: Author's computation using E-views 10, 2020.

Figure i: CUSUM and CUSUMSQ

Cumulative sum (CUSUM) and cumulative sum of square (CUSUMSQ) were used to test the parameter stability of the model. This is also based on the null hypothesis that the regression model is correctly specified with stable parameters. The CUSUM and CUSUMSQ graphs are plotted at 5% level of Significance. Since the curves are within the critical band of 5%, it means that the regression model well specified with stable parameters. However, there is slight evidence of instability in the model in 2005 which may be due the shock of 2005 reform in the banking sector. This is shown in the CUSUMSQ of model 3. Thus, based on the plots, one cannot reject the null hypotheses that the models are stable as such the models do not suffer from serious instability over the periods under study

The ARDL bound test revealed the presence of co-integration in the model which led to the estimation of ECM. In the ARDL short run result the previous values of the private sector credit has a significant short run effect on poverty reduction but market capitalization have significant impact on poverty reduction. However, in the long run both private sector credits and market capitalization have significant effect on poverty reduction. This result conforms to the findings of Rudra (2010), Selim, Yiyang and Kevin (2010), Abdelhafidh (2013) and Joyna (2016). Nevertheless, the findings are in contrast with those of Sule and Momoh (2009), Jegede et al. (2011), Oladoyin and Kayode (2014) among others.

Conclusion and Recommendations

The study divulged that the amount of credits to the private sector (CPS) and total micro credits (TMC) have no any significant impact on poverty reduction in the short run. However, the result shows that in the long run credit to the private sector and market capitalization are positively and significantly related to poverty reduction but still with no evidence of a significant relationship between total micro credits and poverty reduction in the long run. The study disclosed that government expenditure has no significant impact on poverty reduction. Thus, more attention should be geared towards creation of enabling investment atmosphere that can result into poverty

reduction rather than depending on government expenditure. This can be achieved by improving access to credits by the private sector with low interest rates. Our stock exchange market should be strengthened by creating awareness to the public of the importance and profitability of the stock market. There is also the need for government to facilitate development of the financial sector through appropriate regulatory and macroeconomic policies that will bring about improvement in institutional quality, and avoid instability in the sector.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Effects of Interest Rate on Domestic Investment in Nigeria: Linear and Non-Linear Approaches

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Abstract

This work investigated the impact of interest rates variations on investments in Nigeria, for the periods between 1981 and 2018. The linear and non-linear Autoregressive lagged (ARDL and NARDL) techniques were employed to capture both the long-run and short-run dynamics of the variables as well as the asymmetric effects of interest rate on investment in the model. On the whole, investment behaviour was found to be insensitive to interest rate in Nigeria looking at it both from the linear and non-linear ARDL techniques employed in the model. Judging from the asymmetry test, some slight level of asymmetry was found to hold between positive and negative interest rate values. This holds at a 12% level of significances using the stepwise regression result. So, whether or not we aggregate or decompose interest rate into its positive and negative changes, it was found not to impact investment greatly it rather affected their relationship which happens to be in line with economic theory. Specifically, the empirical results of the ARDL indicated that a fall in the prime lending rate by one unitcaused an increase in investments by 0.230 units however this inverse relationship was not statistically significant. Whereas, the NARDL and general to specific least square regressionresults for both positive and negative increase in a year lag value of prime rate by one unit were found to result to a decline in current investment level by 0.0025 and 0.1066 units, as well as 0.3052 and 0.2391. Note alsothat both the increased and decreased interest rate changes have non-significant inverse relationship with investment. Consequently, we recommended among others; a loosening of interest rate by the monetary authority but, under strict scrutiny. This is needed in order to maintain the appropriate threshold and to create an effective and efficient interest rate transmission channel, to engender productive sectors as well as creating a conducive business environment for investment to strive, which will in turn promote domestic investment and economic growth in Nigeria.

Key Words: Investment, Interest Rate, Economic Growth, Financial Market

JEL: 011,013

1.0 Introduction

One of the major monetary policy tools used by financial authorities around the Globe, is interest rate this is due to the role it's plays in mobilizing financial resources with an intention to stimulate economic growth and development, through investment. Interest

rate is the cost of capital, and can be seen as an important economic price for investment, savings, as well as expenditure consumption. It is the opportunity cost of borrowing money and also the returns to the providers of financial resources. Most importantly, interest rate has been seen to possess fundamental implications for the economy due to the cost of capital or its ability to influence the availability of credit, via savings role that it plays (Acha&Acha 2011). Hence, understanding the response of the economy to changes or the variations in interest rates is central to the many issues in economic policy as it serves as a signal for the flow of funds from savers to borrowers both from within the country and outside the country who utilizes them for investment purpose (Richard, 2012).

Investment on the other hand is the change in capital stock or an addition to the stock of goods in existence for a given period of time. Investment can be financial or real in nature depending on whether it is seen as existing assets or addition to capital (Jhingan, 2003). In determining the level of investments, three fundamental factors must be considered; cost of capital asset, expected rate of returns, and the market rate of interest which is summed up in Keynes concept of "*marginal efficiency of capital"* (Jhingan, 2003).

Investment appears to be both a factor that triggers economic activity and a basic cause of economic problem since the classical economist era (Ojima &Emerenini, 2015). It is the most unstable component of all the aggregate demand components and hence has a significant impact on the economic growth of a country. Countries rely on investment to achieving some basic macroeconomic objectives (Muhammad, 2004).Hence, an understanding of the nature, determinants and the driving force of investment is deemed critical and crucial in designing policies to enhance and boost economic growth. The importance of interest rate in this study hinges mostly on its equilibrating influence on the availability of loanable funds from the financial sector for investment. Consequently, the main crux of this study is to examine empirically the impact interest rates variations may have on investment within the context of the Nigerian economy. No doubt, there have been studies bothering around interest rates, economic growth and bank lending, marginal efficiency of capital, and the role of interest rate on Foreign Direct Investment (FDI), which are internationally dominated as well as in local literature, also, most of such studies are cross-country based studies; but not much study centres on interests rate and investments using the Non-linear Auto regressive Lag (NARDL) technique which has the capacity to examine the asymmetric effects of the positive and negative changes in explanatory variables on the dependent variable. This is unlike the conventional ARDL wherein the possible impact of explanatory variables remains same. The innovation in this study therefore lies on the methodology which include the use of Non-linear Auto regressive Lag (NARDL) technique alongside the conventional Linear ARDL, the extension of scope as well as the fact that it is a country specific study, Nigeria economy being the case study.

The rest of the paper is structured as follows: Section two provides the review of related literature, while the methodology adopted for the study is presented in section three. Section four dwells on the findings and discussion, and finally the conclusion and implications are presented in section five.

2.0 Literature Review and theoretical Framework

2.1 Theoretical Review

From extant literature several theories have been advanced in an attempt to aid the effective explanation of the determining factors or driving forces as well as the

rationales for investments and its implication for macroeconomic objectives. They include among others the classical investment theory, the Accelerator investment theory (the fixed and flexible versions), the Keynesian theory of investment, Neo-Classical investment theory, the profit theory of investment, Tobin-q theory, and Mckinnon and Shaw (1973) Financial Repression/Complementary Hypothesis.

2.2 Empirical Review

The behaviour of interest rate culminating from monetary policy adjustments and how it plays out on changes in investment spending both on the aggregate and firm level perspective has stimulated some huge chunk of empirical studies both in the developed, developing and emerging countries with ample evidences in the literature. Mohammad and Md. Rabiul (2003); Ndikumana (2008); Olubanjo, Atobatele and Akinwumi (2010); Hira and Vesarach (2014); Ammer, Tabova and Wroblewski (2018); Aysun, and Kabukcuoglu (2018); Zhang, Li and Lai (2019); Meza, Pratap and Urrutia (2020); Belke, Baudisch and Gocke (2020).

The crux of these studies is that interest rate variation has implication for investment spending changing and possibly for a long-run economic growth. Specifically, based on theory, an inverse relationship exists between them.

Correspondingly, Albu (2006) found that interest rate - investment – economic growth relationships tend to converge to those demonstrated in a market economy using two partial models to investigate the impact of investment on national income growth rate and also to test for relationship between interest rate and investment in the case of Romanian economy, and. In that same light, Taolam (2014) revealed evidence that changes in firms' financial position stemming from either their performance or interest rate variation may translate to changes in their investments and employment plans. Precisely, the study stressed that higher interest rates encourage postponement of investment spending and reduced inventories, whereas lower rates encourage an expansion of activity. According to Monetary Policy Committee (MPC) report (1999), both the private and public sector depend on bank financing and are sensitive to the direct effects of interest rates. Higher interest rate worsens the financial positions of firms and lower rates improve their financial position. Hence, Ingersoll and Ross (1992) derived an appropriate rule for deciding when to invest, and resolved on the fact that the option to wait can be valued as an option of interest rates. Hira and Vesarach (2014) study revealed a negative relationship between interest rates and foreign direct investments in Thailand, Indonesia, and Malaysia. Belke *et.al* (2020) who examined the hysteretic impact of changes in the interest rate on macroeconomic investment under certainty and under uncertainty. They found a strong inverse reaction in investment activity following changes on interest precisely as soon as changes of the interest rate exceed a zone of inaction, what they referred to as the 'play' area. This hysteretic effect of interest rate changes on investment was found in most countries. However, their shape and magnitude differ widely across countries. Ammer et.al (2018) whose study aimed at examining how interest rates affect cross-border portfolio investments used US data from 31 countries who are foreign investors to US revealed that lower interest rate in foreign investors countries will lead to increase in investment in United State and that this effect is generally driven by investment in (higher yielding) corporate bonds. Consequently, they concluded that low interest rates can lead to shifts in the volume and composition of overseas investments.

From the firm-level perspective, Ndikumana (2008) research on investment using annual data on both aggregated industry-level and disaggregated data on 27 sub-sectors of the manufacturing sector in South Africa for a period of 1970-2001. The study found that governments' role is potentially powerful in stimulating private investment. This is so because, a tight or expansionary fiscal policy can either reduce or expand domestic aggregate demand and in the whole, investment. The study also reveals the direct effect of a fall in interest rates to be minimal. From the same angle, Aysun, and Kabukcuoglu (2018) in their study on Interest rates, R&D investment and the distortionary effects of R&D incentives. Using the firm-level financial and sector- level R & D incentives data and a methodology that hinges on within firm allocation of investment. Found among others that firms decrease (increase) their share of R & D spending (investment on R &D) during a credit tightening (easing). This therefore reveals an inverse relationship between interest rate and investment on R & D.

Using Nigeria Data, Eregha (2010) found that investment has an indirect relationship with interest rate variations and other variables in the model. Also, Ojima and Emerenini (2015) who employed multiple regression approach in their research found that high interest rate negatively affects investment for Nigeria. On the reverse side, evidence by Olubanjo, Atobatele and Akinwumi (2010) as carried out in Nigeria using two stages least square method found that a decrease in the real lending rate would not result to automatic increase in domestic investment. Deviating from the norm also Oosterbaan, Der Windt, and Steveninck (2000) revealed that the real interest rate has a threshold of -5 to +15% within which growth is maximized. This therefore explains to the fact that there is a level of interest rate fall that may trigger positive increase in investment spending. Stemming from the above argument, suffice to say that interest rate variation effect on investments in different countries depends on their macroeconomic environment.

Apart from interest rate variation, domestic investment spending can be influenced by other factors like foreign direct investment, level of openness of the said economy, as well as external debt and financial burdens amongst others. On the effect of foreign direct investment on domestic investment, it depends on whether it substitutes or complements domestic investment, because foreign direct investment can be an opportunity or competition for domestic businesses depending on the nature of FDI (De Mello, 1999 as cited in Hira and Vesarach 2014). Masron and Zulkornain (2012) asserts that Multinational Corporations from developed countries can help improve competition within or amongst entrepreneurs of host country, and hence a positive relationship between FDIs and DIs (domestic investments). On the other side, FDI can have some unintended impediments as well. It can affect negatively by crowding out domestic investment. Using Vector Auto regression (VAR) Technique on an annual data from 1986 to 2012. Mohamed, Jit Singh, and Chung-Yee (2013) study on FDI and domestic investment found no relation between FDI and economic growth in Malaysia. Linkages between FDI, DI and interest rates are important to be considered for maximum benefit of Domestic investments. Another important factor to consider is the degree of trade liberalization that is usually included in investment analysis. It might have positive (Balasubramanyum, Salisu, and Saps ford, 1996) as well as negative (Serven 2003) effects on investment. In the same vein, Mohammad and Md. Rabiul (2003) investigated investment behaviour in a panel data of 97 developing countries for the period between 1973 and 2002 using the GMM

dynamic panel estimator. Their result suggests that investment is significantly affected by trade openness including other variables in the model. The external debt level is a variable that can represent a source of external credit in investment financing. However, financial burdens might have bad effect on investment by making macroeconomic policies vulnerable for investment decisions and good by increasing credit availability in the economy (Mohammad & Md. Rabiul, 2003).

From the above, most literature that was reviewed in the area of interest rate and investments were found to have one limitation or the other which this study is set out to improve upon or if possible correct. The methodology which authors employed in examining the impact of interest rate variation on investment happens to be the most recurring of the flaws. Some studies took no cognizance of time series properties. Even though it has been established that such act can lead to biasedness of the result. According to Engle and Granger (1987) any regression run in that manner will produce a spurious result. Again, others who took care of time series properties did not take into consideration the possibility of lag or delayed response and rather analysed a static model. Again, most study treated the issue of interest rate variation as a symmetric case by lumping both the positive and negative growth effect of interest rate which most times yield inconsistent generalization thereby undermining the possibility of asymmetry. Against the backdrops, this study employed the conventional ARDL and the Non-Linear Autoregressive distributive lag (NARDL) techniques. The NARDL approach decomposes the interest rate growth variable into positive and negative components following the stepwise approach in order to examine whether there is asymmetric effect or not. That is, to examine whether there is significant difference in the way and manner the positive and negative components of interest rate affect investment.

2.3 Theoretical Framework

The classical and Keynesian investment theories drive this study. The classical investment theory posits that investment depends on the interest rate and that from the circular flow of income; interest rate guarantees the equality of investment and savings respectively. The notion is predicated on the belief that whatever income that the factors of production earn are either spent on capital goods (invested) and/or are saved. This therefore revealed that an inverse relationship runs between interest rate and investment. The Keynesian theory of investment posits that decisions on investment depends on the differentials of internal rates of return produced from the investment in a specific asset, but, not just on the interest rate. This is known as the Marginal Efficiency of Investment (MEI) and the predominant market rate of interest. This theory was popularized by John M. Keynes and Irving Fisher. They maintained that investments are made until the present value of expected future revenue at the margin, is equal to the opportunity cost of capital. This implies that firms will invest until their net present value (NPV) is equal to zero, i.e. NPV =0

$$NPV = C0 + / Ct\ e\ (g-i)\ t\ dt \quad (2.1)$$

Where; g = growth rate, i = the opportunity cost of capital.

According to this theory, there is said to be a direct relationship between investment and the rates of return from such investment and an inverse relationship between interest rate and investment. This is because; most lucrative projects are undertaken first and as such, any addition to investment will consist of projects with progressively lesser rates of return. Based on the above, an investment

would be embarked upon as long as the marginal efficiency of each additional investment exceeds the interest rate of capital.

That is, IRR >i or MEI >i.

Where; IRR = internal rate of return; i = represents interest rate.

Note that MEI/ IRR is computed by equating present value of revenue to initial cost outlays. According to Keynes *marginal efficiency theory* of investment; a new investment is made when the rate of returns expected from an additional unit of capital asset is over its cost, hence establishing an inverse relationship between investment and rate of interest

Note that investment would be non-profitable when the cost of borrowing the required funds exceed the returns on the investment in other words, if the interest rate on borrowing appears higher. Hence, it implies that higher rate of returns in the face of low interest rate will have a positive impact on investment.

3.0 Methodology

This study employed both the linear and nonlinear ARDL techniques. The nonlinear ARDL known as NARDL approach has been recently developed by Shin,Yu& Greenwood-Nimmo (2014). It is an extension of the ARDL approach by Pesaran, Shin & Smith (2001). The Non-linear ARDL employs the positive and negative partial sum decompositions in detecting the asymmetric effects in the long-run and short-run periods. Linear models are based on the assumption that a linear relationship runs between variables. However, this may not necessarily be the case at all times, the relationship may be nonlinear in some cases. The nonlinear approach will enable us to ascertain whether positive and negative changes in interest rate have symmetric or asymmetric effects on domestic investment in Nigeria. The choice of NARDL is predicated on its advantages over the conventional co-integration and ARDL approaches. For instance, unlike the traditional co-integration and ECM model, the NARDL allows the use of small samples (Romilly,Song& Liu, 2001); NARDL can be applied irrespective of whether the regressors are stationary at levels or at order one (i.e., I(0) or I(1)). However, it does not allow for the use of regressors that are stationary at order two (i.e. I(2)). Unlike the convention ARDL it can be used not just to ascertain the short and long-run impact but to examine the possibilities of short-run and long-run asymmetries as well as hidden co-integration. For example, a negative growth (shock) in interest rate may have a larger absolute impact in the short-run while a positive shock in interest rate may have a larger effect on investment in the long-run (or vice –versa). This can be detected easily with the help of NARDL.

The econometric analysis spanned from 1981 to 2018 due to availability of data. Annual data employed in this study were obtained from the 2019 volume of the Central Bank of Nigeria statistical bulletin, and year 2018 World Development Indicator of World Bank.

3.1 Model Specification

In line with the theoretical framework, and from extant literature, the functional relationship between interest rate and investment in Nigeria is as follows;

$$INV = f(INTRT, FDI, OPN) \quad 3.1$$

The Linear ARDL approach Model as advanced by Pesaran et al. (2001) is specified as follows:

$$\Delta INV_t = c_0 + \partial_1 INV_{t-1} + \partial_2 INTRT_{t-1} + \partial_3 FDI_{t-1} + \partial_4 OPN_{t-1} + \sum_{i=1}^{p} \theta \, \Delta INV_{t-1} + \sum_{i=1}^{p} \beta \, \Delta INTRT_{t-1} + \sum_{i=1}^{p} \gamma \, \Delta FDI_{t-1}$$

$+\sum_{i=1}^{p} \rho\, \Delta OPN_{t-1} + \varepsilon_t$ 3.2

Where; ∂_i are the long-run multipliers, $c_0\ is\ the\ intercept, \varepsilon_t$ is the white noise or error term. $(\theta, \beta, \gamma\ and\ \rho)$ are the short-run coefficients.

Having estimated the above generalized ARDL model, the next step is to carry out the co-integration test suppose the result shows that there is a long-run relationship, short-run model or an ARDL by Error Correction model with long-run estimates will be specified as follows;

$\Delta INV_t = c_0 + \sum_{i=1}^{p} \theta\, \Delta INV_{t-1} + \sum_{i=1}^{p} \beta\, \Delta INTRT_{t-1} + \sum_{i=1}^{p} \gamma\, \Delta FDI_{t-1} + \sum_{i=1}^{p} \rho\, \Delta OPN_{t-1} + \vartheta ECM_{t-1} + \varepsilon_t$3.3

In order to analyze the asymmetric effects of positive and negatives changes or growth of interest rate of Nigeria on the domestic investment of the country, we specified a functional nonlinear ARDL model as follows:

$INV = \alpha_{0+}\, \alpha_1 INTRT_POS_t + \alpha_2 INTRT_NEG_t + \alpha_3 FDI_t + \alpha_4 OPN_t + U_t$3.4

Using the variables in this study, specifically, Investment (INV) proxied by gross capital formation; Prime rate (INTRT); Aggregate income (GDP); Foreign direct investment (FDI); Openness (OPN), which was computed as the ratio of total trade to GDP.

Following Shin et al. (2014) and incorporating the study's variables, an asymmetric model of equation 3.1 and 3.4 are depicted as follows;

$\Delta INV_t = \rho(INV_{t-1}) + \beta_1^p(INTRT_POS_{t-1} + \beta_2^N(INTRT_NEG_{t-1}) + \beta_3(FDI_{t-1}) + \beta_4(OPN_{t-1}) + \sum_{J=1}^{\rho-1} \mu\, \Delta INV_{t-1} + \sum_{J=1}^{\rho-1} (\varphi\, \Delta INTRT_POS_{t-1} + \sum_{J=1}^{\rho-1} \varphi\, \Delta INTRT_NEG_{t-1}) + \sum_{J=1}^{\rho-1} \pi\, \Delta FDI_{t-1} + \sum_{J=1}^{\rho-1} \omega\, \Delta OPN_{t-1} + U_t$3.5

As seen in the equations 3.5above, maximum growth in interest rate is denoted as INTRT_POS while minimum growth in interest rate is denoted as INTRT_NEG. They are added to equation 3.4 and 3.5 as additional variables. The partial sums of squares of INTRT_POS and INTRT_NEG changes in interest rate are defined as follows;

$INTRT_{POS} = \sum_{j=1}^{t} INTRT_j^+ = \sum_{j=1}^{t} \max(INTRT, O)$3.6

$INTRT_{NEG} = \sum_{j=1}^{t} INTRT_j^- = \sum_{j=1}^{t} \text{mIN}(INTRT, O)$3.7

Note that is the coefficients of INTRT_POS and INTRT_NEG are significantly negative and positive respectively, it will imply that they their impacts is not symmetric as assumed under the linear ARDL model.

Where: INV is domestic investment proxied by gross fixed capital formation, INTRT represent interest rate captured by the prime rate, INTRT_POS positive changes of interest rate, INTRT_NEG negative changes of interest rate, FDI foreign direct investment, and OPN is trade liberalization measured as the ratio of total trade to Gross domestic Product.

Stemming from economic theories, the a priori expectations for the investment equation as specified in equation 3.5is summarized as follows:

$\rho > 0$; $\beta_1 < 0$; $\beta_2, \beta_3, \beta_4 > 0$

To capture timing of investment or the effect of delay on investment, the investment variable is lagged by one year.

4.0 Analysis of Data and Discussion of Findings

The results of the study are presented and discussed as follows: To confirm the stationarity status of the series the Augmented Dickey Fuller statistics were adopted. The result showed that all the variables were stationary at first difference. Table 4.1 has a detail of the result.

Table 4.1: Augmented Dickey Fuller Result at Levels and First Difference.

VARIABLES	ADF STATISTICS AT FIRST DIFFERENCE	5% ADF CRITICAL VALUES	REMARKS
DINV	-5.3824	-3.5442	STATIONARY AT FIRST DIFFERENCE
DINTRT	-9.6296	-3.5403	STATIONARY AT FIRST DIFFERENCE
DFDI	-8.4360	-3.5403	STATIONARY AT FIRST DIFFERENCE
DOPN	-4.7637	-3.5403	STATIONARY AT FIRST DIFFERENCE

Source: Authors' computation 2021 *D=First order difference*

Table 4.2: ARDL Bounds Testing to check for existence of Long-Run Relationship

F-STATISTIC	5% CRITICAL BOUNDS	5% CRITICAL BOUNDS
INV	UPPER BOUND I(1)	LOWER BOUND I(0)
6.776*	3.15	4.08

Source: Authors' computation 2021

From Table 4.2 above, the F-Statistic ratio was obtained following the OLS estimation procedure and when compared with the Bound Testing critical Values as suggested by Pesaran et.al (2001), the F-Statistic appears to be greater than the critical values of both the upper and lower bounds at 5% level of significance. This therefore, suggest the existence of a long-run relationship in the investment model.

Table 4.3 Estimates of the Linear ARDL Model: Dependent Variable: DINV

Regressors	**ARDL**		**Long-run ARDL (1,0,0,0)**		**Short-Run ARDL**	
	Coef.	**t-statis.**	**Coef.**	**t-statis.**	**Coef.**	**t-statis.**
Constant	-9.613**	-2.2839	-10.004	-2.659		
DINV(-1)	0.039	0.2174			-0.9608*	-5.3395
INTRT	0.230	1.0409	0.239	1.1160		
FDI	1.130	1.6261	1.176	1.5082		
OPN	8.762***	1.6806	9.119***	1.7507		
ECM(-1)					-0.9608*	-6.184(0.00)
Diagnostic Tests $R^{2\,=}$ 0.22 R^2 0.52 F = 2.24(0.087) DW:1.8853 $x^2SC =$ (0.4531) $x^2HET =$ (0.1145) CUSM = S $CUSM^{2\,=}$ S						

Source: Authors' computation 2021

*Note: *, **, *** represents 1%, 5% and 10% significance; items in parentheses are the probability values of CUSUM and CUSUM of square tests and their stability is denoted by "S" and where unstable its denoted by "UNS";* x^2SC *and* x^2HET *denote the LM tests for serial correlation and Heteroscedasticity tests.*

Results from table 4.3 presents the coefficient of determination to be 0.22 and 0.52 percent for the ARDL and the short-run ARDL respectively. This implies that 52 percent of the variations in investment can be explained by all the explanatory variables in the short run.The F-statistic shows that the model is statistically significant at the 10% level of significance judging from its probability values that reads 0.087. The Durbin- Watson Statistic of 1.86 which is approximately 2 reveals the absence of autocorrelation in the model. Both the serial correlation and Heteroskedasticity Tests accept the Null hypotheses judging by their probability values of 0.4531 and 0.1145 which happened to be greater than 0.005. the tests show the absence of autocorrelation and heteroskedasticity problems in the model. The CUSUM test is significant at 5% level of significance as it ranges between the acceptable region. Since there appear to be a sound goodness of fit as analysed above, we can thus rely on the estimated parameters of the variables. Hence, the result of the estimation is interpreted as follows:

From the long-run result, aggregate value of interest was found to have a positive and insignificant relationship with investment spending in Nigeria for the period under investigation. Thereby implying that a decline in interest rate will cause an increase in investment spending by 0.230 units. This

corroborates (Olubanjo et. al, 2010; Oosterbaan et. al, 2018; and Ammer et al, 2018). Note that here interest rate is assumed to be symmetric in nature. But, judging with the t-statistics, interest appear to be insensitive to impacting domestic investment followed by the fact that its probability value is greater than 5%. Also, FDI and Openness were both seen to have a direct relationship with investment. While FDI happens to be statistically insignificant, OPN was significant at a 5% level of significance in driving investment. From the short-run analysis, the first year lagged differenced investment variable which also is the dependent variable was found to be indirectly related to investment and also statistically significant at 1% level of significance. The Error correction mechanism in the first lag denoted by (ECM-1) is correctly signed with a coefficient of -0.96 and appeared to be highly significant at 1% level. This indicates that, about 96% of the previous year's shock or disequilibrium in domestic investment can be corrected in the year at a faster rate as stated.

Table 4.4 Estimates of the Nonlinear ARDL using Stepwise Backward and General to specific Least squares approaches; **Dependent Variable is DINV**

	Regressors	**NARDL by Stepwise Regression**		**NARDL** by General to Specific Approach	
		Coef.	t-stat.	Coef.	t-stat.
Long - Run Estimates	Constant	18.0652*	2.9673	25.8211	3.0391
	Inv(-1)	-0.4644*	-4.8695	-0.5195	-4.5332
	Intrt_pos(-1)	-0.0025	-0.0181	-0.3053	-1.1339
	Intrt_neg(-1)	0.1066	0.7163	-0.2139	-0.8665
	FDI(-1)	-0.0710	-0.1338	0.6386	0.7877
	OPN (-1)	-36.1211*	-3.4603	-41.8651	-3.3513
Short-Run Estimates	DINV(-1)			0.1293	0.9081
	DINV(-2)	-0.3446**	-2.6251	-0.2510	-1.6875
	DINTRT_POS(-1)			0.2750	1.0785
	DINTRT_NEG(-1)			0.3292	1.1916
	DFDI			0.6312	0.9127
	DOPN			-21.1468	-1.2586
Diagnostic Tests $R^{2\,=}$ 0.55 x^2SC = (0.4017) F = 5.93*(0.007) x^2HET = (0.2373) DW:1.55 CUSM = $SW_{LR\,=}$ 8.99(0.0002) $CUSM^{2\,=}$ $SW_{LR(ASY).=}$ 2.597(0.11)				**Diagnostic Tests** $R^{2\,=}$ 0.62 x^2SC = (0.5504) F = 3.46(0.005) x^2HET = (0.1076) DW:1.84 CUSM = $SW_{LR\,=}$ 7.133(0.0015) $CUSM^{2\,=}$ $SW_{LR\,(ASY).=}$0.5487(0.4663) $W_{SR(ASY)\,=}$ 0.7094(0.4852)	

Source: Authors' computation 2021

*Note: *, **, *** represent 1%, 5% and 10% significance; items in parentheses are the probability values of the CUSUM and CUSUM of square tests and their stability is*

denoted by "S" and where unstable its denoted by "UNS"; x^2SC and x^2HET denote the LM tests for serial correlation and HeteroscedasticityWhite tests. W_{LR}, $W_{LR\ (ASY)}$ and $W_{SR(ASY)}$denote the Wald long-run tests of cointegration, Wald long-run test of asymmetry and Wald short-run test of asymmetry respectively. To check for the presence of asymmetry between the positive and negative changes in interest rate with respect to investment.

From table 4.4, the coefficients of determination for both approaches are 0.55 and 0.62 respectively. These imply that 55 percent of the variations in investment model can be explained by all the explanatory variables in the Stepwise regression. While in the case of the simple general to specific approach, 62 percent of the variations in the investment model is being explained by the independent variables put together. The F-statistics from the two estimation techniques show that the model is statistically significant at the 1% level of significance judging from its probability values that reads 0.000. This implies that the overall model is significant in explaining the variations in domestic investment. The Durbin-Watson Statistic of 1.55 and 1.84 respectively which is approximately 2 reveals the absence of autocorrelation in the model using the two techniques. Due to the soundness of goodness of fit as presented above, the estimated parameters of the variables can be relied on for inferences and policy implication. Hence, the result of the estimation is interpreted as follows:

From the non-linear ARDL (Stepwise regression and general to specific regression) results of the investment model, the one-year lag period investment in the long-run was found to be inversely related and statistically significant to the current year's investment at 1% level of investment. The results shows that an increase in the one year lagged period investment in the long-run by one unit will bring about a decline in the current period's investment by 0.464 and 0.5194 units. This gives credence to the prevalence of the business vicious cycle in the Nigerian economy. Using the NARDL approach, while positive increase in a year lag value of prime rate denoted as (INTRT_POS(-1)) by one unit leads to a decline in current investment by -0.0025 unit, a negative growth in a year lag value of prime rate denoted as (INTRT_NEG(-1)) by one unit were found to result to an increase in current investment level by 0.1066 units. With this method both positive and negative increase in interest rate met the a priori sign. Also, with the general to specific regression approach, an increase in the growth of the positive values of a year lag value of prime rate caused a decline in current investment to a tone of -0.3052,but the negative growth in interest rate by one unit also caused investment level to fall by -0.2391 units. The positive increase in prime rate met the a-priori expectation which is also in line with theory unlike the negative increase. However, judging from their t-statistics they were both found to be statistically insignificant in driving investment in Nigeria. This therefore suggest to mean that interest rate is insensitive to or not strong enough to drive investment growth in Nigeria. And this could be attributed to some structural and institutional defects. In the long-run also, a year period lag Foreign direct investment (FDI) revealed a mixed result for the stepwise, and the general to specific approaches. The inverse relationship between increased positive interest rate and investment confirms the works of (Taolam, 2014; Hira and Vesarach 2014). While the fact that interest rate drop was found to cause a decline in investment tends to supports the following studies (Ndikumana, 2008; Aysun and Kabukcuogh, 2018; Ojima and

Emerenin, 2015). This result could be attributed to huge drop in the prime rate beyond the rate that is appropriate to trigger investment growth.

From the NARDL result an inverse relationship was found to run between FDI and domestic investment with a magnitude of -0.0709 units whereas, using the simple General to specific approach a positive relationship was found to exist between FDI and domestic investment with a coefficient value of 0.6386 units. In both analyses, FDI appeared to be statistically insignificant in driving domestic investment judging from the t-statistics that are less than 2. This therefore implies that the massive inflows of FDI is not capable of boosting domestic investment in general rather FDI are seen to be run independently such that businesses owned by foreigners has nothing to do with domestic investors. This ought to be the reserve as FDI is supposed to complement and boost domestic investment. Openness (OPN) in both analyses happened to be both inversely related and statistically significant at 1% level of significance in driving investment. A unit rise in the level of trade openness, will result to a reduction in the level of domestic investment by 36.1210 and 41.8651 respectively. The inverse nature of the relationship between OPN and domestic investment can be attributed to the loss of competitiveness in the global market which tends to crowd out or hedge off domestic investments or companies from the market as the economy opens further. This suggests to mean that rapid openness tend to represses or retard domestic investment.

The short-run components of the resultsare not farfetched from that of the long-run. In the short-run. The differenced two periods' lagged value of domestic investment was found to inversely related and statistically significant to domestic investment by 5% level of significance. Again, both positive and negative shocks of the prime rate were both statistically insignificant to domestic investment. However, OPN in short-run happens to decline investment but not at a significant rate.The results of diagnostic, robustness and reliability tests are satisfactory. Judging by the probability values of the LM tests for serial correlation and Heteroscedasticity White tests which stood at 0.4017 and 0.2373 for the NARDL and 0.5504 and 0.1076 for general to specific regression which happened to be greater than 5%. With this will accepted the null hypotheses of no autocorrelation and no heteroskedasticity in the model. A long-run equilibrium was found to exist in the model judging by the probability values of the Wald long-run test of co-integration that happens to be significant by 0.0002 and 0.0015 respectively. This also confirms the bounds test of co-integration as reported above and when we compared the F-values of the Wald test 8.99 and 7.13 to the lower and upper bound values from Pesearan et.al (2001) table of co-integration these values outweighed the lower and upper bounds alike. This suggests that there exists a long run relationship in the model.

To examine whether an asymmetric relationship exist between the positive and negative changes in interest and how they impact domestic investment we carried out a Wald test of long-run and short run asymmetry test. From the result we accepted the null hypothesis which states that the relationship between INTRT_POS and INTRT_NEG is symmetrical in nature judging by the probability values of 0.11 and 0.46 respectively from both NARDL and the general to specific approach in the long run case and 0.48 from general to specific approach in the short run scenario. The asymmetry only holds at a higher level of significance of about 12% for the stepwise approach. This is to say that the difference might be there but not too significant. The plots of stability graphs implies that all

estimated coefficients are stable judging by the CUSUM and CUSUM of square graphs that appeared within the acceptable region and are significant at 5% level of significance. The variables in the model were also found to be normally distributed this stems from the plots that did not reveal any form of skewness to the right or left and also by the probability values of the Jarque-Bera test.

Summary Conclusions& Recommendations

This study investigates the impact of interest rates variations on investments in Nigeria, using time series and annual data from 1981 - 2018. The classical and Keynesian theories of investments formed the theoretical basis for analysing the impact of interest rate on investment. The linear and non-linear Autoregressive lagged (ARDL and NARDL) techniques were employed to capture both the long-run and short-run dynamics of the variables as well as the asymmetric effects of interest rate on investment in the model.

The study found interest rate to be insignificant in driving domestic investment in Nigeria both from the linear and non-linear ARDL techniques employed in the model. Judging from the asymmetry test, some slight level of asymmetry was found to hold between positive and negative interest rate values. This holds at a 12% level of significances using the stepwise regression result. So, whether or not we aggregate or decompose interest rate into its positive and negative changes, it does not impact investment greatly it rather affects their relationship which happens to be in line with economic theory. Specifically, the empirical results of the ARDL indicated that a fall in the prime lending rate by one unit caused an increase in investments by 0.230 units however this inverse relationship was not statistically significant. Whereas, the NARDL and general to specific least square regression results for both positive and negative increase in a year lag value of prime rate by one unit were found to result to a decline in current investment level by 0.0025 and 0.1066 units, as well as 0.3052 and 0.2391.Consequently, we recommend a loosening of the rate by the monetary authority but this must be done under strict scrutiny so as to maintain the appropriate threshold. Because any drop beyond the threshold will trigger a decline in investment as was revealed by the coefficient value of the decreased interest rate value (INTRT_NEG). And to make investment significant, it should be segmented according to business scale. To this end, interest rate fall should be channelled to sectors that are productive or have the potential to be productive. Like entrepreneurial, agriculture, service etc. For instance, the interest rate to medium and small-scale business and other productive sectors should be of topmost priority as this may encourage new investments and a boosting of existing ones.

Also, the result reveals that previous investment affects current investment, and this goes further to conform the business vicious cycle syndrome. Conclusively, having examined the impact of interest rate variations on investments in Nigeria, it was deduced that the response of investment to shocks in foreign direct investment was negatively insignificant.On the whole, the government should aspire to put in more efforts on building a stable economy so as to have a conducive atmosphere where investments can thrive.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Aftermath of Covid-19 and Women in Small Scale Industries in Owerri Nigeria

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Abstract

The aftermath of covid-19 refers to events that took place in small scale businesses owned by women in Owerri after the covid-19 pandemic. This led to the imposition of travel ban as well as physical/social distancing to help decrease the spread of the virus which, may have exerted a severe impact on women who engaged in small scale enterprises. Therefore, this study investigated the activities of women in small scale enterprises in the aftermath of the covid-19 pandemic and ways in which these women coped especially because they had relied heavily on the "face-to-face'' customer relations and business transactions prior to the outbreak of the pandemic. The study adopted the adaptive structuration theory propounded by DeSanctis and Poole (1994) because it effectively explains the challenges women in small scale enterprises face in the aftermath of the pandemic. The study made use of questionnaire and secondary sources of data collection technique like, journal articles, books and internet materials. Data collected were presented in tabular form and analyzed using percentages. The findings revealed that women in small scale industries were negatively affected by the pandemic. Notably, some of the coping strategies adopted by women included; the slashing of workers' salary, reduction in production and cancellation of orders made before the outbreak of the pandemic. It was also observed that these women did not adopt any digital means of reaching out to their customers. Therefore, this study recommended that E-commerce trainings should be considered by government and non-government organizations to empower and enable these women continue their businesses even in the face of sudden disruptions like the covid-19 pandemic.

Key Words: Covid-19, Small-Scale Business, Women.

1.0 Introduction

The aftermath of covid-19 refers to events that took place in small scale businesses owned by women after the covid-19 pandemic. It can also be referred to as the happenings that differ from the situation that prevailed prior to the covid-19 pandemic. Some of these happenings included the wearing of face mask, regular use of hand sanitizers, frequent hand wash with soap and water, physical distancing, travel ban and other protocols. These measures which were aimed at reducing the spread of the covid-19 pandemic may have reduced the spread of the pandemic but some of them, may have added to the difficulty of conducting business and perhaps, the transaction costs entailed in doing business.

Some of these happenings which may have added to the difficulty in doing business and perhaps increased the cost of doing business in Nigeria included the travel ban and the physical/social distancing; which to a large extent dealt a great blow on small scale businesses in the country and the economy at large. This strain was felt by almost all businessmen and women however, the strain on businesses owned by women may have been the worst hit compared to their male counterparts.

Fallon (2022), stated that a study conducted by the United States (US) Chambers of Commerce opined that, while the business impact of covid-19 has varied depending on industry, women owned businesses has been hit particularly hard. McEachern (2021) further states that, a new research report which draws on responses from 125 women entrepreneurs across 32 countries reported that the vast majority of women stated that covid-19 was the greatest challenge they ever faced

Though, women in these enterprises may have tried other means of business transaction to reach, communicate and trade successfully during the covid-19 pandemic and the covid-19 lockdown, these women seem to have encountered more challenges in retaining their customers and remaining in business during the covid-19 era. This may have affected the rate of their productivity and thus their profit margin and their socio-economic contribution to the society even after the covid-19 era.

SME Competitiveness Outlook (2020) states that the small companies provide 70% of jobs in countries around the world and about half of economic activity have been put under stress due to the pandemic which has forced some workers and customers to stay indoors. Even though most governments had allowed businesses to reopen, often with stringent conditions, only about 20 percent of SMEs owned by women have resumed production. Even though most women who resumed their businesses in small and medium scale enterprises seemed like they were not going to survive for long especially with the current cash flow in the country, the reopening of businesses in small scale enterprises created a new ray of hope for these women in the face of the pandemic (SME Competitiveness Outlook, 2020).

The aftermath created a supply-side and demand challenge which eventually gave room for the profit challenge. Andres and Wirjo(2020) suggested that if business transactions are conducted through digital platforms, there will be less need for human-to-human interaction in the course of conducting a business especially in the face of a pandemic like COVID-19 They further stated that digital platforms will make it easier to conduct business even while adhering to advisories from health authorities to limit contact. But, many developing countries like Nigeria may not have been able to maximize these digital platforms to grow their businesses especially in rural areas.

They may not have been able to retain their customer strength or do any form of business that may promote the growth of their businesses even while they keep to the covid-19 protocols. Therefore, it is essential to investigate the activities of women in small scale enterprises during the pandemic and the ways in which they have been able to adapt to the aftermath of covid-19 in the country.

There is no doubt that, women in small scale businesses may have grown rapidly before the pandemic. However, the covid-19 may have caused another wave of socio-economic disruption by limiting physical/social interaction and the business capacity of women in the small scale industries.

Before the pandemic, these women may have relied solely on face to face customer interaction/relation and business transaction in conducting their businesses without promoting any form of digital platform or

others means of reaching their customers so as to continue their business even in the face of the pandemic. While accessing the goods to sell may have been a very big challenge to these women, some of these women who may have known how to use these digital platforms, may not have been able to afford the devices like android phone, laptop etc. This may have made it almost impossible to transact business digitally, retain their customers and maximize profit.

Even when one cannot assert the scope of adaption by these women in the face of the pandemic, their level of productivity and business growth may have been affected adversely especially as it has to do with their productivity and profit margin. Thus, this study aims at investigating the activities of women in small scale enterprises in the face of the pandemic and also, to investigate the coping mechanisms adopted of women in small scale industries in the face of the pandemic.

Thus, this study answered the following questions.

1. How have women in small scale enterprises faired in their business with the face of the pandemic?
2. What are the coping mechanisms employed by women in small scale enterprises in the face of the pandemic?
3. How best can women cope in the face of socio-economic disruptions like the COVID-19 pandemic?

2.0 Literature review and theoretical framework

Overview of "the aftermath of covid-19"

The aftermath of covid-19 refers to the events that took place after the covid-19 pandemic. During this period, every sector in the society faces challenges that vary all in an attempt of coping with the changes that comes with the new norm or normal.

SME Competitiveness Outlook (2020) stated four main characteristics of the covid-19 aftermath. According to them, these are;

- **Resilience**

It became clear that fostering business resilience in good times would help firms ride out crises, reduce the likelihood of bankruptcy and improve the state of the economy. Diversifying, connecting with business support organizations and building financial buffers can help contribute to increased SME resilience. For small businesses that are active in international supply chains, the resilience of their relationship with buyers and suppliers will also matter greatly.

- **Digital**

Digital technologies were flourishing before the pandemic hit. During lockdowns, the whole part of the world's economies shifted onto digital platforms. Teleworking, remote learning, teleconferencing, online health services, e-commerce and digital payments really made the world go round in many regions in the first half of 2020.

- **Inclusive**

As is often the case with crises, covid-19 has put the spotlight on those who are economically disadvantaged, such as informal sector workers, migrants and people in microenterprises. Inclusiveness globalization was already a concern before the pandemic. There is now a unique opportunity to rebuild the international orders together, in a way that leaves no one behind. It will be crucial to ensure that the recovery phase lifts all the boats to maintain popular support for open economies.

- Sustainable

Climate change was ranked as the top global business risk in a 2019 survey of insurance industry experts. The high perceived likelihood and severe impact of climate-related risks have ranked them highest in the World Economic Forum's Global Risks Report.

There is no reason to believe that climate risks will abate once the health crisis ends. Sustainability will therefore continue to be important in the new global economy. Retrofitting for both covid-19 sanitary requirements and environmental friendliness may be a wise move.

Some of these coping mechanisms tend to come before the pandemic. They include strengthening the small scale businesses in readiness for such eventualities like the pandemic. These businesses can be strengthened financially and through diversification. The pandemic has shown the importance of digitalizing ones business through technical assistance, skill building and infrastructure support which could be through the availability of digital infrastructure.

Aftermath of covid-19 and women in small scale industry.

A report by the United Nations (2020) assessed the impact of the covid-19 on Micro, Small and Medium Sized Enterprises (MSMEs) in Vietnam. Findings revealed that more than 80 per cent of surveyed MSMEs reported that the aftermath of covid-19 on their businesses was either bad or very bad. Most of them reported a fall in profits leading to a partial halt or scale back to their business operations. The impact of the covid-19 on women-led MSMEs' revenues has been more severe than that experienced by men-led MSMEs – although the reasons for this gender-difference are unclear.

According to them, women-led enterprises were more optimistic than men-led enterprises about their business' financial prospects. It was found out that the lack of demand and revenue has left many MSMEs struggling with a shortage of working capital. Only a relatively small proportion of firms cited difficulties with input supplies.

As a coping mechanism, nearly 50 per cent of MSMEs have had to cut wages and/or hours worked by employees. Simultaneously, clients and customers have been re-negotiating prices down, deferring payments and cancelling orders. Notably, women-led MSMEs were twice as likely to have suspended some or all of their normal business activities as compared to men-led MSMEs. On the whole, the general perception among MSMEs is that the Government's emergency support measures are useful, yet women-led MSMEs provided a lower rating than men-led MSMEs on all the parameters assessed. Detailed information on how to apply for various forms of support, as well as the actual implementation of various measures has been sub-optimal. This may explain in large part why so many MSMEs have hesitated or failed to make use of this support (United Nations, 2020).

The United Nations (2020)further found out that women-led MSMEs display greater flexibility in times of crisis as they tend to be more adept at contingency planning, and are more likely to adopt conservative business strategies, thereby increasing their resilience in times of crisis.

Women-led businesses are more likely to opt for business continuity mechanisms that would enable them strive even in the face of crisis. Some of these coping strategies entail the slashing of workers' salaries and wages. Even when this could mean a coping strategy for small scale entrepreneur, it could as well mean that staff of these enterprises is going to be underemployed. In all, these enterprises suffered a decline in working capital and thus, a decline in profit margin. However, women in these enterprises seem to be more optimistic on the future of their business than their male counterpart.

Global Alliance for Improved Nutrition (GAIN) (2020) reported that the impact of covid-19 is mainly in the aspect of decreased sales, difficulty accessing inputs, and difficulty accessing financing. Some firms stated that, these impacts have lessened over

time. While some firms reported that their business was essentially 'back to normal'. Most firms reportedly changed their production volume by generally decreasing it, while others changed their product's sales price.

Most respondents anticipated future impacts on their supply chains to include shortages of supplies and transportation and distribution disruptions. Most firms reportedly took actions to mitigate the impact of the pandemic on their business and to protect their employees, respectively. However, even while many needed financial and technical support to cope with the effects of the pandemic, only a few had received support to cope with the effect of the pandemic (GAIN, 2020).

The challenge faced by enterprises varies but one singular factor is that, they all affected the profit margin of the enterprise. And even when most enterprises needed financial assistance to strive their businesses, only a few was able to receive financial assistance. The above study failed to give a gender dimension to the impact of covid-19 on businesses however, this study filled the gap in this study.

Effect of the covid-19 on small scale business enterprises

Microenterprises and SMEs constitute the backbone of the global economy, accounting for over two thirds of employment globally and for 80 to 90 per cent of employment in low-income countries (ILO, 2020). They are also among the most vulnerable groups to pandemic-related shocks for several reasons. First, the pandemic has altered the business environment for microenterprises and SMEs and significantly reduced market demand for their products and services. At the sectorial level, supply and demand stagnation has been seen in many industries. Second, a high proportion of microenterprises and SMEs have experienced heavy losses in revenue, and many such enterprises are out of operation due to confined measures.

In May 2020, a summary of the results of 40 surveys on the impact of the pandemic on SMEs showed that more than half of these enterprises had suffered from steep revenue losses and that one third feared they would be out of business within one month (Organization for Economic Cooperation and development (OECD), 2020).

In the context of a developing region, a comprehensive survey that covered 54 countries in Africa and took stock of the impact of the pandemic on SMEs indicated that most of respondents were significantly affected and that the rate of capacity utilization ranged from 30 to 40 per cent for small businesses, compared with 50 to 60 per cent for large enterprises (Economic Commission for Africa and International Economics Consulting, 2020).

Another survey of about 490 SMEs in Ethiopia, three fourths of which were microenterprises and small businesses, showed that 37 per cent had closed by April (Chen, Deniz, Nicola and Andrea, 2020).

Cash is vital during a crisis and without timely external support; cash holdings largely determine the destiny of firms. A survey of the catering industry in China showed that 79 per cent of sampled companies could not survive three months with their cash holdings. This is in addition to the difficulties faced by microenterprises and SMEs in gaining access to financing (Chen, et al, 2020).

Given various restrictive measures, people have been increasingly participating in activities such as online shopping, social media use and teleconferencing. A rapid pandemic-driven digitalization is on its way, providing opportunities associated not only with specific ICT products and services, but also with the digitalization of traditional businesses (International Finance Corporation, 2014).

As more and more activities shifted to online platforms, large companies and microenterprises and SMEs alike are finding new channels to reach more customers at lower costs. However, this digitalization is uneven both across and within countries. It has taken place in a significant manner in developed economies and relatively high-income developing economies, where a sound ICT infrastructure, an e-commerce ecosystem and a distribution network are already in place (World Trade Organization (WTO), 2020). Low Developed Countries (LDCs) and the economically weaker areas in many developing countries, particularly rural areas, do not have such an infrastructure, ecosystem or network.

World Bank (2020) indicates that with regard to SME support measures in response to the pandemic, debt finance (loans and guarantees) and employment support are the policy measures used most. In the area of fiscal policy, a large number of targeted measures have been introduced, such as tax exemptions, deferrals and relief, in order to reduce the tax burden of microenterprises and SMEs and help sustain their businesses.

The covid-19 has obviously prompted the need for creativity whereby businesses are driven by technology. However, the negative changes it has brought to the business world cannot be overemphasized. Basically, during the pa, enterprises suffered a decline in income level and the laid off some of their staff in an attempt to reduce the expenses in the enterprise. Thus, even as enterprises sought was to survive the pandemic, most people who were employed before the outbreak of the pandemic became unemployed.

Coping strategy of businesses based on international experiences

There is need to strengthen government policies supporting microenterprises and SMEs in developing countries, in particular in low-income countries. First, Governments need to establish a set of specific policy objectives and prioritize actions based on the degree of business continuity, the rate of survival of microenterprises and SMEs and the number of jobs in microenterprises and SMEs.

Second, Governments need to design and introduce specific policy measures targeting three different stages, namely, the lockdown phase, the reopening phase and the recovery phase. Third, Governments need to make sure that specific policy measures reach those most in need, evaluate the impact of such measures at each specific phase and adjust measures, if necessary, in order to achieve the best possible results (International Trade Centre, 2020).

The prioritization of policy interventions varies along the timeline. In the first phase, financial support to microenterprises and SMEs to ease liquidity constraints is key. In the second phase, it is crucial to help workers, particularly migrant workers, return to work safely and to help firms deal with supply chain disruptions effectively and resume business quickly. For the latter, both economic and public health measures are needed, including the provision of sufficient testing facilities to help ensure that returning to work and business is safe (International Trade Centre, 2020).

In the third phase, Governments helped rebuild consumer confidence and try bringing market demand back to normal. This also applies in the second phase, to supplement supply-side measures. It is important to note that the timeline differs between localities and industries and policies therefore need to be adapted to specific contexts (International Trade Centre, 2020).

Other companies followed a strategy of resilience, scaling down or adjusting the business temporarily in a manner that will allow it to resume fully later on. Being resilient during the pandemic entailed strategies such as; shifting the sales mix

towards online channels, sourcing from new suppliers or learning to telework.

The most agile firms transformed themselves to fit the new situation, creating novel products such as designer masks or rapid testing technologies. When lockdowns prevented their businesses from opening, they loaned their workers to other active businesses in essential industries (SME Competitiveness Outlook, 2020).

SME Competitiveness Outlook (2020) also revealed that smaller firms were significantly more likely to adopt retreating and agile responses to the crisis than larger enterprises. Small firms that exported were significantly less likely to take the retreating approach than those that sold only domestically. Large businesses, for their part, were more likely to adopt a resilient approach than smaller enterprises, underscoring their greater capacity to ride out the storm.

There is no gainsay that the assistance of the government is relevant for the survival of the small scale enterprises but, even as every enterprise may have adopted one form of coping mechanism or the other, these coping mechanisms are dependent solely on the business environment and type of enterprise being run.

Theoretical framework

This study adopted adaptive structuration theory because it is effective to explain group communication. This theory was propounded by DeSanctis and Poole in 1994. Poole took a critical approach to the linear models of communication and determined that group dynamics are too complicated to be reduced a few proposition or a predictable chain of events.

Based on this theory the social interaction should not be based on few propositions or predictable chain of events. Women in small scale enterprises seem to have depended solely on face-face customer interaction which is not only predictable but narrow in scope. With this kind of method of transaction, they have not been able to conduct business beyond their reach. Thus, when the pandemic came to the fore, they lost most of their customers and supply contacts. This reduced their profit margin greatly even when they tried to establish a new customer base after the pandemic.

This theory best suits this study because it explains the need for a digitalized transaction among small scale enterprises and it effectively explains the challenge of women in small scale enterprises in the face of the pandemic.

3.0 Methodological Approach

The study investigated the aftermath of covid-19 pandemic on small scale businesses owned by women in Owerri and how these women have been able to cope in the face of the pandemic.

The researchers adopted a descriptive research design to enable them discuss the issue under study in a more comprehensive manner.

The data used for this study were collected through questionnaire and secondary sources such as books, journals and internet materials. The researcher derived a sample population of 246 respondents from the population of 277750 women making up the total number of women in Owerri as was projected to 2020 from the 2006 national census.

This sample population was derived using a sample calculator with 95% confidence level, 5 margin of error, population of 277750 and a population proportion of 90. The researcher distributed 82 copies of questionnaires to women who engaged in small scale businesses in Owerri (Owerri Municipal, Owerri North, Owerri West). Ihiagwa Market Square, Eke Onuwa and Orie Obibi Market Square were purposively selected for this study because these markets have a high population of women who engage in small scale businesses. The respondents were

adults who were between the ages of 18 and above, who engage in any form of small-scale business.

These respondents were randomly selected in order to give each individual an opportunity of being represented in the study. Although 246 copies of questionnaire were distributed, a total of 224 copies were returned. This comprised of 72 copies from IhiagwaMaket Square, 74 from Orie Obibi Market Square and 78 from Eke Onuwa. The data were analyzed using simple percentages while the key findings were discussed while recommendations were highlighted.

Research findings

The table below revealed that the impact of the covid-19 pandemic on women in small scale businesses was generally bad. These women could not reach their customers or get goods from their distributors due to the covid-19 pandemic. This by implication reduced their profit margin greatly and almost liquidated their business.This finding supports the postulation of the United Nations (2020) and Global Alliance for Improved Nutrition (GAIN) (2020)which states that the impact of covid-19 on businesses is bad.

Table 1: Analysis on how women in small scale enterprises faired in their business with the face of the covid-19 pandemic?

S/N	Questions	Yes	No	Total
1.	The impact of the covid-19 was bad for my business.	128 57.1	96 42.9	224 100%
2.	My profit margin declined during the covid-19 pandemic.	141 63	83 37.1	224 100%
3.	My business almost liquidated during the covid-19 pandemic.	152 67.9	72 32.1	224 100%
4.	The covid-19 affected the distribution of goods so I couldn't get goods when and as when due.	131 58.5	93 42.5	224 100%
5.	During the covid- 19 era, I couldn't reach my customers.	135 56	89 44	224 100%

The table below revealed that some of the coping strategies adopted by women in small scale businesses included; the reduction in workers' salary, cancellation of orders placed before the pandemic and the reduction in production. But, only a few of the women adopted digital form of sale. This finding by implication revealed that women in small scale businesses may not have had an android phone or money to buy data. It also implied that the living condition of workers and the public at large, may have reduced during the covid-19 pandemic

Table 2: analysis of the coping mechanisms employed by women in small scale enterprises in the face of the covid-19 pandemic?

S/N	Questions	Yes	No	Total
6.	I reduced the salary I pay my workers during the covid-19 pandemic.	68 50.7	66 49.3	134 100%
7.	I cancelled some of my orders on goods.	75 56	59 44	134 100%
8.	I reduced the level of production/sale price.	91 67.9	43 32.1	134 100%
9.	I adopted a digital sales platform.	33 24.6	101 75.4	134 100%

The table below revealed that the organization of E-classes for women and the provision of interest free or little interest loans for women in small businesses will enable these women cope better in the face of socio-economic disruptions like the COVID-19 pandemic. While it will enable them apply for digital classes, it will also help them purchase data and android phones and expand their businesses further.

S/N	Questions	Yes	No	Total
10.	Government/NGOs should organize E-commerce classes for women in small scale industries.	88 65.7	46 34.3	134 100%
11.	Government/NGOs should provide loans with little or no interest to women who cannot afford internet device like phone, laptop and computer.	79 59	55 41	134 100%

Table 3: analysis on how best can women cope in the face of socio-economic disruptions like the COVID-19 pandemic?

Discussion of findings

The effects of the covid-19 pandemic on small scale business enterprises are bad and can be very bad. Sales and demand generally reduces thereby reducing the income and profit margin of most small scale enterprises. This has also led to the closure of some enterprises, reduction in workers' salary and the sack of some employees of these enterprises so as to reduce the cost or expenses of production. Global Alliance for Improved Nutrition (GAIN) (2020) reported that the impact of the covid-19 pandemic is mainly in the aspect of decreased sales, difficulty accessing inputs, and difficulty accessing financing. The report further stated that while some businesses returned to normal after the covid-19 pandemic, some others had some alterations in production volume and supply chain.

In addition to this, the International Finance Corporation (2014) stated that more small firms have experienced a decrease in demand for products or services, in supply of input and in liquidity or cash flow availability as a result of the covid-19 pandemic. The covid-19 pandemic has also led to significant job and income loss and a significant damage to their capacity to make a living (ILO, 2020). That is to say, the covid-19 pandemic dwelt a severe blow on the country's economy and living condition of the masses as a whole.

Despite the negative effects of the covid-19 pandemic, those who engaged in small scale

enterprises devised a means to adapt and keep their businesses during the covid-19 pandemic. While some women may have used the profit or savings they had before the covid-19 pandemic, some others started doing their businesses through on line platforms and slashing the salaries or wages of their employees in an effort to reduce cost.

According to SME Competitiveness Outlook (2020) fostering business resilience in good times would help firms ride out the effect of the covid-19 pandemic. However, the United Nations (2020) and the International Trade Centre (2020) asserts the need for government support during crisis like the pandemic. The United Nations (2020) further asserts the slashing of workers' salaries and the digitalization of small scale enterprises as a means of adaptation for small scale enterprises.

Conclusion and Policy Implications

The covid-19 pandemic seems to have become the new norm guiding human activities in most societies. However, its impact in one of the major employers of labour in the country cannot be overlooked. Though small scale businesses seem to have taken their place in the digital world, the impact on the covid-19 pandemic on small scale businesses are enormous.

While some businesses may have closed down, some others which seem to have survived the pandemic seem to be at the verge of shutting down. Even though many entrepreneurs devised an adjustment method in the face of the covid-19 pandemic, these only proved to be short term solutions to the problems they encountered during the pandemic.

There is no doubt that even as entrepreneurs in small scale businesses seek ways to survive the pandemic, the pandemic has exposed these entrepreneurs to the need to digitalize their trade as it poses tremendous business opportunities in the face of the covid-19 pandemic.

Thus**,** the following recommendations were made based on the findings. They are;

Financing

There is need for government and non-governmental organizations to support these small-scale enterprises financially through interest free loans or grants. This will enable them acquire these devices like android phones, laptops etc. that supports digital trading. This will also, aid them in building resilience and strive better even in the face of a covid-19 pandemic.

Creating business environment

There is need for government to ensure that network providers provide good network at all times to the masses so as to promote small scale businesses in the country.

Sensitization and enlightenment of women in small scale

Government and NGOs should make provision for E-commerce classes for women in small scale enterprises and sensitize them on the need to find out and access other means of reaching their customers through workshops and symposiums.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Rapid Urbanization and Carbon Dioxide Emissions in Africa

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Abstract

Africa continues to experience rapid growth in population and density which increased the amount of fossils fuels use. Fossil fuels produce large quantity of carbon dioxide and lead to climate change. This study examines the effects of urbanization, energy consumption on carbon dioxide emissions (CO_2) in Sub-Saharan African countries (SSA). The study used panel cointegration, vector error correction model (VECM), fully modified ordinary least square (FMOLS) and dynamic ordinary least square (DOLS). The empirical finding from cointegration test reveals that there exists a long run cointegrating relationship between energy consumption, urbanization and carbon dioxide emissions. The results based on Granger causality test indicate that energy consumptions and urbanization granger cause carbon dioxide emissions. The results from FMOLS and DOLS confirmed that energy consumptions and urbanization increase carbon dioxide emissions in the sample countries. This indicates that energy consumption (fossil fuel energy) and urbanization are among the major determinant of CO_2 emissions. Therefore, there is a need to have a policy that would help enhance the use of green energy to reduce the environmental damage.

Key words; Carbon dioxide emissions, Sub-Saharan Africa, Energy Consumption, Urbanization

JEL Classification: C23, O1, Q56

1. Introduction

The adverse effects of climate change on the environment are of immense concern to international organization and governments around the globe. The increasing level of CO_2 emissions due to rapid growth in population and urban density in the developing countries are believed to be responsible for the global warming. The Carbon dioxide (CO_2) emission as one of the greenhouse gases (GHG) is considered the most concentrated greenhouse gas in the atmosphere and has over a century atmospheric lifetime. Brundtland Commission Report (1987) declared that the accumulation of CO_2 is one of the serious environmental threats. The amount of CO_2 emissions in developing countries have increased significantly over the years, due to a rise in energy consumption

(Hossain, 2011; Al-mulali and Binti Che Sab, 2012).

The contribution of Africa as a continent to the global CO_2 emissions in small amounted 2% in 2018 but the trend indicates rising pace (EIA, 2019).As a result,the United States Energy Information Administration, projected that by 2040 energy-related carbon dioxide emissions in developing countries could be about 127% higher than emissions in advanced economies (EIA, 2016). Africa is one of the regions with rapid population growth in the world and the continent is expected to be 64% urban by 2050 (United Nations Population Division, 2014). The studies on urbanization and CO_2 emissions have been well documented in the literature. And most of those studies used data from economiesof Asia and Europe (Omri, 2013; Wang et al.; 2014; Acaravci& Ozturk, 2010) with some limited empirical results on carbon emissions and economic growth in African countries(Olubusoye& Musa, 2020; Dan'Asabe et al. 2021; Kwakwa, 2015). In the light of this reason, our study can render empirical evidences and important policy implications related to Sub-Saharan economies.

2. Literature review

Various empirical studies have documented the links between Urbanization, Energy Consumption and CO_2 Emissions. Apergis and James (2010) explore the relationship between carbon dioxide emissions, energy consumption and real output for 11 countries of the Commonwealth of independent states over the period 1992-2004. They found that in the long-run, energy consumption has a positive and statistically significant impact on carbon dioxide emissions while real output follows an inverted U-shape pattern associated with the Environmental Kuznets Curve (EKC) hypothesis. They found bi-directional causality between energy consumption and CO_2emissions in the long run. But the short run dynamics reveal a uni-directional causality running from energy consumption and real output, respectively, to carbon dioxide emissions and bi-directional causality between energy consumption and real output.

Kwakwa and Adu (2015) uses panel unit root analysis, panel cointegration analysis and the method of FMOLS (Fully Modified OLS) and DOLS (Dynamic OLS) through the period 1977-2012 in the case of countries in SSA region. Their results show the presence of long run relationship between income and carbon emissions. They concluded that both income and non-income variables explain carbon emissions in SSA, albeit income and energy consumption have a greater effect.

Zhang and Lin (2012) developed a study to investigate the impact of economic indicators on pollution (CO_2 emissions) in China during the period 1995–2010 by using the fixed effects model and the method of least square generalized linear regression. They utilize the demographic intensities, urbanization, GDP, industrial production, production of services, and energy consumption as economic indicators. The main results of their study show that the industrial production and GDP have an impact on CO_2 emissions.

Wang et al. (2011) confirm the existence of a relationship between energy consumption, economic growth and CO_2 emissions using panel cointegration and panel vector error correction modeling techniques based on the panel data for 28 provinces in China during 1995-2007. They found bi-directional causality between CO_2 emissions and energy consumption as well as between energy consumption and economic growth. The authors concluded that economic growth is the long-run cause for CO_2 emissions and CO_2 emissions and economic growth are the long-run causes for energy consumption.

Al-Mulali (2011) uses a panel model for the Middle East and North Africa (MENA)

countries during the period 1980-2009. Based on cointegration test results, he found that CO_2 emission, and oil consumption has a long- run relationship with economic growth. The empirical results reveal also a bi-directional Granger causality between oil consumption and economic growth in the short and long run. The author concludes that oil consumption plays a crucial role in the economic growth of the MENA countries. Parshall et al. (2010) used spatial analysis in modelling the link between energy consumption and CO_2emissions at the urban scale. Their study found that urbanisation is among the most important determinants affecting energy consumption in United States. Apergis and Payne (2009) studied the causal relationship between carbon emissions, energy consumption, and GDP within a panel VECM for six Central American countries over the period of 1971–2004. The long-run results confirmed a positive effect of energy consumption on emissions. Granger causality test results from the authors showed short-run uni-directional causality from energy consumption, and real output to emissions, but long-run bi-directional causality was found between energy consumption and emissions.

Farhani and Rejeb (2012) applied the panel unit root tests, panel cointegration methods and panel causality test to investigate the relationship between energy consumption, GDP and CO_2 emissions for 15 MENA countries covering the annual period 1973-2008. To deal with the heterogeneity in countries and the endogeneity bias in regressors, the authors applied respectively the Fully Modified Ordinary Least Square (FMOLS) and the Dynamic Ordinary Least Square (DOLS) approach to estimate the long-run relationship between these three factors. Their finding revealed that there is no causal link between GDP and energy consumption; and between CO_2 emissions and energy consumption in the short run. However, in the long run, there is a uni-directional causality running from GDP and CO_2 emissions to energy consumption.

Acaravci and Ozturk (2010) investigate the dynamic relationship between income, energy consumption, trade openness and carbon emissions for 19 European countries by using Autoregressive Distributed Lag (ARDL) bounds cointegration analysis developed by Pesaranand Shin (1999) and Pesaran et al. (2001), and Error Correction Based Granger Causality models. The bounds F-test for cointegration test yields evidence of a long-run relationship between carbon emissions per capita, real gross domestic product (GDP) per capita and the square of per capita real GDP only for Denmark, Germany, Greece, Iceland, Italy, Portugal and Switzerland. Also, the cumulative sum and cumulative sum of squares tests reveal that the estimated parameters are stable for the sample period. To examine the impact of economic growth and energy consumption on environmental degradation in eight Asian economies during the period 1991- 2013, by using the cointegration test, the Fully Modified OLS, and the panel causality. They utilized the trade openness, economic growth, population, energy consumption and financial development as economic indicators. The main findings of Jamel and Derbali (2016) of their study revealed that economic growth have a positive impact on environmental degradation. According to them, Fisher (1932), Pedroni (1997) and Kao (1999) confirmed the presence of long run relationship between environmental degradation and economic growth. They concluded that the existence of bi-directional linkage between environmental degradation and economic growth in case of eight Asian economies. This finding was in agreement with Omri (2013); Omri (2013) uses the method of least squares generalized through the period 1990-2011 in the case of MENA

region. He examined the impact of economic activity indicators on environmental degradation. He utilizes CO_2emission as proxy for pollution and, capital, financial development, population labour and GDP as indicators for economic activities. The results show the presence of a positive and significant impact of GDP and negative impact of financial development and capital on CO_2emission.

3. Methodology and Sources of Data

3.1 Sources of Data

Recall, the main objective of this study is to examine empirically the causal linkage between urban population, fossil fuel energy and carbon dioxide emissions in Sub-Saharan African countries covering the period 2001-2020. We employed annual panel data drawn from World Bank, World Bank Development Indicators (WDI 2022) online database. We sampled twenty-three Sub-Saharan African countries (Angola, Benin, Botswana, Cameroon, Congo Democratic Republic, Congo Republic, Cote d'Ivoire, Ethiopia, Gabon, Ghana, Kenya, Mauritius, Mozambique, Namibia, Niger, Nigeria, Senegal, Sudan, South Africa,Tanzania, Togo, Zambia and Zimbabwe).

3.2 Model Specification

To examine the effects and the causality between the energy consumption, urbanization and carbon dioxide emissions, two models are specified in line with Farhani & Ben Rejeb (2012) and Çetin & Ecevit (2015).

$$CO_{2it} = \beta_{0i} + \beta_1 FCE_{it} + \beta_2 UPO_{it} + \varepsilon_{it} \quad (1)$$

$$FCE_{it} = \beta_{0i} + \beta_3 UPO_{it} + \beta_4 CO_{2it} + \varepsilon_{it} \quad (2)$$

Where CO_2 denotes Carbon dioxide emissions per capita, FEC is the fossil fuel energy as percentage to total energy and UPO is the urban population as a percentage to total population. β_0 is the constant, ε_t, represents the error terms. β_1, β_2, β_3, and β_4 are the estimated coefficients of the independent variables. The subscript i and t denotes the country time period respectively.

3.3 Methods

The study employed panel cointegration and panel Granger causality to analyse the data. TheJohansen Fisher Panel Cointegration Test is applied to verify the presence of long run cointegrated relationship between carbon dioxide emissions (CO_2), energy consumption and urbanization. Fully modified OLS and Dynamic OLS are the useful to determine long run elasticity. Short run and long run dynamic causal relationship are estimated by panel vector error correction model (VECM) and Granger causality test.

4. Empirical results and discussions

4.1 Descriptive Statistics

Table 1: Descriptive statistics for the variables

Variables	Obs	Mean	Std.Dev.	Minimum	Maximum
Carbon dioxide	414	1.094206	1.686488	0.016313	8.568994
Energy consumption	453	32.36901	21.93466	1.639733	88.14867
Urbanization	460	43.60454	16.07194	14.927	90.092

Source: Author's computation. Using STATA version 16

The table 2 below present the correlation matrix of the variables under study. The results reveal that energy consumption and urban population have a positive and significant correlation with the dependent variable (carbon dioxide emissions). The correlation also reveals no evidence of multicollinearity problem is exist among the variables under study. Since none of the estimated coefficient of the independent variables is >0.75 using the cut off line set by Tabachnick and Fidell (2007).

Table 2: Correlation matrix of the variables

	CO_2	FEC	UPO
CO_2	1.0000		
FEC	0.6851	1.0000	
UPO	0.5404	0.4149	1.0000

Source: Author's computation. Using STATA version 16

Figure 1 shows a trend series between CO_2 emissions, energy consumption and the urban population of some selected countries in the Sub-Saharan Africa during the period under study. The trend indicates thatCongo Democratic Republic has the least amount of CO_2 emissions and energy consumption while South Africa happen to be the highest in term of energy consumption and emitting of carbon dioxide emissions.The countries that recorded the minimum and maximum urban population are Ethiopia and Gabon respectively.

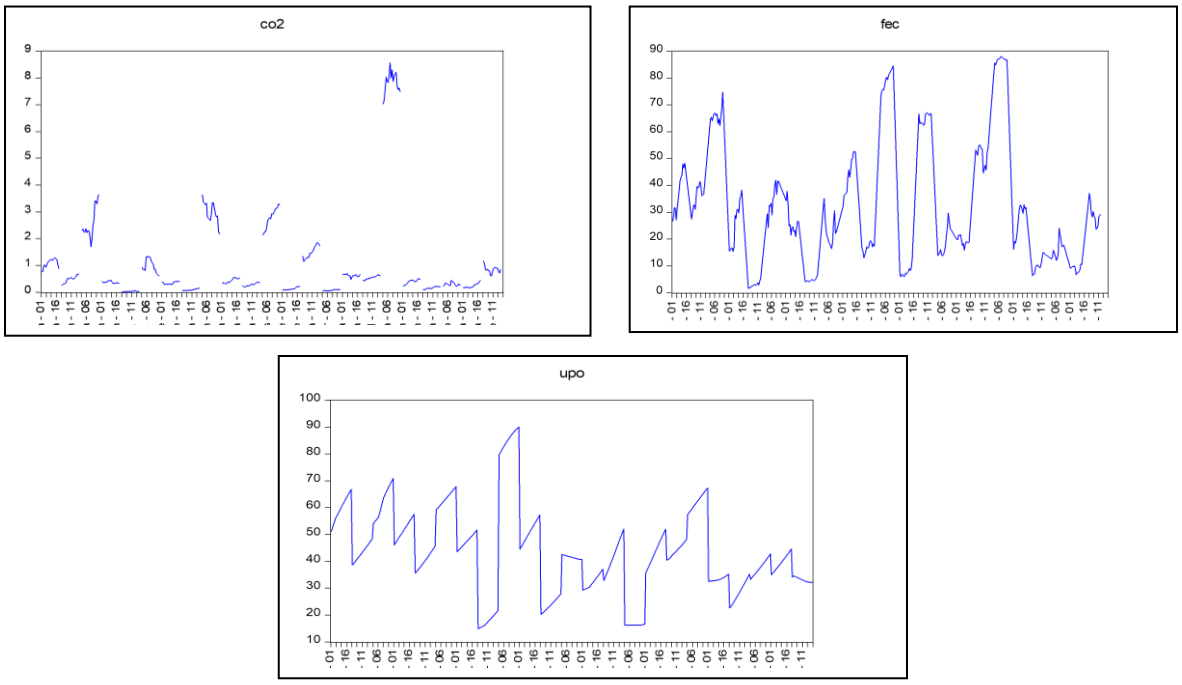

Figure 1: Trends in the Series

4.2 Unit root

The results of ADF and LLC tests are summarized in Table 3. The results indicate that the variables CO_2, FEC, and UPO are not stationary at level but stationary at first difference. All the three variables appear to

be stationary at first difference at 5% significance level. This implies that the three variables contain a panel unit root and are integrated of same order I(1). And when the variables are integrated of same order, the panel cointegration tests can be applied to test the long run relationship between the variables.

Table 3: Panel Unit Root Test Results

	Level	**First difference**
ADF - Fisher Chi-square		
LCO_2	60.536	147.991***
	(0.1738)	(0.0000)
LFEC	9.1419	110.622***
	(1.0000)	(0.0000)
LUPO	58.6305	90.7293***
	(0.1002)	(0.0001)
Levin, Lin & Chu t*		
LCO_2	-0.3460	-11.2560***
	(0.3647)	(0.0000)
LFEC	4.9105	-6.5974***
	(1.0000)	(0.0000)
LUPO	5.1231	-14.8876***
	(1.0000)	(0.0000)

Notes: The panel unit root tests are conducted independently with trend and intercept; the optimal lag lengths are obtained automatically with the SIC. ***and ** indicates significance at 1% and 5% level respectively.

4.3 Cointegration Results

Table 4 shows the results of Johansen fisher cointegration test for the CO_2 and FCE models. It is observed that both the trace test and max-eigen test statistics cannot accept the null hypothesis of no cointegration (none, at most 1, and at most 2) at 1% significance level. These results reveal that there exists a long run cointegrated relationship between energy consumption, urbanization and CO_2 emissions in the sampled countries.

Table 4: Johansen Fisher Panel Cointegration Test

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	477.7***	0.0000	341.8***	0.0000
At most 1	176.6***	0.0000	135.4***	0.0000
At most 2	83.91***	0.0005	83.91***	0.0005

Notes: *** and ** indicates significance at 1% and 5% level respectively.

4.4 Panel Granger Causality Test

The results of the tests of cointegration reported in table 4 & 5 implies only the existence of long run and casual relationship, however it does not indicate the direction of casual relationship between the variables. In order to know the direction of causality, the panel-based on vector error correction model (VECM) followed by Wald test of coefficient developed by Engle and Granger (1987) are employed to examine the long-run and short-run dynamic casual relationships. The first step estimates the long-run parameters in Eq. (1), Eq. (2) and Eq. (3) in order to obtain the residuals corresponding to the deviation from equilibrium. The second step estimated the parameters related to the short-run adjustment. The resulting equations were used in conjunction with panel Granger causality testing are as follows:

$$\Delta CO2_{i,t} = \theta_{1,i} + \sum_{k=1}^{m} \theta_{1,1,i,k} . \Delta CO2_{i,t-k} + \sum_{k=1}^{m} \theta_{1,2,i,k} . \Delta FEC_{i,t-k} + \sum_{k=1}^{m} \theta_{1,3,i,k} . \Delta UPO_{i,t-k} + \delta_{1,i} . ECT_{i,t-1} + \mu_{1,i,t} \quad (1)$$

$$\Delta FCE_{i,t} = \theta_{2,i} + \sum_{k=1}^{m} \theta_{2,1,i,k} . \Delta CO2_{i,t-k} + \sum_{k=1}^{m} \theta_{2,2,i,k} . \Delta FCE_{i,t-k} + \sum_{k=1}^{m} \theta_{2,3,i,k} . \Delta UPO_{i,t-k} + \delta_{2,i} . ECT_{i,t-1} + \mu_{2,i,t} \quad (2)$$

$$\Delta UPO_{i,t} = \theta_{1,i} + \sum_{k=1}^{m} \theta_{3,1,i,k} . \Delta CO2_{i,t-k} + \sum_{k=1}^{m} \theta_{3,2,i,k} . \Delta FCE_{i,t-k} + \sum_{k=1}^{m} \theta_{3,3,i,k} . \Delta UPO_{i,t-k} + \delta_{3,i} . ECT_{i,t-1} + \mu_{3,i,t} \quad (3)$$

Where the term Δ denotes first difference; $\theta_{,i,k,t}$ (i=1, 2, 3) represent the country fixed effect; k (k=1,…,m) is the optimal lag length determined by the Schwarz Information Criterion; and $ECT_{i,t-1}$ is the estimated lagged error correction term derived from the long-run cointegrating relationship of Eq. (1), in which $ECT_{i,t} = CO2_{i,t} - \beta_i \text{FEC}_{i,t} . - \beta_i \text{UPO}_{i,t}$.

Table 5: Panel Granger Causality Test Results (VECM)

Dependent Variable	Sourcesof causation (Independent variable)		
	Short run (t-statistic)		**Long run (t-statistic)**
	ΔLCO_2	ΔLFEC	ΔLUPO	ECT(*-1*)
ΔLCO_2	---	0.9562	1.9088	-0.0028**
ΔLFEC	6.3639**	-	0.7318	-0.0224***
ΔUPO	9.5112**	0.9264	-	-0.0251**

Notes:Figures denote F-statistic values. P-values are in parentheses. *** indicates significance at 1% level ** indicates significance at 5% level respectively. ECT indicates the estimated error-correction term.

The term, $\delta_{j,i}$ (i=1, 2,3) is the adjustment coefficient and $\mu_{j,i,t}$ is the disturbance term assumed to be uncorrelated with zero means.

The table 5 present the results of the panel vector error correction model (VECM). The result reveal that, based on error correction term *ECT (-1)* and Wald tests, there exists a bi-directional causality between energy consumption and CO_2emissions in the long run. The results also reveal that there exists long run unidirectional relationship from urbanizationto energy consumption. The finding also shows short run causality runs from CO_2 emissions to energy consumption and urbanization. These findings are consistent with Çetin & Ecevit (2015) for 19 Sub-Saharan Africa. In the short run no causality was found between energy consumption, urbanization and CO_2emissions. These results indicate that energy consumption and urbanization influence carbon dioxide emissions which in turn affect the quality of the environment.

Table 6: Granger Causality Test

Null Hypothesis	No. of Obs	F-Statistic (Prob.)	Prob.
FEC does not Granger Cause CO2	317	2.98722 (0.0192) **	Rejected
CO2 does not Granger Cause FEC		2.05431 (0.0867)	Accepted
UPO does not Granger Cause CO2	322	4.98187 (0.0007) **	Rejected
CO2 does not Granger Cause UPO		2.24586 (0.0640)	Accepted
UPO does not Granger Cause FEC	361	1.34952 (0.2512)	Accepted
FEC does not Granger Cause UPO		0.21280 (0.9313)	Accepted

** Implies rejection of null hypothesis at 5% level ofsignificance.

Source: E-views output, 2022

The results of the Granger causality test on table 6 above indicated that, a unidirectional causality runs from energy consumption (FEC) and urbanization (UPO) to carbon dioxide emissions (CO_2) at 5% level of significance at four lags.

In order to know the actual effect of energy consumption and urbanization on carbon dioxide, the study proceed to obtain the elasticity of energy consumption, urbanization to carbon dioxide emissions we applied FMOLS and DOLS and the results are reported in table 7. The results show that fossil fuel energy and urbanization do increase carbon dioxide emissions in the sample countries. That is to say, a 1% increase in fossil fuel energy and urbanization could lead to the increase of carbon dioxide emissions by 0.010%and 0.017%, 0.078% respectively. The results also indicate that, 1% increase in urbanization would decreaseCO_2 emissionsby0.018%. This result validates the findings of Dan'asabe, Mustapha & Tukur (2021)who used GMM in case of Sub-Saharan Africa.

Table 7. FMOLS and DOLS Results

Variables	FMOLS	DOLS
CO_2 emissions (Dependent variable)		
Energy consumption (LFEC)	0.0101***(0.0012)	0.0178*** (0.0016)
Urbanization (LUPOP)	-0.0183***(0.0033)	0.0785*** (0.0113)
Observations	386	371
R^2	-14.19	-36.80
Adjusted R^2	-15.20	-56.33

Notes ** and *** indicates significance levels of 5% and 1% respectively. Standard errors are in parenthesis.

Conclusion and policy recommendations

This study examined the links between energy consumption, urbanization and CO_2emissions in twenty-one Sub Saharan African economies using the data set from 2001 to 2020.The Cointegration test revealed that, there exists a long run relationship between energy consumption, urbanization, and CO_2emissions. The VECM Granger causality test revealed bi-directional Granger causality between the energy consumption and CO_2emissions in the long run. The study also found a uni-directional Granger causality test runs from urbanization to energy consumption in the long run. The results of the Granger causality test reveals, a unidirectional causality runs from energy consumption and urbanization to carbon dioxide emissions. The FMOLS and DOLS also confirmed that energy consumption and urbanization increased CO_2 emissions in SSA.

Based on the findings the study recommends that there is need to put in place well-articulated policies that can help reduce CO_2 emissions in SSA. For example, investment in cleaner energy such as biofuels and solar energy, and also implement policies that would promote rural development is necessary to curb the high rate of rural migration.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Impact of Tax Incentive on Industrial Development in Nigeria: 1985-2019

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Abstract

This article investigates the impact of tax incentives on Industrial Development in Nigeria between the periods of 1985 to 2020. Secondary data were sourced from Central Bank of Nigeria, National Bureau of Statistics and Federal Inland Revenue Services on Gross Domestic Product (GDP), Company Income Tax (CIT), Value Added Tax (VAT) and Industrial Output (IoP) using a multiple regression technique of econometrics via E-view 9.0. We tested for unit root to ascertain the status of the data, used co-integration test to establish the long run relationship and applied the ARDL estimation technique to establish the impact of the explanatory variables on the dependent variable. The result showed that company income tax has a negative impact on industrial development while the lag of industrial output, value added tax and gross domestic product has a positive impact on the industrial output during the periods under study. We recommend among others that certain taxes should be waived for firms at the early stage of their takeoff and available tax incentives should be legalized and made known to all.

KEYWORDS: *Industrial Development, Value Added Tax, Company Income Tax, Tax Incentives*

1.0 Introduction

Prior to the Great Depression of 1930s, Governments' focus in economic management was largely laissez-faire - an economic philosophy that is opposed to government intervention. With the emergence of the Keynesian economic model after the 2nd World War, there was a paradigm shift from the hitherto invisible price mechanism to government intervention in the economic system. Government intervenes through the process of legislation, regulation and the use of fiscal policy mechanism aimed at smoothing the pro-cyclical trajectory in the economy (Magaji &Ayo, 2016). The Keynesian doctrine became widely acceptable for ensuring steady growth, full employment and price stability as well as repositioning the private sector as the engine of growth through the provision of incentives to attract private sector investment in targeted sectors of the economy.

Incentives have become increasingly recognized globally, as most countries of the world, irrespective of their stages of industrial and economic developments, now employ a wide variety of incentives in pursuing their economic goals (Magaji & Musa, 2015). The application of incentives

now exists virtually in all sectors of the economy namely: industrial, agriculture, manufacturing, petroleum, solid minerals, energy, and tourism, among others (CBN, 2013).

There are different kinds of incentives. The three basic categories considered by most governments are financial, fiscal, and regulatory. The financial incentives are public–support mechanisms in the form of grants or repayable subsidies, it is common with developed countries (Magaji & Darma, 2021), while developing countries prefer fiscal incentives (tax) because of the fact that they are easily affordable in promoting investment and do not require up-front use of government funds. The regulatory incentives on the other hand are in the form of concessions, exemptions from labour or environmental standards and subsidized infrastructure which are also applicable in most countries (CBN, 2013).

Generally, these incentives are in the areas of manufacturing, export, agriculture and solid mineral, VAT, individuals and other areas. These incentives include: Personal allowance, Capital allowance, Investment allowance, Loss relief, Roll over relief, Annual allowance, Pioneer relief, Tax free dividend, Export Processing Zones Relief, Research and development and Tax free holiday (Dickson and Presley, 2013).

Since the introduction of the structural adjustment programme (SAP) in September 1986, Nigerian economy has experienced instability and dwindling industrial growth rate. This was traceable to inadequacy of tax incentives available to our industries. A major problem facing the industrial sector thereby impeding its development is the problem of excessive taxation in the form of high tax rate, double or multiple taxation. It is a problem of interest to us to find out whether tax incentive affects industrial Development in Nigeria

Based on the problem statement, the following research question is set:

Does tax have any impact on industrial development in Nigeria?

The main objective of the study is to investigate the impact of tax incentives on industrial development in Nigeria. The specific objective is to examine the impact of tax incentives on industrial development in Nigeria.

We constructed research hypotheses to achieve the specific Objective above

H01: Tax incentives do not have any impact on industrial development in Nigeria.

2.0 Literature Review

CBN (2013) defines tax as a compulsory contribution to state revenue, levied by the government on workers' income and business profits, or added to the cost of some goods, services and transactions. Also Black's dictionary describes tax as a ratable portion of the produce of the property and labour of the individual citizens taken by the nation in exercise of its sovereign right for the support of government, for the administration of the laws and as a means for continuing in operation, the various legitimate functions of the state.

United Nations (2018) defines tax incentive as those special provisions that allow for exclusions, credits, preferential tax rates or deferral of tax liability. Tax incentives can take many forms: tax holidays for a limited duration, current deductibility for certain types of expenditures or reduced import tariffs or customs duties. At another level, it can be difficult to distinguish between provisions considered part of the general tax structure and those that provide special

treatment. This distinction will become more important when countries become limited in their ability to adopt targeted tax incentives. For example, a country can provide a 10 per cent corporate tax rate for income from manufacturing. This low tax rate can be considered simply an attractive feature of the general tax structure as it applies to all taxpayers (domestic and foreign) or it can be seen as a special tax incentive (restricted to manufacturing) in the context of the entire tax system. Tax incentives can also be defined in terms of their effect on reducing the effective tax burden for a specific project (Howell, Stotsky & Eduardo, 2001).

This approach compares the relative tax burden on a project that qualifies for a tax incentive to the tax burden that would be borne in the absence of a special tax provision. This approach is useful in comparing the relative effectiveness of different types of tax incentives in reducing the tax burden associated with a project. Commentators contend tax incentives may now play a larger role in influencing investment decisions than in past years. Several factors explain why tax considerations may have become more important in investment decisions (Easson, 2001).

First, tax incentives may be more generous now than in past years. The effective reduction in tax burden for investment projects may be greater than in the past, as tax holiday periods increase from 2 years to 10 years or the tax relief provided in certain enterprise zones comes to include trade taxes as well as income taxes. Second, over the past several decades there has been substantial trade liberalization and greater capital mobility. As non-tax barriers decline, the significance of taxes as an important factor in investment decisions increases. Third, business has changed in many ways. Firms have made major changes in organizational structure, production and distribution methods and the types of products being manufactured and sold. Highly mobile services and intangibles are a much higher portion of cross-border transactions than in past years (United Nations, 2018).

2.1 Empirical Literature Review

Tasie&Akinyomi (2018) examine the impact of tax incentives on the performance of small-scale enterprises. The study employed descriptive analysis technique via structured questionnaire and chi-square to test the stated hypothesis. The findings revealed that there are various tax incentives available to small scale industries and the operators in these industries are very familiar with them. It was also discovered that tax incentives do significantly affect the profitability, staff strength and the growth and development of small scale industries positively. The key recommendation includes that government should periodically review the tax incentives so as to reflect the prevailing economic conditions.

Raphael et al (2019) examine Attracting Foreign Direct Investment in Nigeria through Effective Tax Policy Incentives. They used multiple regression technique in analyzing the model. The findings revealed that although the cost based tax policy incentives had some relatively stronger effect on Foreign Direct Investment compared to profit based tax policy incentives. The study recommends both tax based and non-tax based incentives to attract FDI and encourages domestic entrepreneurs to grow.

Alexander & Van Parys, (2009) in their study consider two empirical questions about tax incentives: (1) are incentives used as tools of tax competition and (2) how effective are incentives in attracting investment? To answer these, we prepared a new dataset of tax incentives in over 40 Latin American, Caribbean and African countries for the

period 1985–2004. Using spatial econometrics techniques for panel data to answer the first question, we find evidence for strategic interaction in tax holidays, in addition to the well-known competition over the corporate income tax rate. We find no evidence, however, for competition over investment allowances and tax credits. Using dynamic panel data econometrics to answer the second question, we find evidence that lower corporate income tax rates and longer tax holidays are effective in attracting FDI, but not in boosting gross private fixed capital formation or growth.

2.2 **Theoretical Issues**

New Economic Geography

One theory was reviewed related to explain tax incentives. Namely: New Economic Geography (NEG) theory.

The NEG theory was built on the neoclassical investment theory which concludes that there is a direct positive relationship between lowered tax rates and increased investment. Van Parys & James (2001). The model introduces the concept of core-periphery. This concept suggests that business concentration reinforces itself and thus the world is left with a core region that attracts the most FDI. NEG models emphasize the role of business concentration that is self-reinforcing leaving the world with a core region.

2.3Theoretical Framework

The aim of the study is to examine tax incentives and its investments in the industrial private corporate sector offered by the tax system in the country. Clearly, taxes are only one of the determinants of capital formation, but, the structure of the tax system is often cited as an impediment to industrial and economic growth, and it is under the direct control of government. Since the exercise of "enterprise" usually involves some investment; that is, some sacrifice of present consumption for future returns, our estimated effective tax rates bear closely on the incentives or dis-incentives provided by government to channel resources into entrepreneurs (Mervyn & Don, 1984).

The total tax liability of the company; that is, total taxes excluding personal income tax on both dividends and interest and excluding any capital gains tax on retained earnings is given by

$I=iY(\theta^{\beta}1+^{\beta}2+^{\beta}3)G\ldots$ i

Where Y denotes taxable income and G denotes gross dividends paid by the company and θ represents tax incentives.

3.0 **Methodology**

In order to empirically analyze the impact of tax incentives on industrial development in Nigeria, the study adapts the tax competition theory coined by (Van Parys & James, 2001). The theory states that the functional relationship between industrial output (I) and tax revenue/incentives (θ) is, in general, non-linear. We used data from Central Bank Statistical Bulletin, Federal Inland Revenue and National Bureau of Statistics. The values of the industrial output/growth and the tax incentives thus depend upon the values of β1, β2,β3 and β4as stated below

The econometric form is expressed as:

$$LnIoP = \beta0 + \beta1lnIoPt\text{-}1 + \beta2lnCiT + \beta3InVAT + \beta4RGDP + \mu\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..vi$$

Where:

IoP = Value of Industrial Output

CIT = Company Income Tax VAT = Value Added Tax

RGDP = Real Gross Domestic Product

Empirical Results Unit Root Test Result

Table 3.1: Augmented Dickey-Fuller Unit Root Test

Variables	TAU Stat.			
At Level	Critical Value			
At 5%	Tau Stat.			
At 1st Diff.	Critical Value			
At 5%	Order of integration			
IOP	3.3652	-1.9510	Not Considered	N/C I(0)
CiT	3.3875	-1.9510	Not Considered	N/C I(0)
VAT	6.2403	1.9550	Not Considered	N/C I(0)
RGDP	0.6894	-1.9510	-5.6765	-1.9513 I(1)

Source: Author Computation 2021 from Mckinnon (1996) using E-view Version 9.0

Hypothesis for Test of Stationarity

Null Hypothesis: Has a unit root (that is, non-Stationary) Alternative Hypothesis: Has no unit root (that is, Stationary)

Decision Rule

Reject the null hypothesis when the Augmented Dickey-Fuller (ADF) test statistics is greater than the critical value in absolute term at the chosen level of significance, on the contrary accept Null hypothesis.

Bound Test Result

Bound Test for Co-integration

Test Coefficient Lag Length Significance

Peseran et al. (2001) BOUND CRITICAL VALUE

The table showed that the Bound test f-statistic value 15.70 exceeds the 99% (4.84), 95% (3.63) and 90% (3.10) Upper Bound critical value of Peseran et al (2001). Thus, the null hypothesis of no co-integration is not accepted, therefore we conclude that long run relationships exist among the variables; industrial output (IOP), company income tax (CiT), value added tax (VAT) and real gross domestic product (RGDP). This indicates that the variables move together in the long run with industrial output (IOP) as the explained variable. According to Peseran et al (2001) existence of a single co-integrating equation indicates that there is unique long run relationship among the variables under consideration. Having established the existence of co-integration among the

variables, we proceed with evaluating the impact of the regressors on the regressand in the long run.

4.0 Data Analysis and Result

The result of the study is analyzed as follows.

ARDL Cointegration Test Result

The estimated long run equation is expressed below:

IOP = 0.304OP(-1) - 0.008CIT + 0.024VAT + 3.93RGDP

t-Stat (1.56) (-1.49) (5.46) (0.29)

Prob. (0.13) (0.00) (0.25) (0.86)

R2 = 0.97

DW = 1.69

Interpretation and Discussion of Results

From the above result and analysis, the following conclusions are drawn:

Since the t-statistic value (1.54) of the lag of industrial output is less than the t- critical value at the chosen 5% significance level (1.87), the null hypothesis of non- significant impact is accepted. That is, previous industrial output has no significant impact on the current industrial output in the long run.

Also, the t-statistic value of company income tax of (/-1.47) is less than the critical value at 5% significance level (1.87), the null hypothesis of non-significant impact is accepted. This implies that company income tax is not important in determining the industrial output in the long run during the period under review.

On the contrary, the t-statistic value of the value added tax of (5.46) is greater than the t-critical value at 5% significance level (1.87), the null hypothesis of non- significant impact is rejected, and thus the alternative hypothesis is accepted. This implies that value added tax as incentive will boost the purchasing power of the consumer which will lead to increased demand and consequently, increased output on the part of the producer.

Furthermore, the t-statistic value of real gross domestic product of 0.29 is less than the t-critical value at 5% significance level of (1.87), the null hypothesis of non-significance impact is rejected. That is, real gross domestic product has no significant impact on the country industrial output in the long run.

The study showed that the data series of industrial output (IoP), company income tax (CiT) and value added tax (VAT) were stationary at level, that is [I(0)] while that data series on real gross domestic product (RGDP) became stationary after the first differencing [I(1)] justifying the need for the chosen analytical technique. The study also showed that the independent variables have a long run

Relationship (i.e. they are co-integrated) with the dependent variable (industrial output).

From the ARDL equation, the lag of industrial output has a positive but non-significant impact on the current output of the firm in the short and long run. Also, value added tax was found to have a positive and a significant impact on the industrial output in the short run but in the long run, its impact is negative. Gross domestic product which served as the proxy for economic growth has a positive and non-significant impact on the country industrial output in the short run but its long run impact is significant.

Contrarily, company income tax was found to have a negative but insignificant impact on industrial output in the short run but has a significant impact in the long run.

The post estimation test showed that the residual estimate of the estimated ARDL model was found to be free from serial correlation given the Durbin-Watson result. The coefficient of determination of about 97% showed that the regressors in the model are capable of predicting what happened to the Regressand and that only about 3% were unexplained as captured by the error term.

Also, the f-statistic result showed that the overall policy parameters are significant enough to forecast the relationship between the Regressand and the regressors.

5.0 Conclusion and Recommendations

This article investigated on whether tax incentive affects industrial Development in Nigeria. We have been able to establish based on the available data and the research questions and objective that company income tax affect negatively the industrial development in Nigeria during the period under review. It can be seen as earlier mentioned that one of the reasons for encouraging private investment (foreign and indigenous) is the expectation that investment activities will generate employment opportunities for Nigerian nationals. The aim of development planning is that economic growth should be accompanied by general development. In other words, benefit of economic advancement should be distributed as widely as possible over the entire society.

Having x-rayed the cardinal impact of tax incentives in the advancement of industrial development and base on the findings and conclusion of this work, it is pertinent to make valuable recommendation, these includes:

i. The government should waive certain taxes on corporate bodies to help them develop and mature especially at their early stage. They should not focus on the revenue that may be lost at this point because in the long-run the benefit surpasses what is lost at the initial time.
ii. The administrative machinery should be well assisted and equipped to enable them render the necessary services and achieve the objectives for which they are established. The financial institutions established to assist on fund raising also need to be given a reorientation so that fund could be made available when needed at attainable cost and procedures.
iii. Government should enact tax incentive legislation with emphasis on the utilization of local inputs in the form of raw materials, labour and fabricated machinery against imported ones.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Impact of Exchange Rate Volatility on Economic Growth in Nigeria: 1986 -2019

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Abstract

This study examines the impact of exchange rate volatility on economic growth in Nigeria. The study covers the period of 1986 to 2019. Using time series data, the methodology adopted is the Vector Error Correction Mechanism to explore the impact of exchange rate volatility on the selected macroeconomic variables. The result indicated that exchange rate volatility has a significant impact on economic growth; specifically it has a positive impact on inflation, unemployment and balance of trade. On the other hand, it has a negative impact on economic growth and investment. The recommendations made include; those relevant authorities should try to avoid systematic currency devaluations in order to maintain exchange rate volatility at a rate that allows adjustment of the balance of payments.

KEYWORD*S: Exchange rate, Economic Growth*

JEL: 012 011

1.0 Introduction

The choice of exchange rate regime can affect economic growth through its effects on macroeconomic variables which are important determinants of growth. Factors such as export, international trade, capital flows are highly affected by the variation of exchange rate. Since the seventies, there has been an increasing importance attached to exchange rate in many countrieswhich could be attributed to factors such as the floating exchange rate variability and volatility as well as the need for foreign exchange risk exposure management; the globalization process and the resultant increased rate and volume of funds flows among nations; the trade liberalization undertaken by developing countries since 1980s, resulting in opening up their economies; the internationalization of modern business; the continuing growth in world trade relative to national economies; the trends towards economic integration in some regions; and the rapid pace of change in the technology of money transfer (Gadanecz and Mehrotra, 2013).

Over the years, Nigeria has undergone different exchange rate policies, either depreciation or appreciation depending on the policy thrust of the government of the day. Aliyu (2011) noted that appreciation of exchange rate results in increased imports and reduced exports, while depreciation expands exports and discourages imports. Also, depreciation of exchangerate tends to cause a shift from foreign goods to domestic goods. Thus, it leads to diversion ofincome

from importing countries to countries exporting through a shift in terms of trade, and thistends to have impact on the exporting and importing countries' economic balance of trade and growth. Although, a number of exchange rate reforms have been carried out by successivegovernments, the extent to which these policies have been effective in promoting exports hasremained unascertained. This is because despite government efforts, the performance of the Nigerian economy remains very slow.

Various factors have been responsible for exchange rate fluctuation in Nigeria over time. However, changes in Oil Price have been the major driver of exchange rate fluctuation (Ogunjuyigbe&Laisu, 2010). Since the discovery of Oil, Nigeria's reliance on income from Oil and Gas has further been buoyed by an almost consistent upward movement in the prices of crude oil reaching about $147 per barrel in 2008, before averaging $90 per barrel in 2010, $85 per barrel in 2012, $79 per barrel in 2014 and decreased to as low as $60 per barrel in 2016, $52 per barrel in 2017 and $58 per barrel in 2018 (OPEC bulletin, 2018). Exchange rate fluctuated with changes in Oil Price as it stood at 118.5669 Naira to $1 in 2008 and increased to 150.298 Naira to $1 in 2010 with a decline in Oil Price. With further decline in Oil Price, exchange rate increased to 194.0294 Naira to $1 in 2014 and 371.8655, 375.1277 and 373.08 Naira to $1 in 2016, 2017 and 2018 respectively (OPEC bulletin, 2018).

Analysis of Nigeria's exchange rate movement from 1986 - 2019 showed that there exists a causal relationship between the exchange rate movements and economic growth (CBN, 2019). Consequently, the persistent depreciation of the exchange rate trended with GDP. In this context, the exchange rate movement in the 1990's trended with economic growth. Exchange rate volatility is accompanied by fluctuation in growth rate. For instance, while the exchange rate moved from 8.3 Naira to $1 in 1990 to 22.05 Naira to $1 and 21.86 Naira to $1 in 1993 and 1995 respectively, economic growth decreased from 11.36 percent in 1990 to 1.56 percent in 1993 and 2.15 percent in 1995. Also, when the exchange rate moved from 21.86 in 1995 to 92.69 and 102.11 in 1999 and 2000 respectively and rose thereafter to 133.5 in 2004 and averaged 198.74 between 2005-2019, economic growth trended in the same direction (CBN, 2019).

Thus, from the above scenario, it is important to note that there is a strong nexus between exchange rate and Gross Domestic Product (GDP). It is therefore not surprising that, exchange rate is among the most watched, analyzed and government manipulated macroeconomic indicators. Most countries attempt to moderate their domestic currency fluctuations by imposing restrictions on exchange rate movements (Benita &Lauterbach, 2007). It is a key macroeconomic measure in the context of general economic reform programmes and because of its importance, government takes active part in its determination. Specifically, it is important as the connection between the pricing systems of countries, as a price in the allocation of real resources among tradable and non-tradable sectors, as a promoter or otherwise of imports and exports, and as an instrument in the design of the balance of tradeprogramme of a country. Various macroeconomic policies notably, fiscal and monetary had from time to time been adopted to address this problem of exchange rate fluctuation. Unfortunately, these measures have met with little or no success and this has hindered the achievement of other macroeconomic objectives. It is in this light that this study is devoted to carrying out an analysis of the impact of exchange rate volatility on economic growth in Nigeria, since the Structural Adjustment Programme

(SAP) of 1986 to 2019 and its policy implication.

The objective of this study is to analyse the impact of exchange rate volatilityon economic growth in Nigeria for a period of 34 years (1986 – 2019). The choice of 1986 as a base year was to enable us see the changes that would have occurred as a result of the Structural Adjustment Programme (SAP) that was meant to holistically reform the Nigerian economy then and to track the impact of the democratic governmentof Nigeria since its return in 1999.

2.0 Literature Review and Theoretical Framework

2.1 Conceptual Review

a Exchange Rate

Exchange rate is the price of the currency of one country expressed in terms of the currency of another. For example, the Nigerian Naira has exchange rate against the U.S. dollar and many other currencies. It may be expressed as nominal exchange rate or real exchange rate.According to Akintola and Lawal (2012), the nominal exchange rate is a monetary concept which measures the relative price of two currencies e.g. Naira in relation to dollar (N/$), while the real exchange rate is a real concept that measures the relative price or value of different countries' products.

Nominal exchange rate is used in this study as the rate of the Naira to dollar that is the amount of naira exchange to a dollar. This measurement is in-line with various studies carried on exchange rate such as Yaqub (2010);Iyeli and Utting (2017). Rasaq (2012); Attah-Obeng, Enu, Osei-Gyimah and Opoku (2014).

b. Volatility

Volatility measures the rate and magnitude of price changes around a trend. In other words, it captures the deviation of the actual observed price from its normal or expected value (Pindyck, 2002). The computation and estimation of price volatility is not unique to exchange rate and is heavily discussed in a wide range of economic fields. Earlier studies on volatility focused on asset or security returns.

In principle, measures of exchange rate volatility can be classified into two broad categories (Matthews, 2010). First, realized historical volatility that measures the volatility of observed past prices.Secondly, stochastic volatility which captures volatility at a given point in time also considering past realization of volatility. From the foregoing, volatility in this context could rightly be defined as the rate at which the price of exchange rate increases or decreases for a given period (Kashif et.al 2010). It is measured by calculating the standard deviation of the annualized returns over a given period of time. In financial market, volatility measurement is based on the standard deviation of the asset return, a variable that appears in option pricing formulas, where it denotes the volatility of the underlying asset return from now to the expiration of the option (Shiller and Radikoko, 2014).

Volatility is measured in this study using the econometrics approach of calculating volatility clustering. This approach used the Generalized Auto-Regressive Conditional Heteroscedasticity (GARCH) model. This measurement is consistent with other studies on exchange rate volatility such as Tarawalie et al. (2012)

c Economic Growth

Economic growth is an increase in the production of goods and services over a specific period. To be most accurate, the measurement must remove the effects of inflation.Economic growth creates more profit for businesses. As a result, stock prices rise which gives companies capital to invest

and hire more employees. As more jobs are created, incomes rise. Consumers have more money to buy additional products and services. Purchases drive higher economic growth. For this reason, all countries want positive economic growth. This makes economic growth the most-watched economic indicator (Silas &Matas, 2018).

Thus, the study measures economic growth in terms of Gross Domestic Product as it is the best way to measure economic growth. This is because, it takes into account the country's entire economic output. It includes all goods and services that businesses in the country produce for sale. It doesn't matter whether they are sold domestically or overseas. GDP measures final production. It doesn't include the parts that are manufactured to make a product. It includes exports because they are produced in the country. Imports are subtracted from economic growth. Most countries including Nigeria measure economic growth quarterly.

2.2 Empirical Review

There are various empirical literatures that have been carried out in developing and developed economies on the linkage between exchange rate and economic growth. Different statistical information and econometrics techniques were used in these empirical studies. The relationship between exchange rate volatility and economic growth has received considerable attention in previous studies. Despite the immense research on the topic, there is still no general unanimity that has been reached on the relationship between exchange rate volatility and economic growth(BarGuellil et al., 2018). The literature reveals diversified outcomes are making this topic an empirical question which still requires further investigation. While some studies revealed the existence of a negative relationship, others established a positive nexus, while others found no significant relationship at all (Iyeli and Utting, 2017). Some of the previous researches carried out on the topic are reviewed as follows:

For studies conducted on other developing countries, Attah-Obeng, Enu, Osei-Gyimah and Opoku (2013) examined the relationship between GDP growth rate and exchange rate in Ghana from the period 1980 to 2012. The study employed the graphing of the scatter diagram for the two variables which are GDP growth rate and exchange rate, established the correlation between GDP growth rate and exchange rate using the Pearson's Product Moment Correlation Coefficient (PPMC) and finally estimated the simple linear regression using Ordinary Least Square (OLS). This result conformed with the theory that undervaluation (high exchange rate) stimulates economic growth in the short run. Thus, policy makers should stabilise monetary and fiscal policies in the long run.

Similarly, Ganesh, Moses andMusyoki (2012) examined the impact of real exchange rate volatility on economic growth in Kenya. The study employed the Generalized Autoregressive Condition of Heteroscedasticity (GARCH) and computation of the unconditional standard deviation of the changes to measure volatility and Generalized Method Moments (GMM) to assess the impact of the real exchange rate volatility on economic growth for the period, January 1993 to December 2009. Data for the study were collected from Kenya National Bureau of Statistics, Central Bank of Kenya and International Monetary Fund Database by taking monthly frequency. The study found that RER was very volatile for the entire study period. Kenya's RER generally exhibited appreciating and volatility trend, implying that in general, the country's international competitiveness deteriorated over the study period. The RER Volatility reflected a negative impact on economic growth of Kenya.

Examining the effect of exchange rate shocks on economic growth in Turkey for the period 1987:1 to 2008:3,Berument*et al.* (2012) used sign restriction approach to divide exchange rate shocks into monetary policy fluctuations and portfolio preference fluctuations. The study estimated models where real GDP is dependent on nominal GDP, GDP deflators, exchange rate, interest rate and money supply, using the Vector Autoregressive (VAR) technique. The study found no clear relationship between exchange rate shocks and economic growth but concluded that economic growth depended on the sources of exchange rate shocks.

Using time-series data spanning from 1971 to 2009, Mori, Asid, Lily, Mulok and Loganathan (2012) investigated the effects of exchange rates on economic growth in Malaysia. The results of ARDL bounds test suggest that long-run cointegration exists between both nominal and real exchange rates and economic growth with a significant positive coefficient recorded for real exchange rate. The study concluded that both exchange rates have a similar causal effect towards economic growth and suggested that a systematic exchange rate via monetary policy should be properly developed to promote the stability and sustainability of economic growth in Malaysia.

For panel cross country studies, Umaru et al. (2019) examined the effects of exchange rate volatility on economic growth of West African English-speaking countries. Macroeconomic data used for this study were obtained from the World Bank Data Stream between 1980 to 2017 and analyzed using Stata 14 panel data regression analysis. The results obtained showed that the independent variable (real exchange rate) is statistically significant and negatively related to the dependent variable (GDP) in West African English-speaking countries excluding time-invariant variables.

BarGuellil et al. (2018) examined the impact of exchange rate volatility on economic growth. An empirical investigation based on a sample of 45 developing and emerging countries over the period of 1985 to 2015 was conducted using the difference and system generalized method of moments estimators. Findings suggested that the generalized autoregressive conditional heteroskedasticity-based measure of nominal and real exchange rate volatility has a negative impact on economic growth. Also, the effect of exchange rate volatility depends on the exchange rate regimes and financial openness, that is, volatility is more harmful when countries adopt flexible exchange rate regimes and financial openness.

In a similar research, Tarawalie et al. (2012) investigated the effects of exchange rate volatility on output growth and inflation in the West African Monetary Zone (consisting of Ghana, The Gambia, Guinea, Liberia, Nigeria and Sierra Leone) following exchange rate regime shift. Results from the study revealed that, while exchange rate volatility is inflationary across all the countries, its effects on output growth differ. Specifically, volatility and depreciation in particular negatively affect real GDP growth in Liberia and Sierra Leone but positively impacts on output in the other countries albeit weakly. The difference in direction and magnitude of effect is not far-fetched from the differences in macroeconomic conditions prevailing in each country.

Examining the impact of real exchange rate volatility on long-run economic growth for advanced and emerging economies over the period 1970 to 2009, Holland et al. (2011) observed that, high (low) exchange rate volatility positively (negatively) affects real GDP growth rate. The study noted that controlling for exchange rate volatility in a model containing levels of exchange rate and

exchange rate misalignment renders the variables insignificant,thereby suggesting that exchange rate stability is more crucial in propelling long-run growth than exchange rate misalignment. The study, however, did not find any significant link between exchange rate volatility and long-run productivity growth.

Similarly, Gadanecz and Mehrotra (2013) revealed non-linearities between real exchange rate volatility and output volatility among emerging market economies. Their finding suggests that real exchange rate volatility aids in absorbing shocks as well as limit output volatility, but too much of volatility in exchange rate increases output volatility.

Also, study carried out by Polodoo, Seetanah and Padachi (2011) on the "impact of exchange rate volatility on economic growth on small island developing states" using the generalised method of moments found out that in dynamic setting, volatile exchange rates do not influence economic growth.Another study by Holland, Vieira, Silva and Bottecchia (2011) examined exchange rate volatility on economic growth in 82 advanced and emerging economies using panel econometrics analysis discovered that a relatively less volatile real exchange rate structure has a positive effect on economic growth and vice-versa.

For studies conducted in Nigeria, Ubah (2015) examined the effect of exchange rate volatility on economic growth in Nigeria on the basis of annual data from 1980 to 2012. Employing the Generalised Autoregressive Conditional Heteroscedasticity (GARCH) technique to generate exchange rate volatility, the relationship between exchange rate volatility and economic growth was estimated. Findings further showed that in the short run, economic growth is negatively responsive to exchange rate volatility in Nigerian case, while in the long run, a negative relationship exists between the two variables. The study recommended control of import content of both public and private expenditure, greater diversification of the economy through investment in key productive sectors of the economy to guard against the vicissitude exchange rate volatility.

In a related study, Iyeli and Utting (2017) assessed the effect of exchange rate volatility on Economic Growth in Nigeria from 1970 to 2011. The model formulated depicts Real GDP as the dependent variable, while Exchange Rate (EXR), Balance of Payment (BOP) Oil Revenue (OREV) and inflation (INF) are independent variables. The study employed the Johansen Co-integration estimation techniques to test for the short and long runs effect of the variables used. The ADF test revealed that all the variables are stationary. From the parsimonious model, the results show that OREV and EXR are positively related to GDP. Further findings revealed that there exist two equations at 5% level in both trace and Max-Eigen statistic. This implies that exchange rate volatility and oil revenue contribute positively to GDP in the long run.

In addition to the aforementioned reviews, Ismaila (2016), examined exchange rate depreciation and Nigerian economic performance after structural adjustment programmes (SAP). The study used cointegration and error correction mechanism. The variables used were broad money supply, net export and total government expenditure, real output and exchange rate. The results show that broad money supply, net export and total government expenditure have significant impact on real output performance in the long run, while exchange rate has direct and insignificant effect on the Nigerian economic growth in both short and long run. Therefore, the study suggested that policy makers should not totally rely on exchange rate

depreciation policy instrument to induce economic growth.

Using GARCH Models, Dahiru and Asemota (2013) examined exchangerate volatility with monthly exchangerate return series from 1985 to 2011 for Naira/US dollar return and from 2004 to 2011 for Naira/British Pounds and Naira/Euro returns. The study compared estimates of variants of GARCH models with break in respect of the US dollar rates with exogenously determined break points. The results revealed presence of volatility in the three currencies and equally indicate that most of the asymmetric models rejected the existence of a leverage effect except for models with volatility break. Evaluating the models through standard information criteria, volatility persistence and the log likelihood statistic, showed that results improved with estimation of volatility models with breaks as against those of GARCH models without volatility breaks and that the introduction of volatility breaks reduces the level of persistence in most of the models.

Azeez, Kolapo and Ajayi (2012) also examined the effect of exchange rate volatility on macroeconomic performance in Nigeria from 1986 to 2010. The model formulated depicts Real GDP as the dependent variable, while Exchange Rate (EXR), Balance of Payment (BOP) and Oil Revenue (OREV) are proxied as independent variables. It employed the Ordinary Least Squared (OLS) and Johansen co-integration estimation techniques to test for the short and long runs effects respectively. The results showed that oil revenue and balance of payment exert negative effects, while exchange rate volatility contributes positively to GDP in the long run. The study recommended that monetary authorities should pursue policies that would curb inflation and ensure stability of exchange rate.

In the same vein, Danmola (2013) analysed the impact of exchange rate volatility on macro-economic variables in Nigeria. The Ordinary least square and Granger Causality was used to test the relationship between them. The variables used were exchange rate, GDP and investment. It was observed that exchange rate has a significant impact on economic growth. The study then recommended exchange rate control.

In a related study, Adeniran, Yusuf and Adeyemi (2014) examined the impact of exchange rate on Nigerian economic growth from 1986 to 2013. Employing the correlation and regression analysis, the ordinary least square (OLS) method was used to analyze the data. The result revealed that exchange rate has positive and insignificant impact on Nigerian economic growth and recommended that government should encourage the export promotion strategies in order to maintain a surplus balance of trade and also conducive environment, adequate security, effective fiscal and monetary policies, as well as infrastructural facilities should be provided so that foreign investors will be attracted to invest in Nigeria.

Using Vector Error Correction Model (VECM), Akinlo and Lawal (2012) examined the impact of exchange rate on industrial production in Nigeria over the period 1986-2010. The findings confirmed the existence of long run relationship between industrial production index and exchange rate, money supply and inflation rate. Moreover, exchange rate volatility had no perceptible impact on industrial production in the short run but had positive impact in the long run.

Based on the annual time series data for the period 1970 to 2009 and employing vector-autoregressive model, Dada and Oyeranti (2012) analysed the impact of exchange rate on macroeconomic aggregates in Nigeria. The estimation results showed that there was

no evidence of a strong direct relationship between changes in the exchange rate and GDP growth. Rather, Nigeria's economic growth has been directly affected by fiscal and monetary policies and other economic variables particularly the growth of exports (oil) and concluded that improvements in exchange rate management were necessary but not adequate to revive the Nigerian economy.

On the effect of exchange rate on the economic sector output, Ehinomen and Oladipo (2012) examined the impact of exchange rate management on the growth of the manufacturing sector in Nigeria. Ordinary Least Square (OLS) multiple regression analysis was employed to analysed time series data which spanned between 1986 to 2010. The empirical result of this study showed that depreciation which forms part of the structural adjustment programme (SAP), 1986, and which dominated the period under review has no significant relationship with the manufacturing sector's productivity. It was observed that in Nigeria, exchange rate appreciation has a significant relationship with domestic output and recommended that government should direct its exchange rate management policy towards exchange rate appreciation in order to reduce the cost of production in the manufacturing sector which depends heavily on foreign inputs, while there should be total ban of importation on consumer and intermediate goods that can be produced locally.

2.3 Theoretical Framework

Fisher (1938), in his Quantity Theory of Money postulated that exchange rates are determined in the process of equilibrating or balancing the stock or total demand and supply of money in each economy. According to the monetary approach, the nominal demand for money is stable in the long run and positively related to the level of nominal national income but inversely related to interest rate. The nation's money supply is equal to its monetary base times the multiplier. The nation's monetary base is equal to the domestic credit created by its monetary authorities plus its international reserve. Unless satisfied domestically, an excess supply of money in the nation results in an outflow of reserves, or a balance of payment deficit under fixed exchange rates and a depreciation of the nation's currency(without any international flow of reserves) under flexible exchange rate. The opposite takes place with an excess demand for money in the nation.

In this theory, attention is given to the stock of currencies in comparison to the willingness of people to hold these stocks. According to the monetary theory, exchange rates adjust to ensure that the quantity of money in each currency supplied is equal to the quantity demanded (Rasaq, 2012). Both Quantity Theory of Money (QTM) and Purchasing Power Parity (PPP) have been used in support of the aforementioned theory.

Thus, Fisher's Quantity Theory of Money (QTM)states that there is a direct relationship between the quantity of money and the level of prices of goods and services sold (Virendra, 2011). In other words, more money equals more inflation. In a domestic framework, the equation below is formulated to explain the relationship between money supply and inflation:

$$MV = PY \qquad (2.1)$$

M = Money supply/demand; V = Velocity of circulation (the number of times money change hands); P = Average price levels; Y = Output (GDP)

Finally, it can be concluded that an increase in the money supply leads to inflation, which in turn results to a decrease in the value of money or purchasing power. Similarly, if this

is considered in an international context, the following implications will apply:

Firstly, a rapid increase in money supply (in the home currency), which as stated earlier means inflation, will put into effect the PPP resulting in the depreciation of the currency's exchange rate. Secondly, a higher interest rate will also result in the currency's depreciation because of the positive relationship between interest rates and money in circulation.

Finally, if the domestic GDP grows faster than overseas GDP, the demand for money will increase. Assuming there is a given supply of money, the exchange rate will decrease.

3.0 Methodology

3.1 Research Design

The research employed the analytical research design using the Vector Error correction model (VECM) to establish a long run and short run interaction between exchange rate volatility and economic growth in Nigeria. VECM belongs to a category of multiple time series model commonly used for data where the underlying variables have a long-run stochastic trend, also known as co integration. It is a theoretically driven approach useful for estimating both short-term and long-term effect of one time series on another. Before specifying the time series regression there was a need to test and extract the latent exchange rate volatility process. This was done with the use of the Generalized Auto-Regressive Conditional Heteroskedasticity (GARCH).

The stationarity test (unit root test) was carried out first using the Augmented Dickey Fuller (ADF) test on each variable to test for stationarity and avoid for spurious regression as suggested by Phillips and Moon (1999). Depending on the stationarity test result, the cointegration test was conducted to determine if the variables have a long-run equilibrium relationship. The Johansen's cointegration test was used to test for long run relationship between variables.

3.2 Model Specification

a Measuring Exchange Rate Volatility

The ARCH model of Engle (1982) provides a systematic framework for modeling volatility process. The basic premise is that the mean exchange rate volatility is serially uncorrelated, but is dependent. This dependence is usually modelled as a simple quadratic function of its lagged values (Tsay, 2002).

Specifically, the ARCH process imposes an autoregressive structure on the conditional variance that permits volatility shocks to persist over time. It can therefore allow for volatility clustering. The general form of the model, denoted by ARCH(q) begins with the Autoregressive Model;

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_1 Y_{t-1} + \alpha_1 Y_{t-1} + \cdots + \alpha_P Y_{t-P} + \epsilon_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i Y_{t-i} + \epsilon_t \quad (3.1)$$

Where Y_t is the dependent variable, $\alpha_i$are parameters to estimate and $\epsilon_t$the error term. The lags of the dependent variables can be stack together as $X_t$and the $\alpha_i's$ as φ which is rewritten as;

$$Y_t = X_t\varphi + \epsilon_t \quad (3.2)$$

Where the error term is assumed to be normally distributed with 0 mean and variance h_t also written as;

$$\epsilon_t \sim N(O, h_t) \quad (3.3)$$

The ARCH(q) model estimated with Maximum Likelihood Procedures is given as;

$$h_t = \alpha_0 + \sum_{i=1}^{q} \alpha_i \epsilon_{t-1}^2 + V_t \quad (3.4)$$

$$V_t \sim IIN(O, h_t) \quad (3.5)$$

The main problem with an ARCH model is that it requires a large number of lags to catch

the nature of the volatility, this can be problematic as it is difficult to decide how many lags to include besides, it produces a non-parsimonious model where the non-negativity constraint could fail. The GARCH model is usually much more parsimonious and often a GARCH (1,1) model is sufficient, this is because the GARCH model incorporates much of the information that a much larger ARCH model with large numbers of lags would contain.

Due to these deficiencies of ARCH, Bollerslev (1986) generalised the ARCH process by allowing the conditional variance to be a linear function of *p* lagged conditional variances in addition to *q* past squared errors. In other words, GARCH (*p,q*) implies the following form of the conditional variance:

$$h_t = \alpha_0 + \sum_{i=1}^{q} \alpha_i \epsilon_{t-1}^2 + \sum_{j=1}^{p} \beta_i h_{t-j} + V_{t_t} \quad (3.6)$$

Where $\alpha_0$is the constant term, $\epsilon_{t-1}^2$is the ARCH process, h_{t-j} is the GARCH term

To ensure the conditional variance is positive, an inequality restriction must be

imposed on the variance equation in (3.6):

$$\alpha_0 > 0 \; and \; \alpha_i \geq 0, \beta_i \geq 0, \forall i,\text{j}$$

According to Blanchard and Gali (2007) and Plante and Thrum (2012) amongst others, real oil prices follow an Autoregressive AR(p) process with time varying volatility, where volatility follows a mean reverting Moving Average MA(1) process. Specifically;

$$EXR_t = \rho_1 EXR_{t-1} + \rho_2 EXR_{t-2} + \rho_3 EXR_{t-3} + \cdots + \rho_p log + e^{\sigma t} V_t$$

$$= \sum_{i=1}^{p} \rho_i log EXR_t + e^{\sigma t} V_t \quad (3.7)$$

$$\sigma_t^2 = (1 - \delta_\sigma)\bar{\sigma} + \delta_1 \sigma_{t-1}^2 + \gamma_1 V_{t-1}^2 + V_{\sigma,t} \quad (3.8)$$

Note:

$\{V_t, V_{\sigma,t}\} \sim N(0,1)$ i.e. zero mean and constant variance

Where;

$EXR_t$is Exchange Rate, σ^2 is Variance, ρ, γ and δ are parameters to be estimated. $\bar{\sigma}$ is the unconditional mean of σ_t^2. The shock to Exchange Rate volatility $V_{\sigma,t}$ is assumed to be independent of the error term V_t . The postulated oil price process is the same as in Fernandez-Villaverde et al. (2015) with time varying volatility.A method to test for the significance of GARCH errors using the Lagrange multiplier test was proposed by Engle (1982).

The null hypothesis is that, in the absence of ARCH/GARCH components, we have

H_0: $\delta_1 = 0 \quad ; \gamma_1 = 0$ (3.9)

The alternative hypothesis is

H_1: $\delta_1 \neq 0 \quad ; \gamma_1 \neq 0$ (3.10)

That is, in the presence of ARCH components, the estimated coefficients δ_1 must be significant. In a sample of *T* residuals under the null hypothesis of no GARCH errors, the test statistic TR^2 follows χ^2 distribution with *q* degrees of freedom. If TR^2 is greater than the Chi-square table value, we *reject* the null hypothesis and conclude there is a GARCH effect. If TR^2 is smaller than the Chi-square table value, we do not reject the null hypothesis. Also, we can also test the null hypothesis using the probability value of the Langrangian Multiplier (LM) statistics. We accept the null hypothesis if the probability falls outside the conventional levels of significance. That is, if p>0.05, it accepts the null hypothesis that there is no GARCH effect. Where the reverse is the case, it will reject the null hypothesis.

b. Multivariate Time Series Model

In an attempt to justify the impact of foreign exchange on macroeconomic performance in

the Nigerian economy, important macroeconomic variables such as gross domestic product, exchange rate, balance of trade, investment, inflation and unemployment will be considered in building the model for this study. Also, a VECM model shall be used to carry out the analysis. The model used is adapted from the work of Iyeli and Utting (2017) who examined exchange rate volatility and economic growth in Nigeria. Their model was given as

RGDP = f (EXR, OREV, INF) (3.11)

Where RGDP= real gross domestic product, EXR= exchange rate, OREV is Oil Revenue and INF = inflation rate. OREV was dropped as it was not part of the macroeconomic indicators under consideration in this study. However, in line with the objectives of the study, other important macroeconomic indicators such as unemployment and money supply were included.

VECM model comes to play when it has been established that, there exists a long-run relationship between the variables under consideration. The VECM regression equation is statedbelow as:

$$\Delta EXR_t = \alpha_0 + \rho_1 ECM + \sum_{j=1}^{m} \alpha_{1j} \Delta EXR_{t-j} + \sum_{j=1}^{m} \alpha_{2j} \Delta GR_{t-j} + \sum_{j=1}^{m} \alpha_{3j} \Delta INF_{t-j} + \sum_{j=1}^{m} \alpha_{4j} \Delta MS_{t-j} + \sum_{j=1}^{m} \alpha_{5j} \Delta UMP_{t-j} + U_{1t} \quad \text{.....3.12}$$

$$\Delta GR_t = \beta_0 + \rho_2 ECM + \sum_{j=1}^{m} \beta_{1j} \Delta EXR_{t-j} + \sum_{j=1}^{m} \beta_{2j} \Delta GR_{t-j} + \sum_{j=1}^{m} \beta_{3j} \Delta INF_{t-j} + \sum_{j=1}^{m} \beta_{4j} \Delta MS_{t-j} + \sum_{j=1}^{m} \beta_{5j} \Delta UMP_{t-j} + U_{1t} \quad \text{.....3.13}$$

$$\Delta INF_t = \lambda_0 + \rho_3 ECM + \sum_{j=1}^{m} \lambda_{1j} \Delta EXR_{t-j} + \sum_{j=1}^{m} \lambda_{2j} \Delta GR_{t-j} + \sum_{j=1}^{m} \lambda_{3j} \Delta INF_{t-j} + \sum_{j=1}^{m} \lambda_{4j} \Delta MS_{t-j} + \sum_{j=1}^{m} \lambda_{5j} \Delta UMP_{t-j} + U_{1t} \quad \text{.....3.14}$$

$$\Delta MS_t = \gamma_0 + \rho_4 ECM + \sum_{j=1}^{m} \gamma_{1j} \Delta EXR_{t-j} + \sum_{j=1}^{m} \gamma_{2j} \Delta GR_{t-j} + \sum_{j=1}^{m} \gamma_{3j} \Delta INF_{t-j} + \sum_{j=1}^{m} \gamma_{4j} \Delta MS_{t-j} + \sum_{j=1}^{m} \gamma_{5j} \Delta LUMP_{t-j} + U_{1t} \quad \text{.....3.15}$$

$$\Delta UMP_t = \delta_0 + \rho_5 ECM + \sum_{j=1}^{m} \delta_{1j} \Delta EXR_{t-j} + \sum_{j=1}^{m} \delta_{2j} \Delta GR_{t-j} + \sum_{j=1}^{m} \delta_{3j} \Delta INF_{t-j} + \sum_{j=1}^{m} \delta_{4j} \Delta MS_{t-j} + \sum_{j=1}^{m} \delta_{5j} \Delta UMP_{t-j} + U_{1t} \quad \text{.....3.16}$$

A negative and significant coefficient of the VECM (i.e.ρin the above equations) indicates that any short-term fluctuations between the independent variables and the dependent variable will give rise to a stable long run relationship between the variables.

Where, GR is growth rate; BoT is Balance of Trade; UMP is Unemployment Rate

3.3 Sources of Data

The data on GDP Growth rate and Inflation rate were from the National Accounts Statistics and the Consumer Price Index (CPI) of the National Bureau of Statistics (NBS) respectively. Also, from NBS are the data on Unemployment using the Labour force Survey Reports. The data for other variables (Investment, Exchange Rates and Balance of Trade) were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, 2019. The data sample size covers 34 years (1986 – 2019). The Base year of 1986 was chosen to enable for analysis on the

EXR is Exchange Rate; INV is Investment; INF is Inflation Rate

$\alpha_0 - \alpha_6$, $\beta_0 - \beta_6$, $\lambda_0 - \lambda_6$, $\gamma_0 - \gamma_6$, $\delta_0 - \delta_6$, and $\phi_0 - \phi_6$are Coefficients to be estimated.

$U_{1t} - U_{6t}$ are the Gaussian white noise that are independently and identically distributed random variable.

impact of exchange rate on macroeconomic performance during the structural adjustment economic reforms era. Also, the time period was chosen because a time series analysis requires a number of years for it to be meaningful and to take proper account of the persistent dynamics.

4.0 Data Analyses and Interpretation Of Results

The data were analysedusing Econometric views (E-views) and adopting various econometric techniques to determine the direction of interaction amongst the variables under consideration. Graphical analyses were carried out in order to observe trends' flows in the variables under consideration. Diagnostic tests were conducted on the data to be sure that they were valid enough for relevant inferences to be made. The model was then estimated, and interpretations of major findings were made.

4.1 Descriptive Statistics

The descriptive statistics is used to examine the statistical properties of the variables such as their measure of central tendencies like the mean and median as well as their measure of dispersion like the maximum, minimum and standard deviation. The descriptive statistics also indicate the pattern of distribution of the variables to identify if the variables were normally distributed or not.

Table 4.1 Descriptive Statistics

	EXR	BoT	EGr	INF	MS	UMP
Mean	124.5784	4068.981	4.856765	19.96417	4220.703	18.80059
Median	119.7685	1930.821	4.760000	12.00000	652.0400	18.29000
Maximum	417.4642	19620.19	14.60000	76.75887	17093.93	29.80000
Minimum	2.020575	-19488.70	-0.550000	0.223606	11.35000	10.50000
Std. Dev.	124.7672	7973.721	3.666145	18.69839	5969.745	3.680975
Skewness	1.190885	0.209092	0.620907	1.717681	1.041843	0.937559
Kurtosis	3.479075	4.339967	2.822580	4.770020	2.340773	4.786990
Jarque-Bera	2.361652	2.791386	2.229240	1.115748	3.766466	3.504988
Probability	0.115286	0.247661	0.328040	0.210025	0.233938	0.118630
Sum	4235.667	138345.4	165.1300	678.7818	143503.9	639.2200
Sum Sq. Dev.	513706.1	2.10E+09	443.5403	11537.78	1.18E+09	447.1360
Observations	34	34	34	34	34	34

Source: Author's computation using E-Views Software, Version 11 (2019)

The descriptive statistics above indicate that all the variables have equal number of observations of 34 each. The results also indicate the statistical properties of the variables such as mean, median, maximum, minimum, etc. as well as the pattern of distribution of the variables.

On the distribution, it was observed from the above descriptive statistics with reference to the Jarque-Bera estimates and probability value, that all the variables are normally distributed as indicated by their probability values of the Jarque-Bera statistic given as 0.115286, 0.247661, 0.328040, 0.210025, 0.233938 and 0.118630 respectively which are higher than0.05 level of significance.

4.2 Generalized Autoregressive conditionally heteroscedastic (GARCH) Result

The data Analysis begins by testing as well as extracting exchange rate volatility using the Generalized Autoregressive conditionally heteroscedastic (GARCH) model.

Table 4.2 Estimating GARCH (1, 1)

Mean Equation

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	-0.089722	0.000530	-169.4428	0.0000
C	128.7483	0.190417	676.1405	0.0000
	Variance Equations			
α(1)	401.6583	42.45590	9.460601	0.0000
α(2)	1.618658	0.007131	226.9779	0.0000
α(3)	0.373541	0.022513	16.59226	0.0000
β(1)	-0.107688	0.036035	-2.988437	0.0028
β(2)	0.148013	0.335509	0.441160	0.0591
T-DIST. DOF	2.135290	0.067948	31.42523	0.0000
R-squared	0.863763	Akaike info Criterion		8.545476

Source:Computed using E-Views 11 Software Package (2019)

From table 4.2, the variance equation showed the presence of GARCH effect since all the GARCH parameters α(1), α(2), α(3) and β(1) are significant and in the mean equation, the GARCH parameter is also significant as depicted by the probability value of 0.0000 which is lower than 0.01 (1 percent level of significance). This shows that volatility exists in exchange rate from 1990 to 2019. From the variance equations α(1), α(2), α(3), β(1) and β(2) above, exchange rate volatility was extracted.

4.3 Unit root test

Having established the exchange rate volatility, the next step is to compute the stationarity properties of the variables under investigation as follows:

Table 4.4: UNIT ROOT TEST (Augmented Dickey Fuller Test)

Variable	Levels	Critical Values		First differences	Critical Values		Order of Integration	
INF	-2.847412	1%	-4.440739	-5.343534	1%	-4.394309	I(1)	**Stationary at 1st difference**
		5%	-3.632896		5%	-3.612199		

		10%	-3.254671		10%	-3.243079		
EXRV	-3.473491	1%	-3.679322	-4.612287	1%	-4.416345	I(1)	**Stationary at 1st difference**
		5%	-2.967767		5%	-3.622033		
		10%	-2.622989		10%	-3.248592		
MS	8.433056	1%	-4.416345	- 4.992494	1%	-4.440739	I(1)	**Stationary at 1st difference**
		5%	-3.622033		5%	-3.632896		
		10%	-3.248592		10%	-3.254671		
EGr	-3.131129	1%	-4.309824	-7.460081	1%	-4.323979	I(1)	**Stationary at 1st difference**
		5%	-3.574244		5%	-3.580623		
		10%	-3.221728		10%	-3.225334		
UMP	-3.177009	1%	-4.356068	-4.891551	1%	-4.323979	I(1)	**Stationary at 1st difference**
		5%	-3.595026		5%	-3.580623		
		10%	-3.233456		10%	-3.225334		
BoT	-2.567528	1%	-4.309824	-5.9536	1%	-4.323979	I(1)	**Stationary at 1st difference**
		5%	-3.574244		5%	-3.580623		
		10%	-3.221728		10%	-3.225334		

Source:Computed using E-Views 11 Software Package (2021)

From the above summary table of the Unit Root test using Augmented Dickey Fuller Test, it is evident that all variables are not stationary at level at 1%, 5% and 10% level of significance. However, when the variables were examined at first difference, they were stationary at first difference. This satisfies the requirements for using Vector Error Correction Mechanism (VECM) as the method of data analysis.Having successfully tested for stationarity at first difference, cointegration test was conducted to examine the long run relationship among the variables under study:

Table 4.5 Cointegration Analysis

Series: EXRV EGr INF UMP MS BoT
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.977525	316.4731	139.2753	0.0000
At most 1 *	0.927032	210.2029	107.3466	0.0000
At most 2 *	0.883168	136.9065	79.34145	0.0000
At most 3 *	0.682812	76.78986	55.24578	0.0002
At most 4 *	0.542555	44.63857	35.01090	0.0035
At most 5 *	0.380830	22.73982	18.39771	0.0116

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Author's computation using E-Views Software, Version 11 (2019)

From the table 4.2the Trace statistic is greater than the critical value for all the equations, hence, the null hypothesis of non-cointegration is rejected. This shows that there is long run relationship among the variables of study.

4.4 VECM Short-run Result

Table 4.5 VECM Short-run result

Vector Error Correction Estimates
Date: 07/10/20 Time: 20:05
Sample (adjusted): 1986 2019
Included observations: 34 after adjustments
Standard errors in ( )& t-statistics in [ ]

Error Correction:	D(EGr)	D(INF)	D(MS)	D(UMP)	D(BoT)	D(EXRV)
CointEq1	-0.000214	-0.006560	-7.14E-06	-0.020418	4.58E-05	-0.006560
	(0.00091)	(0.00215)	(2.1E-06)	(0.03091)	(0.00071)	(0.00215)
	[-5.00979]	[-3.04475]	[-3.38979]	[-0.66056]	[0.06486]	[-3.04475]
D(EGr(-1))	0.019506	-0.011663	1.82E-05	-0.083922	0.003318	-0.011663
	(0.06867)	(0.01659)	(1.6E-05)	(0.23799)	(0.00544)	(0.01659)
	[3.11565]	[-0.70304]	[1.12459]	[-0.35262]	[0.60985]	[-0.70304]
D(INF(-1))	0.378225	0.031183	0.000188	-0.253693	0.059921	0.031183
	(0.17668)	(0.16490)	(0.00016)	(2.36577)	(0.05409)	(0.16490)
	[3.22558]	[0.18910]	[1.16887]	[-0.10723]	[1.10780]	[0.18910]
D(MS(-1))	5.475546	77.20749	0.185783	1338.143	-1.257671	77.20749
	(1.43570)	(141.203)	(0.13808)	(2025.76)	(46.3159)	(141.203)
	[5.08138]	[0.54678]	[1.34552]	[0.66056]	[-0.02715]	[0.54678]
D(UMP(-1))	0.128499	0.017380	-6.82E-06	0.400043	0.000677	0.017380
	(0.02770)	(0.01256)	(1.2E-05)	(0.18018)	(0.00412)	(0.01256)
	[6.00627]	[1.38381]	[-0.55536]	[2.22024]	[0.16423]	[1.38381]
D(BoT(-1))	4.747052	-1.252821	-0.000202	-19.51381	-0.617344	-1.252821
	(1.67778)	(0.46007)	(0.00045)	(6.60027)	(0.15091)	(0.46007)
	[3.91481]	[-2.72314]	[-0.44932]	[-2.95652]	[-4.09093]	[-2.72314]
D(EXRV(-1))	-0.378225	0.431183	-0.000288	0.253693	0.059921	0.031183
	(0.17668)	(0.16490)	(0.00016)	(0.16577)	(0.02409)	(0.16490)
	[-3.22558]	[3.18910]	[-2.86887]	[3.10723]	[3.10780]	[0.18910]
C	-0.145185	0.041895	-3.75E-08	0.203728	0.011877	0.041895
	(0.15589)	(0.01533)	(1.5E-05)	(0.21996)	(0.00503)	(0.01533)
	[-0.93134]	[2.73256]	[-0.00250]	[0.92622]	[2.36174]	[2.73256]
R-squared	0.940330	0.953846	0.981355	0.905956	0.938200	0.953846
Adj. R-squared	0.893577	0.849732	0.881079	0.895159	0.845856	0.849732
F-statistic	9.301182	9.438147	9.805811	9.858857	9.662385	9.438147

Source: Author's computation using E-Views Software, Version 11 (2019)

From the VECM results, the short-run interpretation of the results is given with exchange rate volatility as the independent variableas follows:

For the EGr equation, a unit increase in exchange rate volatility in the short-run will lead to 0.378225 decrease in EGr (Economic Growth). The result is statistically significant at 5 percent level of significance as indicated by t-statistic value of 3.22558 which is greater than the theoretical t-value of 2.68 at 5 percent level of significance.

For the INF equation, a unit increase in exchange rate volatility in the short-run will lead to 0.431183 increase in INF (Inflation Rate). The result is statistically significant at 5 percent level of significance as indicated by t statistic value of 3.18910 which is greater than the theoretical t value of 2.68 at 5 percent level of significance.

For the MS equation, a unit increase in exchange rate volatility in the short-run will lead to 0.000288 decrease in MS (Money supply). The result is statistically significant at 5 percent level of significance as indicated by the t statistic value of 2.86887 which is greater than the theoretical t value of 2.68 at 5 percent level of significance.

For the UMP equation, a unit increase in exchange rate volatility in the short-run will lead to 0.253693 increase in UMP (Unemployment Rate). The result is statistically significant at 5 percent level of significance as indicated by t statistic value of 3.10723 which is greater than the theoretical t value of 2.68at 5 percent level of significance.

Having established both the long and short run impacts of exchange rate on macroeconomic performance, it is pertinent that the forecasting power of the model be determined through the decomposition of the variance and the impulse response function. This is analysed in Tables 4.9 and 4.10 below:

4.2.5 Impulse Response Function

Impulse response function is determined through an in-depth impulse response analysis that helps to quantify the reaction of every single variable in the model on an exogeneous shock to the model. The reaction is usually measured for every variable at a given time a shock occurs.The reaction of another economic variable to the impulse is referred to as the response. It is derived from the estimated VECM. Table 4.10 explains the response of the variables under investigation to impulse from exchange rate volatility:

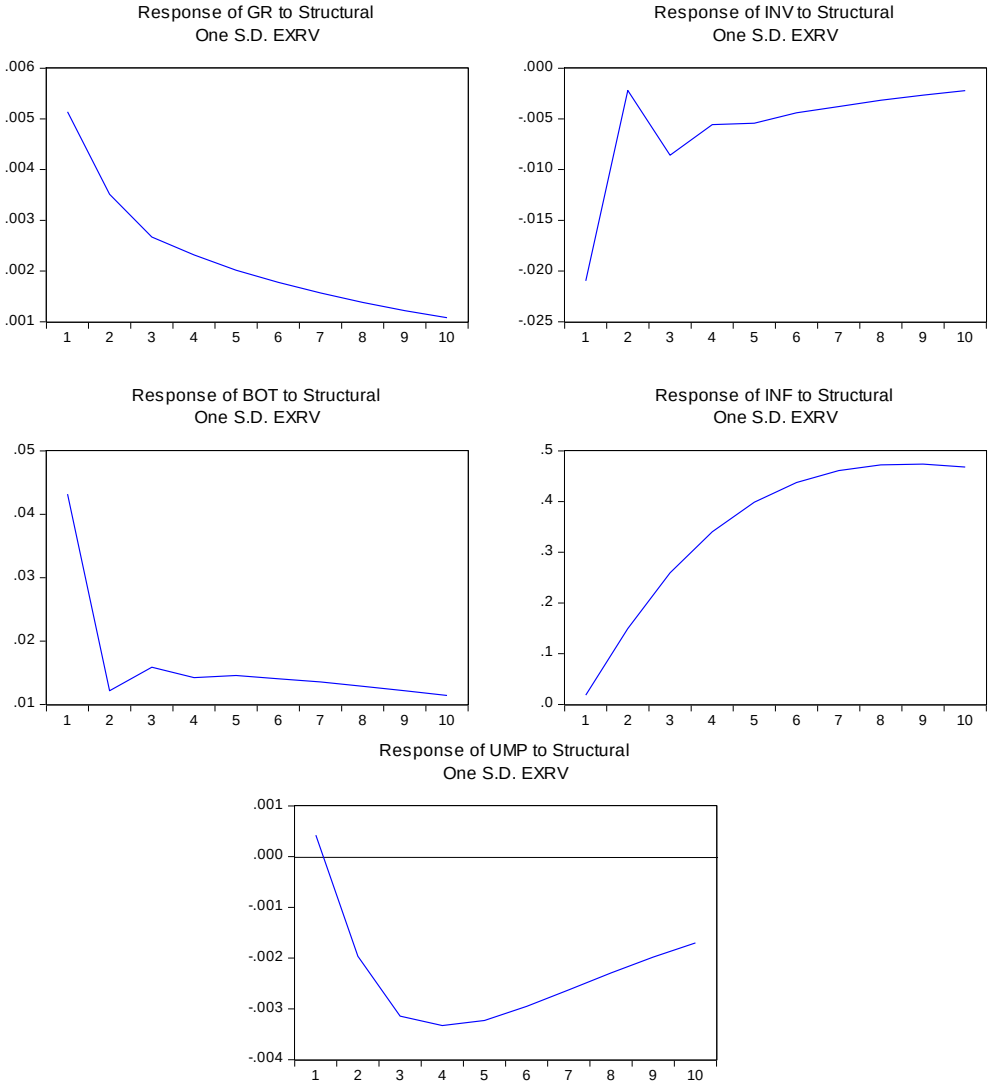

Figure 4.4 Impulse Response Function (IRF)

Source:Authors Computation using E-Views 11 Software Package (2019)

Figure 4.4 graphically depicts responses of EGr, MS, BoT, INF and UMP to a shock in exchange rate volatility over a period of ten (10) years. As seen in the graph, there is a positive, but declining response from EGr to a shock in EXRV. There is an indication from the declining rate that if shock continues into the future, response from EGr may eventually be zero and even negative. The positive response of EGrto EXRV is not a good signal for the Nigerian economy as it means that as the value of naira to dollar depreciates; that is, more units of naira will be given up to get a unit of dollar, it will reduce economic growth from period 1 to period 10 as indicated from the impulse response graph and table.MS is seen to have a decreasing negative response to shock in EXRV. The response from first period up to third period were unstable but stable afterward and it is leaning towards the positive region as

indicated from its position in the last (10^{th}) period.

Similarly, shock in EXRV causes a decreasing positive response from BoT. It is observed that there is a sharp decrease between the response in first period and second period, a fluctuating one from the second to the fifth after which the response became stable by declining at a seemingly constant rate. If this continues into the future, response of BoT may eventually be zero and probably negative. There is an indication that INF has direct relationship with shocks in EXRV. Its response over time is positive and an increasing one until the ninth period where the response reaches its peak and starts declining. This suggests that INF response to shock in EXRVand at later period will be minimal compared to earlier period. UMP response to volatility in exchange rate is at its highest in the first period after which it assumes a continuous decrease to the seventh period where the downturn occurs. There is an indication that if the trend continues, UMP may eventually be zero and assumes positive response to persistence shock in exchange rate.

The impulse response analysis and the variance decomposition carried clearly depicts that any sudden changes in any of the variables have the tendency of impacting on other variables.

Conclusion and Policy Implications

The empirical results show that exchange rate volatility has a significant impact on economic performance. This result indicated that exchange rate volatility discourages economic growth, which supports many previous studies (e.g. Enu, Osei-Gyimah and Opoku 2013). This finding also suggests that the volatility of exchange rate has played an important role in the fluctuations of macroeconomic performance in Nigeria over the years. In addition, the results also suggest that volatility of the exchange rate adversely affects money supplyin Nigeria. This finding supports the claim that a floating exchange rate may work as an economic stabilizer to mitigate external disequilibria. Moreover, the robustness checks of Variance Decompositions and Impulse Response Functions analysis supports the findings from VECM model.

Based on the findings above, many policy implications can be drawn regarding the relationship between exchange rate volatility and macroeconomic indicators in Nigeria.

a. First and foremost, reducing exchange rate volatility is quite crucial to mitigate its negative impact on money supply and output growth. Serious attention should be paid to factors that stimulate exchange rate fluctuations like high inflation and budget deficit. Thus, policymakers should consider adopting inflation targeting as a strategy in addition to the autonomy of the monetary policy.

b. Furthermore, relevant authorities should try to avoid systematic currency devaluations in order to maintain exchange rate volatility at a rate that allows adjustment of the balance of payments.

c. Considering the current shortage of foreign exchange in Nigeria, the economy needs an effective exchange rate policy in order to overcome the unfavorable impact of declining foreign reserves. Therefore, an encouraging exchange rate should be offered for foreign transactions and transfers to attract flows of foreign capital such as FDI and migrants' remittances. In addition, diversification of the economy should be considered as a top priority within the development agenda. In this respect, managing a competitive exchange rate would be a crucial tool to enhance productivity of the domestic sectors.

d. Moreover, trade cooperation with neighbouring countries in the region would be helpful in increasing foreign earnings, particularly in the short run that would to boost the growth of the nation's economy.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Domestic Debt and Domestic Private Investment: A re-investigation of the Crowding-out Hypothesis in Nigeria

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Abstract

Owing to the huge increase in volume of domestic borrowing in Nigeria (especially within the last two decades) and the existence of conflicting findings on impact of domestic borrowing has on domestic private investment,this study re-examined the crowding-out hypothesis in Nigeria spanning the period 1981-2020. The estimates from co-integration and error correction mechanism show that domestic debt impact negatively on domestic private investment in Nigeria. This implies that crowding-out hypothesis holds for Nigeria. The model was affirmed structurally stable using CUSUM and this also implies that findings could be relied upon. In the light of the findings, it was recommended that a strategy/policy that help manage and cushion negative impact domestic debt has on domestic private investment in Nigeria should be put in place and effectively implemented. Example includes; policy that enhances domestic savings, utilization of public funds for critical infrastructure and enabling environmentfor business to strive amongst others.

Keyword: Domestic Debt, Investment, Time Series Analysis, Nigeria

JEL Classification: H63, L16, C22, N37.

1. Introduction

Excessive domestic borrowing by government reduces credit availability for domestic private investment owing to the rise in interest rate it engenders. This occurs if government spending fails to stimulate the economy as expected (Carlson and Spencer, 1975).This is in tune with lazy bank hypothesis which holds that huge government domestic borrowing weakens bank ability to seek new profitable ventures and thus result in a reduction in lending to the private sector for investment.However, it is also worthy to note that the rise in interest rate which domestic borrowing engenders could attract more capital inflow into the economy and as such have a positive effect on investment and the economy (if the domestic financial market exhibit resilience) [Izevbigie, 2015].

Data from Debt Management Office-DMO (2018 and 2020) and Central Bank of Nigeria-CBN (2020) shows that domestic private investment is characterized by a downward fluctuation while domestic debt recorded tremendous increase over the last two decades in Nigeria. For example, DMO (2018) specifically showed that domestic

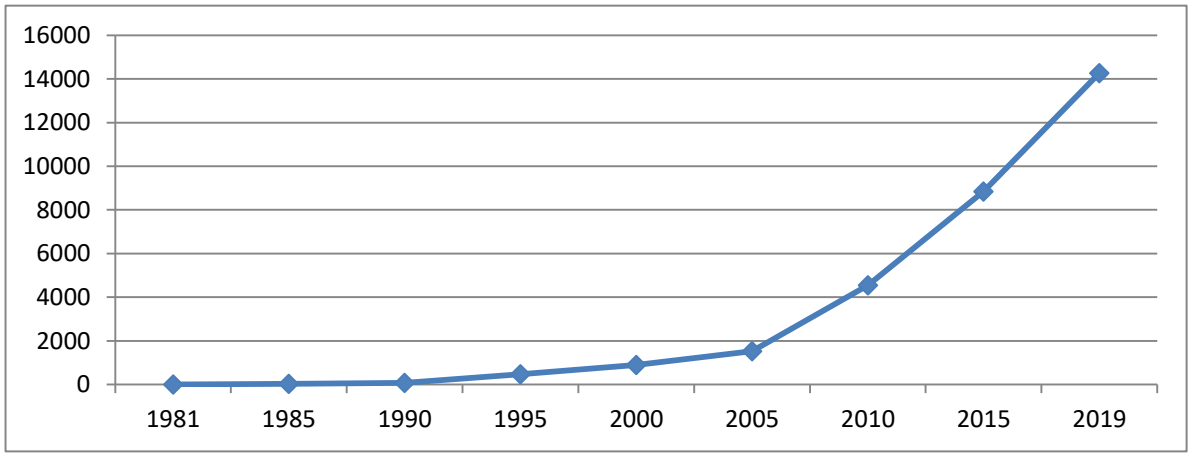
debt (in percentage of GDP) rose from 10.92 percent in 2013 to 13.04 percent in 2016 and thereafter to 14.52 percent in 2017.As at late 2019 government domestic debt profile average about15.2 percent of GDP (CBN, 2020). Data from CBN (2020) also revealed that domestic private investment fell from about 10 percent in 2000 to about 6 percent in 2005 with a marginal increase to the tune of about 9 percent by 2019.

In recent times, there isa rebound of interest among researchers on the impact domestic debt has on domestic credit to the private sector in developing countries such as Nigeria owing to the quest for fund to attend to developmental challenges.A cursory look at the literature shows thatempirical findings are divided between those that upheld that domestic debt crowds-out domestic private investment for example Akanbi (2020), Abubakar, Adegoke and Augustine (2019) and those that found otherwise- Omodero (2019), Aigheyisi (2014). This study therefore set out to re-examine the Nigeria caseusing a lucid econometric technique and by so doing established the crowding-out hypothesis amidst increasing domestic debt profile of the country in recent times.

2. Some Metal Reflections

Treasury bills, Treasury bond, Treasury certificate and developmental stock are the major domestic debt instrument in Nigeria. As at 2002, Treasury bill, Treasury bond and development stock accounted for about 62.93 per cent, 36.93 percent 0.14 per cent of domestic debtCBN (2010). Also,World Bank (2020) report showed that the volume of domestic debt accumulation in Nigeria has been in the upward direction for over the past two decades. For example, in 2003 Nigeria's domestic debt was N1.09 trillion while domestic debt-GDP ratio stood at about 21.26 per cent. The report showed further that domestic debt increase from about $34.4 billion in 2011 to about $47.05 billion in 2014. As a share of GDP, domestic debt was 10.92 per cent, 13.04 per cent and 14.52 per cent in 2013, 2016 and 2017 respectively (DMO 2018). Also, data from CBN (2020) shows that the consolidated government domestic debt stock as at late 2019 was 15.2 percent of GDP compared to 15.9 percent of GDP in 2018. Using figure 1, the development in Nigeria domestic debt can be seen at a glance for the period 1981 to 2019.

Figure 1: Trend in Domestic Private Investment (percentage of GDP)



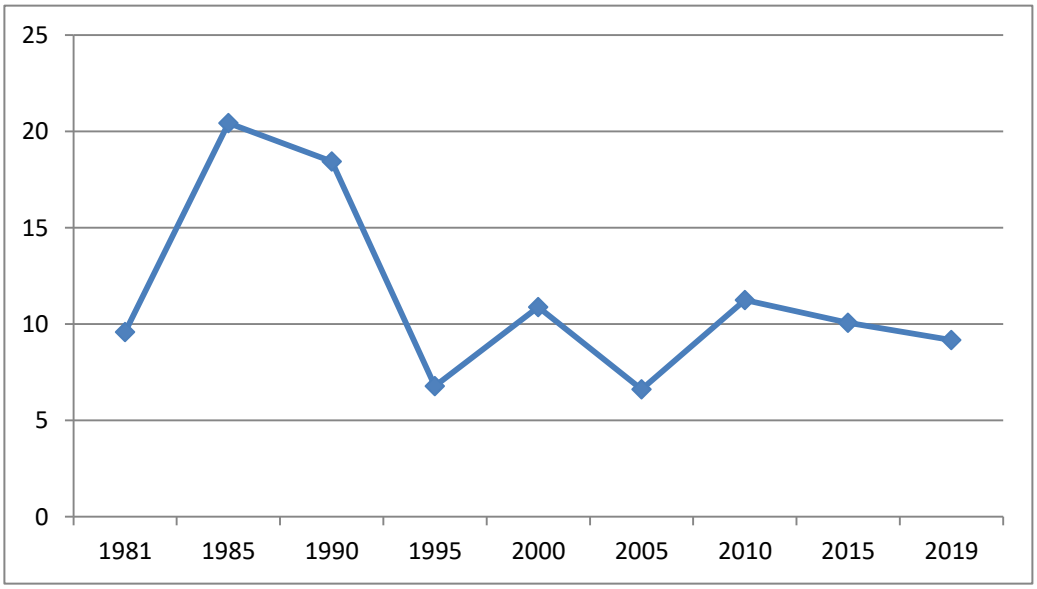
Graphed by Author using Data from DMO (2020)

The upward trend in the volume of domestic debt as shown in Figure 1 for the period 1981-2019 may not be unconnected to the quest for funds to attend to myriad

developmental challenges such as weak productive capacity, high unemployment rate, weak infrastructural facilities among others bedevilingNigeria as a country. It may also not be unconnected to the fact that domestic borrowing hedges against exchange rate fluctuation/risk. As stated by (Aigheyisi, 2014), the continuous increase in the volume of domestic debt in Nigeria could be attributed to the fact that domestic borrowing is denominated in domestic currency, lowers currency mismatch and promotes a stable investors' base.

Also, to get a clearer picture of the development in domestic private investment in Nigeria,presentedbelow is the trend in private domestic investment in percentage of GDP for selected years between 1981 and 2019.

Figure 2: Trend in Domestic Private Investment (percentage of GDP)



Graphed by author using data from DMO (2020)

From figure 2, it can be observed that there is a somewhat decreasing fluctuating trend for the period. Specifically in 1981, domestic private investment as a percentage of GDP was about 10 percent; in 1985 it rose to about 20 percent and thereafter fell again to about 18 percent and 6 percent in 1990 and 1995 respectively. However, between year 2000 and 2019, domestic private investment as a percentage of GDP hovers between 6 percent and 11 percent. Specifically, while domestic private investment was about 10 percent in 2000, it fell to about 6 percent, 11 percent, 10 percent and 9 percent in 2005, 2010, 2015 and 2019 respectively. From the trend as depicted in Figure 2, there seem to be a sharp variation in domestic private investment in Nigeria over the years.

3. Empirical Review

An attempt is made here to bring to fore studies that relate domestic debt to domestic

private investment in Nigeria. Omodero (2019) examined the impact government domestic debt has on private sector credit in Nigeria for the period 1988-2018 using OLS technique. It was found that domestic debt has a significant positive impact on private sector credit while interest rate exerts negative influence on the private sector credit. Izevbigie (2015) examined the role of public sector debt in facilitating domestic private investment in Nigeria for the period 1981-2013 using co-integration and error correction mechanism. It was found that while domestic debt positively and significantly impact on domestic private investment, external debt exhibited negative and significant impact on domestic private investment. This was similar to earlier findings by Aigheyisi (2014) while determining if government domestic debt crowds-out domestic private investment in Nigeria for the period 1981 to 2012 using co-integration and ECM technique.Other similar studies includes Özdemir and Gomez (2020); Coban and Tugcu (2015); Xu and Yan (2014);Şen and Kaya (2014);Apere (2014);Mahmoudzadeh, Sadeghi and Sadeghi (2013); Maana, Owino and Mutai (2008); Atukeren, (2005).

Akanbi (2020) examined the impact of government domestic borrowing on private sector credit in Nigeria for a 10 year period 2009-2018 using OLS estimation technique. The results showed that prime lending rate has a positive effect on government bond issuance although not significant. The findings also revealed that there is a negative relationship between government domestic bond issuance and the banks credit to private sector. Abubakar, Adegoke & Augustine (2019) examined the relationship between government borrowing and private sector growth in Nigeria for the period 2005-2017 using structural vector auto-regressions (SVAR). The results from impulse response functions and variance decomposition show that government domestic borrowing impact negatively on domestic private sector investment in Nigeria. Chinanuife, Eze and Nwodo (2018) investigate public debt spiral and the level of public investment in Nigeria in a quarterly time series data spanning 1981-2016. Result from ARDL methodology employed showed that public debt has negative and statistical significant impact on domestic investment in Nigeria, that is, public debt crowds-out domestic investment in Nigeria. Also, other studies in this light includes; Nwaeze (2017); Anyanwu (2016); Akomolafe, Bosede, Emmanuel and Mark(2015); Mbate (2014);Damian, Ude and Ekesiobi (2014); Ude and Ekesiobi (2014).

4. Methodology

4.1. Theoretical Framework

The theoretical foundation for this study is neoclassical theory of investment which is based on the neoclassical theory of optimal capital accumulation determined by relative prices of factors of production. The theory holds that firms maximize profit/stock of capital where marginal product of capital (MPK) equals cost of capital.

Given Cobb-Douglas production function as stated in equation (1);

$$Y = AK^{a}L^{1-a} \quad (1)$$

where, Y = output, K = capital, L = labour; A= level of technology; α = measures of share of capital/labour in output.

To obtain MKP, we differentiate equation (1)with respect to labour, that is;

$$MPK = dY/dK = \alpha AK^{a}L^{1-a} = \alpha Y/K \quad (2)$$

Equation (2) can also be express as;

$$\alpha Y/k = r/P \quad (3)$$

From equation (3), the desired stock of capital (K*) is then stated as;

$$K^{*} = \alpha P/r^{*}Y \quad (4)$$

Equation (4) expresses desired stock of capital (K*) as a function of output (Y), real cost of capital (r/p)- r = price/user cost of capital; p = price of output.

Also, from equation (3), the rental cost of capital can be expressed as;

$$r = \alpha P / K^{*} Y \quad (5)$$

If the real cost of capital is estimated by nominal rate of interest (i) adjusted for expected rate of inflation (πe). Then, the expected real interest rate, that is, i – πe could be taken to be the real cost of borrowing funds/adding to the stock of capital. If depreciation (d) is taking as a flat rate per year, the rental cost or price of capital (r) can then be expressed as;

$$r = i - \pi e + d \quad (6)$$

Equation (6) shows that the rental cost of capital (r) is determined by rate of interest, expected rate of inflation and rate of depreciation.

4.2 Model Specification

In the light of the above theoretical exposition and in tune with Jorgensen (1967), the model for this study is derive through a modification of equation (6) stated functionally as;

$$DPI = f(DDT, INT, INF, CAM, GES) \quad (7)$$

Where:DPI = domestic private investments; DDT = domestic debt; INTR = interest rate; INF = inflation rate; CAM= capital accumulation; GES = government expenditure

The eschewing error correction specification is stated as;

$$DPI_t = \beta_0 + \beta_1 DDT_t + \beta_2 INT_t + \beta_3 INF_t + \beta_4 CAM_t + \beta_5 GES_t + \Omega ECT_{t-1} + \varepsilon_t \quad (8)$$

Where; β_0 = intercept term; β_1-β_5 = parameter estimates; ECT_{t-1} = error correction term; Ω = error correction term coefficient; ε_t= error term. Other variables are as previously defined.

The *a priori* expectations of the coefficient estimate β_1, β_2, β_3, β_4 and β_5 are indeterminate, that is they could either be positive or negative while the coefficient of error term is expected to be negative, that is, $\Omega < 0$.

4.3. Analytical Technique and Data Sources

Co-integration and error correction mechanism (ECM) is adopted for this study. This methodology basically comprises three steps. The first step is testing for unit root (stationarity test). This is followed by co-integration test, that is, test of long run convergence among the variables. If variables are found to be co-integrated, we then carry out estimation of the error correction model.Besides being amenable to times series analysis, ECM wide application in empirical analysis may be attributed to the fact that it is amenable to times series analysis and correct for dis-equilibrium in the short run.

Data covering the period of estimation1981-2020 were sourced from World Bank, World Development Indicator (2021) and Central Bank of Nigeria (2021).

5. Analysis and Discussion

The various estimates conducted are presented and explained below.

Table 5.1: Descriptive Statistics

	DPI	DDT	INT	INF	CAM	GEX
Mean	2874.9	13.68	17.69	19.15	9.21	5.17
Median	898.25	10.56	17.6	12.55	8.17	5.24
Maximum	14272.6	33.29	31.7	72.84	19.63	19.03
Minimum	11.19	4.68	8.9	5.39	4.96	-3.26
Std. Dev.	4124.12	6.44	4.8	17.06	3.56	4.25
Skewness	1.52	1.04	0.25	1.78	1.19	0.93
Kurtosis	4.05	3.39	3.76	4.99	3.99	5.12
Jarque-Bera	16.88	7.26	1.37	27.16	10.9	12.95
Probability	0	0.02	0.5	0	0	0
Sum	1121.21	533.51	690	746.71	359.19	201.5
S Sq. Dev.	6.46	1677.60	875.98	11063.33	480.53	686.43
Observations	39	39	39	39	39	39

Source: Authors' Computations (2021)

From the Table 5.1, the average of domestic private investment (DPI) is about 2874 with a high standard deviation value to the tune of 4124. This implies that observations are widely spread from the mean. Skewness is a measure of asymmetry of the distribution of the series aroundthe mean. Positive skewness implies that the distribution has a right tail while negative skewness implies that the distribution has a left tail. From Table 5.1, skewness is positive implying that domestic private investment lie to the right of the mean. Kurtosis measures the peakedness or flatness of a distribution. If kurtosis is above three, the distribution is peaked or leptokurtic relative to the normal distribution and if the kurtosis is less than three, the distribution is flat or platykurtic relative to normal distribution. Here, kurtosis is more than three; this indicates that the distribution is peaked. The 1 percent statistically significant of J-B indicates that the density function of the series is non-normally distributed. For domestic debt (DDT), the mean and standard deviation values are approximately 13 and 6 respectively. The relative low standard deviation indicates that observations are not widely dispersed from the mean. The Skewness is positive showing that DDT lie to the right of the mean. The kurtosis is also more than three and as such shows that the distribution is peaked. J-B statistics passes the significant test at 5 percent and thus indicate that the density function of the series is non-normally distributed.

Table 5.2. Unit Root Test

Variables	*Levels*		*First difference*		*I (d)*
	ADF Stat	*ADF 95%*	*ADF Stat*	*ADF 95%*	
DPI	-0.78	-2.94	-7.18	-2.94	I(1)
DDT	-1.11	-2.94	-11.09	-2.94	I(1)
INT	-0.007	-2.94	-3.31	-2.94	I(1)
INF	-2.77	-2.94	-4.46	-2.94	I(1)
CAM	-1.11	-2.94	-6.85	-2.94	I(1)
GES	-2.66	-2.94	-5.36	-2.94	I(1)

Source: Author's Computation (2021)

Unit root test helps to determine the stationarity status of the variables in the model and the method employed here is Augmented Dickey Fuller (ADF). From the result presented, variables were not statitionary at levels. However, they all attained stationarity at first difference as can be observed that the ADF test statistic are greater than the corresponding 95 percent critical ADF value at first difference.

Table 5.3: Co-integration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.731	114.670	95.753	0.001
At most 1 *	0.555	73.963	69.818	0.022
At most 2 *	0.536	48.824	47.856	0.040
At most 3	0.404	24.971	29.797	0.162
At most 4	0.196	8.925	15.494	0.372
At most 5	0.067	2.160	3.841	0.141
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.573	40.707	40.077	0.042
At most 1	0.211	25.138	33.876	0.375
At most 2	0.577	23.852	27.584	0.140
At most 3	0.323	16.045	21.131	0.222
At most 4	0.198	6.765	14.264	0.517
At most 5	0.055	2.225	4.421	0.141

Source: Author's Computation (2021)

From the Table 5.3, the trace statistics and the Maximum eigen statistics indicated that there are three and one co-integrating equations respectively at 5 percent significant levels. In other words, Trace test indicates three (3) co-integrating equations at the 0.05 level and Max-eigenvalue test indicates one (1) co-integrating equation at the 0.05 level.

Table 5.4: ECM and Long Run Estimates

ECM Estimates					*Long Run Estimates*				
Variable	Coeff	Std. Error	t-Stat	Prob.	Variable	Coeff	Std. Error	t-Stat	Prob.
C	1.957	0.867	2.256	0.032	C	1.929	0.843	2.286	0.029
DDT	-0.159	0.051	-3.087	0.004	DDT	-0.146	0.051	-2.84	0.007
INF	-0.230	0.103	-2.225	0.034	INF	-0.231	0.101	-2.27	0.030
INT	0.580	0.256	2.258	0.032	INT	0.614	0.240	2.551	0.015
CAM	0.402	0.274	1.467	0.153	CAM	0.316	0.276	1.143	0.261
GEX	0.239	0.090	2.642	0.013	GEX	0.221	0.078	2.820	0.008
ECM(-1)	-0.451	0.180	2.503	0.018	R-squared 0.578		Mean dependent var 2.462		
R-squared 0.615		Mean dep var 2.433							
Adj R-squared 0.608		S.D. dep var 0.404			Adj R-square 0.554		S.D. dep var 0.415		
S.E. of reg 0.311		Akaike info criterion 0.683			S.E. of reg 0.323		Akaike info criterion 0.726172		
Sum sq resid 2.613		Schwarz criterion 0.998			Sum sq resid 3.237		Schwarz criterion 0.987		
Log likelihood -4.627		Hannan-Quinn criter. 0.791			Log likelihood -7.434		Hannan-Quinn criter. 0.818		
F-statistic 4.792 Prob(F-stat) 0.001		Durbin-Watson stat 1.929			F-statistic 5.682 Prob(F-stat) 0.000		Durbin-Watson stat 2.186		

Source: Author's Computation (2021)

From Table 5.4, domestic debt has negative and statistically significant impact on domesticprivate investment in both the short and long run. One unit rise in domestic debt result to about 0.15 unit and 0.14 unit decrease in domestic private investment in the short run and long run respectively. This is in tune with studies such as Abubakar, Adegoke and Augustine (2019); Nwaeze (2017); and Anyanwu (2016). By implications, the findings upheld that the crowding-out hypothesis holds with regards to domestic debt and domestic private investment in Nigeria. Also, inflation rate exhibited a negative impact on domestic private investment in both the short run and long run and this was statistically significant in both cases. A unit increase in inflation rate

result to about 0.23 units decrease in domestic private investment in the short and long run. With respect to interest rate, it was found to exhibit positive and statistically significant impacts on domestic private investment in both the short run and long run respectively. A unit rise in interest rate result to the tune of approximately 0.6 units increase in domestic private investment. For capital accumulation, it exhibited positive impact on domestic private investment in the short run and long run, this was however not statistically significant in both cases.

Lastly, government spending exerts positive and statistical significant impact on domestic private investment in both the short and long run. A unit rise in government spending result to an increase in domestic private investment to the tune of about 2.2 units in the short and long run.The error correction term is negatively signed with a coefficient that ranges between zero and one and statistically significant (at 5 percent). Its coefficient of 0.45 indicates a restoration to equilibrium to the tune of approximately 45 percent in the event of a temporary displacement thereof. The coefficient of determination and the adjusted coefficient of determination in both the short run and long run were moderately high and ranges between 55percent and 61 percent. This shows that the explanatory variables account significantly for the changes in the dependent variable. This was further attested to by the statistical significant F-statistics value of approximately 5 unit in both the short and long run affirming the overall explanatory power of the model.Durbin-Watson statistics value that falls within the neighborhood of two (2) clearly indicates the absence of serial correlation in the model.

5.5. Stability Test

Stability test was conducted to determine the structural stability of the model by examining the property of the plots of Cumulative Sum of Recursive Residual (CUSUM). From Figure 1 as shown in the appendix, the plots of CUSUM fall within the critical bounds at 5 percent significance level. This indicates that the model is structural stable and findings could be relied upon.

6. Conclusion and Recommendations

Owing to the continuous increase in domestic borrowing and the seemingly mixed empirical findings on its impact on domestic private investment, this study attempted a re-examination of the Nigeria case using a simple and lucid econometric technique covering the period 1981 to 2020. The result shows that domestic debt impact negatively on domestic private investment in Nigeria in tune with studies such as Abubakar, Adegoke and Augustine (2019); Anyanwu (2016)and this implies that the crowding-out hypothesis holds for Nigeria. The model was affirmed structurally stable using CUSUM and this also implies that findings could be relied upon.

In the light of the empirical findings, the following are suggested;

1. To increase the volume of fund at public and possibly private domain, policies that encourage domestic savings should be strengthened.

2. Political office holders should harness and leverage on other sources of fund in the light of the crowding-out effect of domestic debt on domestic investment.

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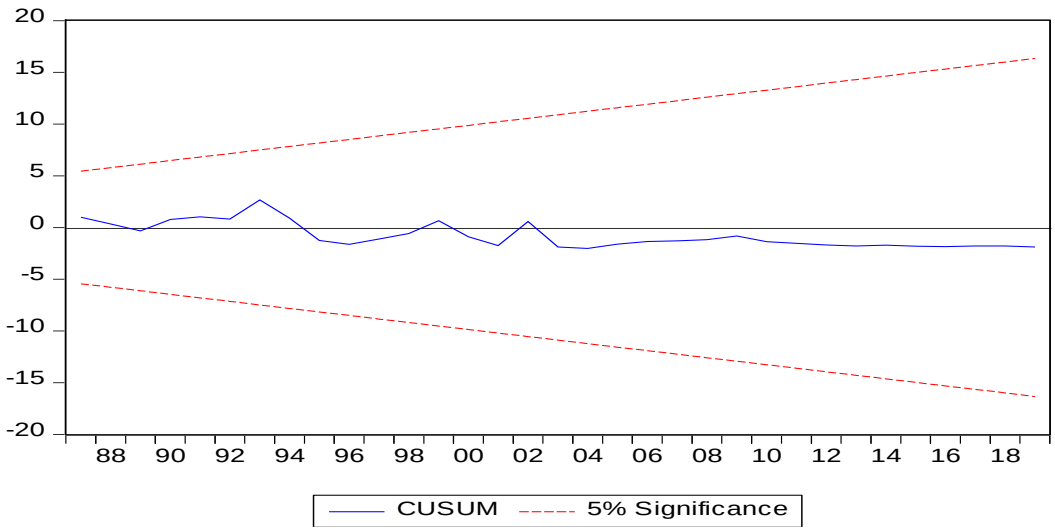
Appendix

Figure 1: CUSUM Test Result



Source: Author's Computation (2021)

Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Effect of Fire Insurance Policy on Claims settlement in the Nigerian Insurance Industry

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Abstract

This descriptive study is about the effect of fire insurance policy on claims settlement in the Nigerian Insurance Industry with the major objective of assessing the effects of fire insurance policy on claims settlement in the insurance sector in the Federal Capital Territory (FCT) of Nigeria had a population of 11,426 comprising of the clients and employees of three insurance firms including AIICO, Zenith Insurance and Axamansard. That population was reduced to a sample size of 387 using Yammane's statistical technique. The study employed the secondary and primary sources of data. Most particularly, copies of questionnaire were administered on the sample size of 387, and 284 respondents (copies) representing 73.39% were completed and returned. Subsequently, the simple percentage (%) statistical tool was used to analyze the data while the multiple regression technique via the e-view was used to test the hypotheses. The findings showed that fire insurance policies do positively and significantly affect claims settlement in the Federal Capital Territory of Nigeria and that some policies have more effect on some claims settlement than others. Consequently, the study recommended that the selected insurance firms and othersshould strive to develop the most effective and efficient insurance policies that would encourage settlement of claims promptly in order to attract and retain more clients. Furthermore, it recommended that insurance firms should strive to modify existing general policies to suit peculiarities and needs in other to increase patronage.

Keys: *Claims, Fire, Insurance, Policy, Settlements*

Introduction

1.1 Background to the study

Insurance practice has come a long way since Lloyds sent runners to the water front to pick up news of ship movements after which he would send policy around London for subscription by anyone with sufficient means (Agbakoba, 2010) and it has continued to grow and expand over the years especially as risk burdens continue to increase through the simple society to modern times. What began small is today seen as the backbone of any country's risk management system because it ensures financial security; serves as an important component in the financial intermediation chain, and offers a ready source of long term capital for infrastructural projects too.

Consequently, virtually all countries of the world including Nigeria have an insurance sector. The development of the insurance sector in Nigeria began in 1921, but only became significant in the early 1980s, a time

referred to as Mushroomery era of the market (Tajudeen, & Adebowale, 2013).

The sector is today a huge one globally and that has given rise to the different categories of insurance coverage and businesses by experts, practitioners and government to help mitigate risks and losses in the different spheres of existence to the individual, the organizations and other entities through the different policies and claims settlements. The Insurance Act (2003) categorized it into Life and Non-Life (General) Insurance Businesses. Furthermore, the Life Insurance Business is expanded into three categories including: Individual Life Insurance; Group Life Insurance and Pension; and Health Insurance; while the Non-Life Insurance Business include: Fire Insurance; General Accident Insurance; Motor Vehicle Insurance; Marine and Aviation Insurance; Oil and Gas Insurance; Engineering Insurance; Bonds, Credit Guarantee and Surety-ship Insurance, and; Miscellaneous Insurance Business (Oluoma, 2014).

Fire insurance is one major area of interest and concern to the different stakeholders in most countries of the world because all entities can experience fire havoc. The Great Fire of London in 1956 that destroyed about 13,000 houses in four days gave birth to this aspect of insurance (Omar, 2005). It is a contract to indemnify the loss suffered by the insured as a result of fire outbreak.

Several fire insurance policies including the comprehensive, blanket and consequential loss policies based on risk covered have been developed to handle fire related havocs in different areas such as vehicles and houses with the promise to compensate for related losses especially via claims settlement, but the management of these settlements is an issue of serious concern especially in developing economies like Nigeria. Related laws of 1962 and 1965 did not sufficiently cover claims settlement in Nigeria and that gave rise to lots of malpractices (Tajudeen & Adebowale, 2013). Even with subsequent reforms and efforts, the issue of fraud, poor service delivery, inconsistent, delayed and/or high incidence of non claims settlement have led to serious distrust culminating in poor patronage by the Nigerian citizenry especially residents and indigenes of the Federal Capital Territory (FCT). The sector is still not performing even in the 21st century.

The main objective of this study was to evaluate the effects of fire insurance policy on claims settlement in the insurance sector of the Federal Capital Territory especially as it concerns burnt vehicles and houses.Consequently; the following research questions were drawn:

i. To what degree does the fire insurance policy affect burnt vehicle claims settlement in the insurance sector in the Federal Capital Territory?

ii. To what extent does the fire insurance policy affect burnt house claims settlement in the insurance sector in the Federal Capital Territory?

The relevance and importance of this study at this time and age cannot be overemphasized given the huge apathy and concerns around insurance activities and huge non-claims settlement in Nigeria generally and in the Federal Capital Territory particularly. Consequently, the benefits of the study to some persons and groups cannot be underestimated. These groups of persons include students, lecturers, scholars, other contributors and researchers in the academia, financial and insurance experts as well as the government. Existing and potential insured will be educated through this study.

Furthermore, two assumptions were formulated to guide this study and they include

H_{O1}: *Fire insurance policies do not positively and significantly affect burnt vehicle claims settlement in the Federal Capital Territory of Nigeria.*

H_{O2}: *Fire insurance policies do not positively and significantly affect burnt house claims settlement in the Federal Capital Territory of Nigeria.*

Literature Review and Theoretical Framework

2.1 Conceptual Framework

The Concept of Fire Insurance Policy

Insurance is a form of risk management primarily used to hedge against the risk of a contingent and uncertain loss. Omoke (2012) defined insurance as the act of pooling funds from many insured entities in order to pay for relatively uncommon but severely devastating losses, which can occur to these entities. Gollier (2003) presented the concept as involving the transfer of risk from an individual to a group, sharing losses on an equitable basis by all members of the group. Agbaje (2005) defined it as the business of pooling resources together to pay compensation to the insured or assured on the happening of a specified event in return for a periodic consideration known as premium. It refers to something people buy by paying periodic premium to protect them from losing money while promising to be careful ('duty of care'). It can also be simply seen as a means of protection from financial loss.

This concept requires a contract usually evidenced by a document called insurance policy which is usually signed at the foot by the insurer, assurer or his/her agent. That is, an insurance policy is a standardized contract or agreement between the insurer and the insured, known as the policyholder that determines the claims, which the insurer is legally required to pay.

Majorly, insurance can be classified into two different policy areas as pointed out in chapter one of this study to include the Life and Non-life insurance. The fire insurance is part of the latter classification and it is an agreement between two parties, the insurer and insured, whereby the former undertakes to indemnify the loss suffered by the latter in consideration for his/her (insured) paying certain sum called 'Premium'. Fire insurance contract may also be defined as an agreement where one party (insurer) in return for a consideration (premium) undertakes to indemnify another (insurer) against financial loss that the latter may sustain by reason of certain subject-matter (e.g. vehicles, houses, office building, life, etc.) being damaged or destroyed by fire or other defined perils up to an agreed amount (insurancelegaldictionary.com, 2014).

A fire insurance policy is a contract in which the element of indemnification is applied. The fire insurance policy is usually issued for a period of one year and on the request of the policyholder it can be renewed every year. If, within the insured period, the subject matter is damaged, destroyed or lost due to fire outbreak, only then it is indemnified up to the loss not exceeding the insured amount. Furthermore, the risk coverage in fire insurance is wider to further cover any loss caused by unintentional or accidental fire.

In order to receive indemnity in fire insurance two conditions must be satisfied; firstly, there must be ignition of actual fire and secondly, it must be established that the fire was accidental, not intentional (yourarticlelibrary.com, 2015). Additionally, the subject matter must be damaged or burnt by the fire. If these subject matters are not damaged or destroyed by fire but by heat or smoke they will not be covered under the word 'fire'. Fire insurance contract is based on mutual faith. On receipt of the proposal the underwriter assesses the possible loss involved in the proposal. The proposal may

be accepted on its receipt or a surveyor may be sent to assess the proposal. When the underwriter accepts the proposal, the contract comes into existence. Sometimes a cover note is issued immediately and the policy is sent later on. A cover note binds the insurer to indemnify the risk. The risk coverage starts on the payment of premium.

There are different principles of fire insurance policies based on the risk coverage and these include comprehensive, blanket and consequential loss policies as adopted by this study.

The comprehensive fire insurance policy is an agreement that covers other risks of loss caused by burglary, riots, arson, civil commotion, explosions, civil war, accidents, etc. in addition to the risk of loss caused by fire in one single policy. It covers virtually all areas of insurable risk. It is not limited to havocs or damages caused by fire outbreak only.

A blanket fire insurance policy is one policy used to insure properties located at one or different locations against the risk of fire. The insured may have different properties at different locations. If one policy is taken for all the properties located at different places, it is called blanket fire insurance policy.

The consequential loss fire insurance policy indemnifies the loss caused not directly by fire but incidental to the event of fire. Under this type of fire insurance policy, the insurer not only compensates the loss caused by fire, but also other indirect losses such as loss of net profit due to expenses like salaries, interest, increased cost of advertising and hiring of temporary premises.

2.2.2 The Concept of Claims Settlement

Barry (2011) defined insurance claims as all activities geared towards monitoring the insured's compensation, restitution, repayment or any other remedy for loss or damage in respect of doing their obligations.An insurance claim is a formal request to an insurer or insurance company requesting for a payment based on the terms of the insurance policy, contract or agreement. The insurer reviews the claim for its validity and then pays out to the insured or requesting party (on behalf of the insured) once approved. These claims could be from death benefits on life insurance policies; routine health examinations; damages from fire outbreak; losses from robbery or burglary; etc. In many cases, third parties can file claim on behalf of the insured, but usually only the person(s) listed on the policy are entitled to claims payment (Redja, 2008).

Claims settlement is the payment of proceeds by the insurer to the insured to settle an insurance claim within the guidelines stipulated in the insurance policy or contract or agreement (investopedia.com, 2015). A claim payment is the defining moment in the relationship between the insurer and the insured. Butler and Francis (2010) submitted that claims payment or settlement is the chance to show that the years spent paying premiums were worth the expense.

Prompt, fair and just settlement of claims by the insurer to the insured to compensate for the loss of insured subject matter is essential to the survival, growth and development of the insurer and the industry because satisfied insured will speak well about the company and the industry, and that will attract potential clients.

2.3 The Theoretical Base (The Theory of Utmost Good Faith)

The theory of utmost good faith is the underpinning theory for this study. The principle that the relationship between parties in an insurance agreement requires the exercise of utmost good faith has early roots in Hastie v. DePeyster, 3 Cal. R. 190 (NU 1805). This duty of utmost good faith,

uberrima fides, is given weight in various contexts, essentially to create a standard of conduct that a *cedent* must be satisfied in order to reap the benefits of its reinsurance agreement.

The doctrine of utmost good faith is generally premised on an existing relationship between parties, thus suggesting that a contractual relationship already has come into existence, it is frequently the fact that in analyzing whether a cedent has adequately disclosed to the insurer facts material to the risk.

The principle that an insurer seeking reinsurance coverage has an unqualified duty to make full and accurate disclosures of all facts material to the risk, i.e., those facts that an insurance underwriter would normally want to consider when evaluating whether to assume coverage, can be found in numerous decisions, both ancient and recent. Generally, an insurer can rescind an insurance contract based on a *cedent's* misrepresentation if the misrepresentation or non-disclosure was made with an actual intent to deceive or the matter represented was material. Based on this general rule of law, a reinsurer could rescind a reinsurance policy even if the cedent innocently misrepresented a material fact.

2.4 Empirical Review

A related study conducted by Tajudeen and Adebowale, (2013) investigated the roles of claims manager in claims handling process in the Nigerian insurance industry with the objective of exploring the claim managers' roles in claims handling process in insurance business in Nigeria and they discovered that there is a significant relationship between claims operation and effective claims management. The study also revealed that there is a significant relationship between fraud detection and effective claims management.

Nebo and Okolo (2015) in their paper on an assessment of the effects of the strategies for customer satisfaction on the performance of selected insurance firms in Enugu metropolis with objectives to determine the strategies mostly adopted by insurance firms in Nigeria for customer satisfaction, to assess how each of the strategies adopted contributes to the performance of the insurance industry in Nigeria and to ascertain the overall effects of these strategies on the performance of the insurance industry in Nigeria found that out of the ten factors adopted seven had significant influence on the insurance industry's performance. These seven include prompt settlement of claims, quality insurance products, fair premium, prompt attendance to customer complaints, timely communication of policy renewal notices, thorough explanation of policies, explanation of product benefits and understandable policy documents. The study recommended that managers should capitalize on those seven strategies that have strong positive influence on customer satisfaction to improve the seemingly battered image and performance of the insurance industry in Nigeria while deemphasizing expenditures in money, time and human resources on the less important variables.

Omar (2005) assessed consumers' attitudes towards life insurance patronage in Nigeria and found that there is lack of trust and confidence in the insurance companies. Other major reason discovered is the lack of knowledge about life insurance products. He recommended that renewed marketing communication strategy that should be based on creating awareness and informing the consumers of the benefits inherent in life insurance so as to reinforce the purchasing decision. The weakness of Omar's study is the study's inability to relate demographic variables such as income and religion on consumers' attitude towards insurance services because standard of living and

religion could be some of the demographic factors that influenced the poor attitude of Nigerians towards insurance services. For example, where income per capita is low, insurance penetration is bound to be low.

While reviewing the performance of the insurance industry, Dorfman (1980) observed that even though the life insurance industry engages in product innovation, the market for life insurance appears to have a serious weakness in that not many new improvements have been forthcoming in recent years. Kuhlemeyer and Allen (1999) conducted a similar study on consumer satisfaction with life insurance: a benchmarking survey and revealed that consumer satisfaction with life insurance products is largely accounted for by the trust they repose in the sales agents in contrast to those who purchase direct from the insurance companies. Customers who purchased from sales agents were more satisfied with the insurance companies. This apparently justifies the importance of agents and brokers in the marketing of insurance products. Similarly, Johri (2009) carried out a survey titled customer satisfaction in general insurance industry and the result showed that claim settlement‖ was the major determinant of customer satisfaction.

Wasaw and Hill (1986) tested the effect of Islam on life insurance consumption and the results of their study indicated that consumers in Islamic nations purchase less life insurance than those in non-Islamic nations. Religion historically has provided a strong source of cultural opposition to life insurance, as many religious people believe that a reliance on life insurance results from a distrust of God‗s protecting power. Some scholars are of the opinion that religious antagonism to life insurance still remains in several Islamic countries.

2.5 The Study Gap

Consequent upon the review of related empirical studies including those by Omar (2005), Johri (2009), Tajudeen *et al*, (2013), and Nebo *et al* (2015), this study is motivated by the realization that there is rarely any study that has focused on assessing the effects of such fire insurance policy as the comprehensive policy, blanket policy and consequential loss policy on fire affected or damaged cars, offices and houses in Nigeria.

Methodology

This descriptive study was conducted in the Federal Capital Territory (FCT) of Nigeria, commonly known as FCT-Abuja located at Middle Belt region of Nigeria, where three leading insurance companies including AIICO Insurance, Zenith Insurance and Axamansard (formerly, Mansard) with a study population of 11, 426 (see table 3.1) were selected.

Table 3.1 Population of the study

Insurance companies	Employees	Fire Insurance Clients	Total
AIICO	82	3,794	3,876
Zenith Insurance	123	4,099	4,222
Axamansard	97	3,231	3,328
Total	**302**	**11,124**	**11,426**

Source: *Field Survey, (2021)*

The study employed the Taro Yammane statistical technique to arrive at a sample size of 387 that was shared amongst the different fire insurance companies' clients and employees using the simple proportion method (see table 3.2)

Table 3.2 Distribution of the sample size

Insurance companies	Employees	Fire Insurance Clients	Total
AIICO	23	104	127
Zenith Insurance	34	112	146
Axamansard	26	88	114
Total	**83**	**304**	**387**

Source:*Researcher's computation, (2021)*

Furthermore, copies of well-structured 5-point Likert scale questionnaire were administered on the sample size using three sampling techniques including the stratified, the purposive and the random sampling techniques because of its nature and objectives. Respondents were grouped into employees and clients (stratified) while focus was more on the employees in the claim settlement units or department. Subsequently, the simple random sampling technique (first come walk-in clients) became handy in the selection of the sample size from within these groups. Then the collated data were analyzed using the simple percentage (%) while the hypotheses were tested using multiple regression (the e-view statistical software package tools) statistical techniques for the analysis of data. The regression technique was adopted because it has the capacity to reveal the cause and effect relationship between two major variables and among their proxies. Furthermore, the e-view version of the multiple regression contains other information such as the t-statistics, F-statistics, p-statistics, the co-efficient of determinant (R^2) and the Durbin-Watson (DW) statistics. This method was adopted because it is the best instrument to identify, compare, describe and to reach a conclusion.

The model is stated as follows:

$B_{VEH}=\infty + \beta_1 (C_{OMP}) + \beta_2 (B_L) + \beta_3 (C_{ONS}) + \varepsilon_i 1$

$B_{HO}=\infty + \beta_1 (C_{OMP}) + \beta_2 (B_L) + \beta_3 (C_{ONS}) + \varepsilon_i 1$

***(Source:** The researcher, 2021)*

Where:

B_{VEH} = Burnt Vehicle

B_{HO} = Burnt House

∞ is the intercept/slope

β_1, β_2, and β_3 are the regression coefficient or slopes, which determine the contribution of the independent variable. The independent variable is measured by the adopted sub scales, which include Comprehensive Insurance Policy (C_{OMP}); Blanket Insurance Policy (B_L) and Consequential Loss Insurance Policy (C_{ONS})$\varepsilon_i 1$ is the stochastic error term

Data Presentation and Analysis

4.1 Response Rate

Table 4.1: Return Rate of the Respondents

Respondents' Insurance Companies	**Copies of Questionnaire Administered**	**Copies of Questionnaire Not Returned**	**Copies of Questionnaire Returned**	**Percentage of Copies of Questionnaire Returned**
AIICO	127	36	91	**71.65%**
Zenith Insurance	146	38	108	**73.97%**
Axamansard	114	29	85	**74.56%**
Total	**387**	**103**	**284**	**73.39%**

Source: *Field Survey, (2021)*

Table 4.1 showed the response rates of the copies of questionnaire administered on the study respondents including the employees and clients (customers) of the three insurance companies including AIICO, Zenith Insurance and Axamansard. The table revealed that a total of 387 copies of the questionnaire were administered on all the clients and employees of the three insurance companies and 284 copies representing 73.39% were completed and returned or retrieved.

4.2 Respondents' Characteristics

Table 4.2.: Demographic Characteristics of Respondents

Characteristics	**Respondents' Categories**	**Frequency**	**Percentages**
Qualifications	WAEC & Equivalents	33	11.61
	OND & Equivalents	48	16.90
	HND/BSc & Equivalents	131	46.15
	MSc/MBA & Equivalents	54	19.01
	PhD & Above	18	06.33
Total		**284**	**100.00**
Respondents:	Client	215	75.70
	Employee	69	24.30
Total		**284**	**100**
Employees experiences:	Below 5 years	11	15.95
	6-10 years	17	24.63
	11-15 years	21	30.43
	16-20 years	09	13.04
	Above 20 years	11	15.95
Total		**69**	**100.00**
Years as a client:	Below 5 years	28	13.02
	6-10 years	53	24.65
	11-15 years	88	40.93
	16-20 years	27	12.55
	Above 20 years	19	08.85
Total		**215**	**100.00**

Source:*Field Survey, (2021)*

Table 4.2 displayed the demographic characteristics of the respondents of this study including the academic qualifications, status and years of relevant experiences. 69 respondents were employees of the three insurance companies while 215 were clients (customers) and more than 60% of each of these categories of respondents have over 10 years related experiences either as an employee or a client. Furthermore, over 88% are holders of post secondary school academic qualifications ranging from OND

and equivalents to over PhD. These are significant data that can affect the quality of responses and findings.

4.3 Tests of Hypotheses using Multiple Regression Techniques via E-View Statistical Software Package

4.3.1: Test of hypothesis one:

H_{O1}: *Fire insurance policies do not positively and significantly affect burnt vehicle claims settlement in the Federal Capital Territory of Nigeria.*

Table 4.3.1: E-view table for test of Hypothesis One (H_{01})

Dependent Variable: Burnt vehicle claims settlement (B_{VEH})
Method: Least Squares
Date: 03/07/21 Time: 17:23
Sample: 1 284
Included observations: 284

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.018679	0.105496	-0.177058	0.8596
C_{OMP}	0.224051	0.032164	6.965866	0.0000
B_L	-0.030089	0.037153	-0.809887	0.4187
C_{ONS}	0.111438	0.078744	1.415184	0.1581

R-squared	0.899988	Mean dependent var	2.302817
Adjusted R-squared	0.898554	S.D. dependent var	1.434011
S.E. of regression	0.456740	Akaike info criterion	1.288043
Sum squared resid	58.20256	Schwarz criterion	1.352286
Log likelihood	-177.9022	Hannan-Quinn criter.	1.313800
F-statistic	627.6687	Durbin-Watson stat	0.107327
Prob(F-statistic)	0.000000		

Source*:* *Data output using E-view, 2021*

1% level of significance, 5% level of significance and 10% level of significance

From the model, equation 1

$B_{VEH} = \infty + \beta_1 (C_{OMP}) + \beta_2 (B_L) + \beta_3 (C_{ONS}) + \varepsilon_1$ ……(1)

$B_{VEH} = 0.01 + 0.22C_{OMP} - 0.03B_L + 0.11C_{ONS}$

SE=	0.01	0.03	0.03	0.07
t =	0.17	6.96	0.80	1.41
P=	0.85	0.00	0.41	0.15
R^2=	0.45			
F-stat	=	627.6687 (prob. 0.00)		
DW	=	0.10		

Interpretation

From the computation on table 4.3.1, the mathematical equation for the effect of each policy on burnt vehicle claims settlement is $B_{VEH} = 0.01+0.22C_{OMP}-0.03B_L+0.11C_{ONS}$, which indicated that burnt vehicle claims settlement (B_{VEH}) improves by 22% and 11% for every 1% increase in the comprehensive and consequential loss policies respectively, but decreases by 3% by every 1% increase in the blanket policy.

Furthermore, it displayed p-statistics values of 0.0000 (0.00%); 0.4187 (41.87%); and 0.1581 (15.81%) for the comprehensive (C_{OMP}); blanket (B_L) and consequential loss (C_{ONS}) insurance policies respectively. That meant that with a p-statistic value of less than 0.1000 (10%) the comprehensive policy has positive and significant effect on the claims settlement of burnt vehicle owners (B_{VEH}), while the blanket (B_L) and consequential loss (C_{ONS}) insurance policies with p-statistics values of 0.4187 (41.87%); and 0.1581 (15.81%) respectively that are greater 0.1000 (10.00%) have non positive and insignificant effect on burnt vehicles claims settlements. Additionally, the R^2 value of 0.45 showed that 45% of the variations in burnt vehicles claims' settlements are caused by these three policies, while the outstanding 55% are caused by variables not captured in this study.

Overall and based on the study's decision rule, the overall p-stats value of 0.0000 (0.00%) is less than 0.1000 (10%) and within the acceptable range, implying a positive and significant relationship between the major variables. Consequently, the study rejects the null hypothesis (H_{O1}) that fire insurance policies do not significantly affect burnt vehicle claims settlement in the Federal Capital Territory of Nigeria.

4.3.2: Test of hypothesis two

H_{O2}: *Fire insurance policies do not positively and significantly affect burnt houses claims settlement in the Federal Capital Territory of Nigeria.*

Table 4.3.2: E-view table for test of Hypothesis Two (H_{02})

Dependent Variable: Burnt Houses Claims Settlement (B_{HO})

Method: Least Squares

Date: 03/07/21 Time: 17:25

Sample: 1 284

Included observations: 284

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.024450	0.052178	0.468602	0.6397
C_{OMP}	-0.007640	0.015908	-0.480245	0.6314
B_L	-0.001224	0.018375	-0.066627	0.9469
C_{ONS}	0.788252	0.038946	20.23947	0.0000

R-squared	0.967468	Mean dependent var	1.964789
Adjusted R-squared	0.967002	S.D. dependent var	1.243567
S.E. of regression	0.225899	Akaike info criterion	-0.120006
Sum squared resid	14.23751	Schwarz criterion	-0.055764
Log likelihood	22.04086	Hannan-Quinn criter.	-0.094250
F-statistic	2074.301	Durbin-Watson stat	0.467502
Prob(F-statistic)	0.000000		

Source*: Data output using E-view, 2021*

1% level of significance, 5% level of significance and 10% level of significance

From the model, equation 2

$B_{HO} = \infty + \beta_1 (C_{OMP}) + \beta_2 (B_L) + \beta_3 (C_{ONS}) + \varepsilon_1$

$B_{HO} = 0.02\text{-}0.00(C_{OMP}) \text{ -}0.00(B_L) +0.78(C_{ONS})$

SE=	0.05	0.01	0.01	0.03
t =	0.46	0.48	0.06	20.23
P=	0.63	0.48	0.96	0.00

R^2= 0.96

F-stat = 2074.301(prob. 0.00)

DW = 0.46

Interpretation

From the computation on table 4.3.2, the mathematical equation for the effect of each policy on burnt house claims settlement is $B_{HO} = 0.02\text{-}0.00C_{OMP}\text{-}0.00B_L+0.78C_{ONS}$, which indicated that burnt houses claims settlement (B_{HO}) remain constant (0.00%) for every 1% increase in the comprehensive (C_{OMP}) and blanket (B_L) insurance policies, but improves by 78% for every 1% increase in the consequential loss (C_{ONS}) policy.

Furthermore, it displayed p-statistics values of 0.6314 (63.14%); 0.9469 (94.69%); and 0.0000 (0.00%) for the comprehensive (C_{OMP}); blanket (B_L) and consequential loss (C_{ONS}) insurance policies respectively. That meant that with a p-statistic value of less than 0.1000 (10.00%) the consequential loss (C_{ONS}) policy has positive and significant effect on the claims settlement of burnt houses (B_{HO}), while the comprehensive (C_{OMP}) and blanket (B_L) insurance policies with p-statistics values of 0.6314 (63.14%); and 0.9469 (94.69%) respectively that are greater 0.1000 (10.00%) have non positive and insignificant effect on burnt houses claims settlements. Additionally, the R^2 value of 0.96 showed that 96% of the variations in burnt houses claims' settlements are caused by these three policies, while the outstanding 4% are caused by variables not captured in this study.

Overall and based on the study's decision rule, the overall p-stats value of 0.0000 (0.00%) is less than 0.1000 (10%) and within the acceptable range, implying a positive and significant relationship between the major variables. Consequently, the study rejects the null hypothesis (H_{O2}) that fire insurance policies do not significantly affect burnt houses claims settlement in the Federal Capital Territory of Nigeria.

Summary, Conclusions and Recommendations

5.1 Summary of major Findings

The study evaluated the effects of fire insurance policy on claims settlements in the Nigerian insurance industry and found out that overall, fire insurance policy positively and significantly affects claims settlement especially as it concerns subject matters as burnt vehicles and houses. But all the policies do not have the same level of effect. The study discovered that the comprehensive insurance policy has the most positive and significant effect on the burnt vehicle claims settlement while the blanket policy has the least. Furthermore, it was also discovered that the consequential loss insurance policy has the most positive and significant effect on the burnt houses' claims settlement while the comprehensive and blanket policies have little or no effect.

Consequently, the study recommended that the selected insurance firms and others should strive to develop the most effective and efficient insurance policies that would encourage settlement of claims promptly in order to attract and retain more clients. Furthermore, it recommended that insurance firms should strive to modify existing general policies to suit peculiarities and needs in other to increase patronage.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Impact of Regional Trade Agreement on Trade and Consumer Welfare in Nigeria

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Abstract

The importance of Regional Trade Agreements (RTAs) has gained more prominence in recent times given the African Continental Free Trade Area (AfCFTA) agreement which commenced in January 2021. This complements the existing Economic Community of West African States (ECOWAS) sub-RTA driven by the ECOWAS trade liberalization scheme and the protocols underlying its establishment. There have been mixed reactions by stakeholders on the impact of the existing and new RTAs especially in terms of their impact and therefore, this paper examined the trade creation, trade diversion and consumer welfare impact of RTAs in Nigeria. Quantitative impacts were obtained based on a partial equilibrium simulation tool- Software for Market Analysis and Restriction of Trade (SMART), which has an integrated database sourced from the World Trade Organization (WTO). The dataset used is for 2016 which, is the most recent available dataset for Nigeria and other African countries. The outcome of a tariff reduction simulation exercise revealed a trade creation effect of US$43.59 million or (75.71%). This largely exceeds the trade diversion effect of US$13.98 million or (24.28%). In terms of welfare, the removal of tariff barriers led to a welfare gain of US$4.09 million, wherein the industrial and agricultural sectors were found to have contributed the most to consumer's welfare recording 73.30% and 23.27%, respectively. Therefore, the study recommends that policies that support economic integration with other African countries such as improved trade logistics infrastructure, protocols on the free movement of persons and capital, eliminating tariff and non-tariff barriers and harmonizing regulatory measures would be required to maximize the gains from an RTA.

Keywords: Trade Creation, Trade Diversion, Regional Trade Agreements

JEL Codes: F15, I31

1. Introduction

There exists a raging debate regarding trade diversion and trade creation effects around the world, especially in the south-south regional trade areas. Yeats (1998) expresses a pessimistic view that promoting intra-regional trade has potential adverse effects on member countries and third-party countries and hurt Africa's industrialization and growth. This view is supported by Park (1995), and Schiff (1997). However, Evans (1998) found a net positive effect of the Southern Africa regional integration initiative. Others who hold similar views include Cernat (2006) and Elbadawi (1997). The debate on the impact of the Regional Trade Agreement (RTA) in the context of trade creation and diversion remains inconclusive and thus warrants further empirical scrutiny.

Since the 1970s, Nigeria has been a mono-cultural economy relying heavily on oil as its major income earner. Crude oil has remained the dominant export, accounting for 70.87% (N3,75 billion) of the value of total export, while non-crude oil exports amounted to 29.13% (N1,54 billion) (National Bureau of Statistics, 2019). The implication is that the dynamics of the economy is at the drives of the price of oil, which for the most part, has been volatile. The major fallout of this fragile structure of the Nigerian economy has been growing without creating jobs and reducing poverty (Onodugo, 2013). The on-hand explanation to this economic paradox is that the oil sector which produces more than 70% of export earnings is in the hands of less than 1% of the population. Perhaps, the sector is disconnected from other tiers and sectors of the economy and thus offers little or no linkage and multiplier effect to the economy as a whole.

An RTA provides ample opportunity towards diversification of the export base since it provides more opportunities for non-oil exports, and could also boost the competitiveness of local industries. This is because the RTA would enable Nigeria to break into new Africa markets as it diversifies its export destination and goods produced for the regional market. The extent to which this opportunity is harnessed will depend on the productive capacity of the economy to service domestic and regional markets.

The total regional value of trade indicates that Europe is still a significant trading partner of Nigeria. However, trade barriers from Nigeria's export destinations as well as stringent sanitary and phytosanitary standards make it difficult for Nigeria to efficiently explore global export markets. However, with an RTA, countries within the same region tend to trade with themselves without any restrictions, making it easy to diversify exports with relatively lower transport costs compared to trading with non-regional markets. Recent evidence by the Economic Community of Africa (ECA) shows that when African countries trade with themselves they exchange more manufactured and processed goods, stimulate knowledge transfer, and create more value. Notably, manufactured goods constitute a significant portion of regional exports relative to non-regional exports (Songwe, 2019). Moreover, countries within the RTA are often on the same level of development and thus have similar economic objectives.

Furthermore, the violation of the rule of origin has remained a major constraint to Nigeria's export diversification and growth efforts due to smuggling along border towns that persisted over the years. This has led to significant trade diversion from Nigeria leading to lower revenue, job losses, lower domestic output, welfare losses, limited value addition due to unfavourable competition, etc. A functional RTA can serve as a disincentive to smuggling since it implies zero restrictions through the formal trading

channels, and that the rules of origin are maintained to avoid re-exports from neighbouring countries to Nigeria. Thus, it can be very effective in defending the Nigerian economy from smuggling of consumer goods such as rice, chickens, arms and ammunition, which threaten the welfare, security and economic stability of the country.

Against this backdrop, this paper seeks to examine the consumer welfare and trade effects of RTAs through the lens of trade creation and trade diversion. Notably, empirical studies estimating trade creation and diversion effects is particularly important because the impact of an RTA could be harmful or beneficial depending on the type of economy as well as the extent of trade creation relative to trade diversion. This is particularly important as Nigeria recently became a signatory of the AfCFTA. Therefore, the outcome of this paper could serve as valuable inputs for preparing trade strategies that can help to maximize the gains from joining the RTA.

There have been a plethora of studies carried out to evaluate the effect of the formation of RTAs on intra- regional trade (Cassim, 2001; Musila 2005; Agbodji, 2008; Coulibaly, 2009; Kepaptsoglou et. al, 2010). While some studies have attempted to examine trade flows, trade potentials, and prospects in other regions of the world, others have examined the determinants and attempted to predict the impact of forming an RTA (Salisu and Ademuyiwa, 2012). However, the trade creation and diversion effect of RTAs such as AfCFTA in Nigeria has not been adequately researched. Also, previous studies in the area of trade creation and trade diversion suffer from a well-known measurement error problem (Baier and Bergstrand, 2007). Most studies use dummy variables to identify the presence of an RTA due to inadequate data. In addition, most studies do not attempt to measure the welfare effects of RTAs due to data limitation, but instead take the first step down that path by estimating the impacts of the agreement on trade flows (Magee, 2008). These obvious gaps could be overcome using a partial equilibrium model: Software for Market Analysis and Restriction of Trade (SMART) which has an integrated database and is capable of estimating the trade and welfare effects of an RTA. The model is preferred because it allows the utilization of widely available trade data at the appropriate level of trade classification detail to capture the principle of special and differential treatment in the simulation analysis (Guei et. al, 2017). The dataset for this study is 2016, which is the most recent available dataset for Nigeria and other African countries in the WITS-SMART simulation database. Interestingly, this period coincides with the period when RTA processes were integrated with the continental free trade agreement by the African Union.

This study is organized into 6 sections. Following this introduction, Section 2 provides the background to the study while Section 3reviews related literature. Section 4 outlines the research methodology. Section 5discusses the findings while Section 6 concludes and puts forth some recommendations.

2. Situational Analysis

International trade is one of the most essential and widely discussed topics in the world today. Global connectedness and desire to consume varieties of goods have prompted the need for market integration among countries of the world. The need for deeper integration has taken patterns that foster interaction between countries, particularly those with similar preferences and within a common geographical region. This has been reinforced by potential and substantial gains from regional trade between countries in

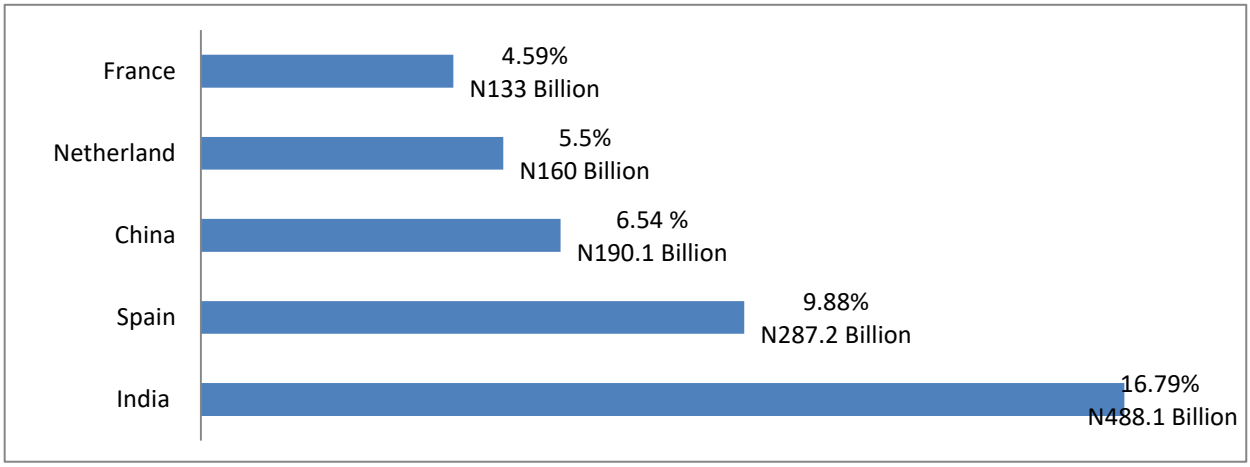
terms of economies of scale, availability of product varieties, lower price, etc. The idea of regional trade dates back to the classic works of Adam Smith and David Ricardo, as well as the subsequent overwhelming body of knowledge that followed thereafter. This is underpinned by the notion that with large gains from trade, countries could create an incentive system that allows for greater trade flows between nations. Such an incentive system typically involves reducing tariff and non-tariff measures that make it relatively cheaper for countries to trade.

In Africa, different forms of these RTAs have been adopted ranging from the Economic Community for West African States (ECOWAS) FTA made up of 15 countries; monetary and custom union like the West African Economic and Monetary Union (WAEMU) which comprises eight francophone countries; and the West African Monetary Zone (WAMZ) which is an Anglophone dominated monetary union with six countries as members (Salisu and Ademuyiwa, 2012). Several reasons have been put forth for the rapid spread of RTAs around the World but the most important for developing countries is to promote sustainable regional development, increase the competitiveness of domestic industries, diversification of exports as well as promote exports in both traditional and non-traditional markets.

Like several other countries, Nigeria has over the years committed to leverage on RTAs in its foreign policy. From 1986, there was a significant shift in Nigeria's trade policy direction towards greater liberalization. This shift in policy is directly attributed to the adoption of the Structural Adjustment Program (SAP). The Customs, Excise, Tariff etc. (Consolidation) Decree, enacted in 1988, was based on a new Customs goods classification, the Harmonized System of Customs Goods Classification Code (HS). It provided for a seven-year (1988 -1994) tariff regime, to achieve transparency and predictability of tariff rates. Imports under the regime thus attracted advalorem rates applied on the Most Favored Nation (MFN) basis. Furthermore, between 1999 and 2006, Nigeria's trade policy regime was geared towards enhancing the competitiveness of domestic industries, with a view to, *inter alia*, encourage local value-added and diversifying exports. The mechanism adapted to this end is gradual trade liberalization.

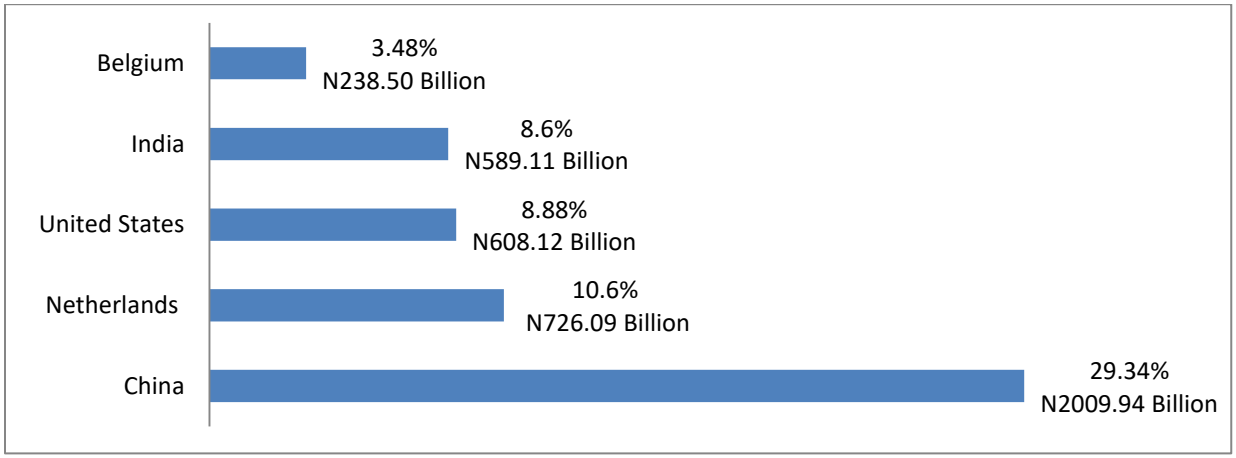
The underlining rationale behind these regional trade integration commitments is that the agreements will boost intra- and inter-regional trade performance. This is based on the understanding that RTAs encourages countries of the same region to specialize in producing goods in which they have the least cost of production. This in turn ensures efficient resource allocation and boost social output. Also, such trade agreements are often associated with a greater influx of FDI and allow for the transfer of knowledge. Cumulatively, these transactions boost domestic output, income earnings, increase employment opportunities, and lead to welfare improvement. In addition, as countries increasingly specialize in what they can do best, such specialization can be a nucleus for cutting edge innovation and invention that are critical for long term growth and sustainable development.

Figure 1: Nigeria's Major Export Trading Partners as of Q1, 2021 Export Trade



Source: National Bureau of Statistics (NBS), Foreign Trade in Goods Statistics (Q1 2021)

Figure 2: Nigeria's Major Import Trading Partners as of Q1, 2021 Import Trade



Source: National Bureau of Statistics (NBS), Foreign Trade in Goods Statistics (Q1 2021)

Because of the greater involvement of Asian countries such as China, Asian imports dominate the import market of Nigeria; this to some extent explains why the European Union (EU) persuades the ECOWAS to implement the Economic Partnership Agreement (EPA): to gain full access to the region's market, especially the large population of Nigeria, the most populous African countries. However, the EPA later failed because, the introduction of the agreement to African, Caribbean, and Pacific (ACP) countries by the EU was not an act of benevolence, but on the contrary. It was necessitated by changes and shifts in the international political landscape of economics and power through which China, India, Brazil, and Russia have become important actors in international political economic discussion and global trade (Whiteman 2012:3). Harvey (2007) observed that the neoliberal policy associated with trade liberalization, which is key to the EPA, has not proven to be better in eradicating poverty and harnessing economic growth and development, but instead leads to uneven geographical development and an increase in social and spatial polarization (Omisiri,

2013:63; Oniș and Senses, 2005:267, cited in Larner 2000:8).

The debate around trade liberalization in Nigeria has however called for economic and political attention. According to Kareem (2014), agriculture was the most liberalized sector for Nigeria, with a weighted average tariff decline from 30.2% in 2000 to 8.8% in 2010. Correspondingly, the import of agriculture commodities rose from US$963 million in 2000 to US$34 billion in 2010, an increase of more than 250% over ten years. However, the share of agriculture imports in the GDP due to the formation of ECOWAS, decline from 2% in 2000 to 1.5% in 2010, which implies a loss of GDP. While, manufacturing sector imports grew from slightly less than US$5 billion in 2000 to more than US$30 billion in2010, which was 13% of the GDP for the year compared to about 11% in 2000. This represents a loss in the GDP.

The CET has led to an increase in the overall household welfare of 6.9% at the national level (Kareem, 2014). This welfare gain is traced to the increase in expenditure by 8.9%, which compensated for the losses incurred by households from sales of agricultural produce of 1.9%. In addition, the overall change in real income due to the CET in the agricultural sector indicates that the consumers of agricultural products have been better-off, resulting from the availability of a wider variety of cheaper goods. Furthermore, Nigeria's imports from ECOWAS declined over the years in terms of their share in the country's total imports. In 1994, the share of imports from ECOWAS in Nigeria's total imports was closely 5%. This then decline to 3.2% in 2005 and fell to 2.3% in 2012 (IMF, 2013). This suggests that more than 97% of Nigeria's imports of goods and services in 2012 came from countries outside ECOWAS. According to UNCTAD (2012), less than 7% of Nigeria's imports are sourced from Africa. This implies a lesser trade diversion from Nigeria as the country imports more of the commodities from outside ECOWAS - hence reducing Nigeria's trade expansion from the ECOWAS. This reduction in the flow of imports from ECOWAS to Nigeria is due to inadequate infrastructure and limited implementation of sub-regional trade liberalization scheme.

Two strands of the literature have emerged: the liberal and protectionist positions. While the ideas of the former have leaned towards the pursuit of freer trade between countries; the latter have argued forcefully that although the derivable benefits of free trade are laudable, they are to some extent hypothetical and effective only under the conditions of full-employment, the full allocation of resources and perfectly competitive market conditions. The protectionist view is skeptical about the gainsand pessimistic about the potentiallosses from free trade because uneven distribution from trade could lead to job losses in domestic import-competing industries (Yeo and Deng, 2019). Indeed, Singh (1985) argued that the applicability of free trade is limited in the case of a developing economy, where a vast segment of the productive resources is still unexplored and there is an acute problem of unemployment.

A free trade regime would intensify misallocation and utilization of resources by weakening the domestic industries; especially those that lack enough competitive powers. This debate has not only been theoretically contested but has also produced mixed findings. Several studies such as Othieno and Shinyekwa, (2011), Mugano, Brookes and Le Roux (2013) and Kwaramba, Kwenda-Magejo and Rankin (2015) found that an African RTA could lead to an expansion in trade performance. However, other studies like Rodriguez and Rodrik (1999), Santos- Paulino and Thirlwall (2004) and Jones and Morrissey (2008) have presented contrary evidence. Given the

commencement of the AfCFTA and its importance, it is important to examine the trade and consumer welfare effect of this RTA in Nigeria.

3. Literature Review

3.1 Review of Conceptual Issues

Trade Creation

Trade creation (TC) is defined as the additional trade generated from an FTA that would not have existed without the FTA's establishment. The less efficient domestic production centers will be priced out by the lower-priced import from more efficient production center(s) in the other FTA member nation(s). The removal of the tariffs that protected the less efficient domestic production centers, as a result of the FTA, will essentially displace high-cost domestic production. So, the removal of tariffs results in cheaper imports, which drive up demand by consumers in member countries, as imports are more affordable and potentially of a higher quality (Viner, 1950). Trade creation refers to the replacement of relatively high-cost domestic production with lower-cost imports from the partner country (Nicholls, 1998).

Trade creation occurs when countries that sign an agreement can import cheaper goods produced by members of the same bloc. It causes an increase in welfare (Morais and Bender, 2006). Trade creation occurs due to an introduction of a Regional Trade Agreement, which in turn permits the supply of products from a more efficient producer of the same product (Yego and Siahi, 2018). It makes consumers better off by giving them more product varieties as they can buy goods from the most efficient supplier at the lowest cost. Trade creation results in an improvement in resource allocation and economic welfare. Therefore, trade creation can be defined as the substitution of less efficient national production with more efficient partner-country production.

Trade Diversion

According to Nicholls (1998), trade diversion refers to a switch in imports from a more efficient producer country in the rest of the world to a less efficient partner country. Trade diversion happens mainly when imports from countries outside the bloc area are reduced after the agreement takes place. More competitive suppliers are then substituted for suppliers less competitive which are in member countries. This phenomenon is related to a loss in welfare and efficiency (Morais and Bender, 2006). Trade diversion occurs when the introduction of an RTA shifts trade away by allowing the supply of products by a less efficient supplier within the RTA vis-a-vis a more efficient supplier outside the RTA. (Yego and Siahi, 2018). Trade diversion worsens efficiency in resource allocation. Besides, trade diversion harms non-members as they lose an exporting opportunity. Therefore, trade diversion can be defined as the substitution of more efficient non-partner imports with less efficient partner-country sourced imports.

Regional Trade Agreements (RTAs)

According to Yego and Siahi, (2018), Regional Trade Agreements usually involve a group of countries agreeing to engage in free trade within the economic bloc but maintain tariffs with the rest of the world. When under a free trade area, the member countries apply different tariffs on import flows from the rest of the world. In the words of Mattoo et al. (2017), Preferential Trade Agreements (PTAs) have been also referred to in the literature as Regional Trade Agreements, Free Trade Agreements, and Economic Integration Agreements, which are any trade agreement between a subset of countries (two or more). Therefore, an RTA

can be defined as a formal agreement that occurs between two or more countries of the same region, for trade liberalization that will boost trade flows and enhance welfare.

3.2 Empirical Review

Estimating trade creation and trade diversion effects of regional trade agreements have produced mixed outcomes. Previous studies such as Magee (2008), and Othieno and Shinyekwa (2011) found evidence of trade creation over trade diversion, while Morais and Bender (2006), Varma t.al. (2017) and Russ and Swenson (2019), found otherwise. However, Salisu and Ademuyiwa (2012), Matto et.al, (2017), Villa, Gomez and Omar (2012), and Yego and Siahi (2018) found mixed evidence of trade creation and trade diversion.

Morais and Bender (2006), evaluate the effect of Mercosur and NAFTA Agreements on concepts of welfare, trade creation and trade diversion. Their databank covers the period from 1980 to 2002. The estimated gravity equations, by panel data methods, with dummy variables to detect intra-bloc and extra-bloc relations. Their results suggested that trade creation has not occurred in both agreements. Thus, NAFTA was followed by trade diversion and Mercosur presented difficulties in measuring this component. Magee (2008) examined the impact of RTAs on trade flows by using a gravity model to analyze data from 1980 to 1998 for between 133 countries. The study found that trade creation is roughly seven times larger than trade diversion on average. His estimation also reveals that regional agreements have significant anticipatory effects on trade flows and continue to affect trade for up to 11 years after they begin.

Othieno and Shinyekwa (2011) examine the effect of the East African Community Customs Union Principle of Asymmetry on Uganda regarding trade, welfare and revenue effect since 2005. Using the simulation tool, they found that the end of tariff reduction increased trade creation and welfare effects which reflected in consumer surplus in terms of reduced prices. In addition, the diversion effect that resulted from the CET on respective products such as woven cotton fabric, soap products and paints vanished. Shinyekwa, and Othieno, (2013) examine the trade creation and trade diversion effects of the East African RTA.Using panel data to analyze data from 2001 to 2011 on several countries that trade mainly with the EAC. Their results revealed that the implementation of the EAC treaty has created trade contrary to widely held views that South-South RTAs largely divert trade.

This partly contradicts the study of Salisu and Ademuyiwa (2012) on trade effects of the West Africa Monetary Zone (WAMZ). Using the gravity model to analyze data for the period 2005-201l, they found that WAMZ has been trade-diverting although country-specific analysis reveals that individual countries in the RTA do not necessarily exhibit similar trends as Nigeria and Gambia are export creating while Ghana and Guinea are export diverting. This contradicts the findings of Villa, Gomez and Omar (2012) on the impact of the Preferential Trade Agreement between Canada and Colombia. Their dataset is for 2010. They applied a partial equilibrium and the simulations showed that trade creation could be one and a half times larger than trade diversion. Trade between the two countries in the first year grew by approximately 10%.

Makochekanwa (2014) investigates the welfare implication of the COMESA-EAC-SADC tripartite FTA using a dataset for 2011. Using the WITS-SMART model, the study found that about $2 billion worth of new trade would be created, with the main beneficiaries being the Democratic Republic of Congo and Angola. Around $454 million trade will be diverted resulting in a positive net trade of $1.5 billion across the 26

countries. The result also suggests that around $1 billion will be lost following the removal of import duties. This contradicts the results of Varma et.al. (2017), on trade creation and trade diversion effects of the Asia Pacific Trade Agreement (APTA), and the India-Singapore Comprehensive Economic Cooperation Agreement (ISCECA). Their study covers the period from 2005 to 2015. Using the gravity model, they found that agreements have not led to any trade creation, due to the presence of a cluster of smaller, economically less influential countries, high cost of intra-regional trade, and prominence of south-south integration.

Other studies on trade creation and diversion impact of RTAs such as Matto et.al, (2017) present contrary results. Covering a sample of 96 countries for the period from 2002 to 2014, they found that deep agreements lead to more trade creation and less trade diversion than shallow agreements. This is in line with the study of Guei et.al, (2017) who used a simulation model to show that the total trade effects in South Africa are likely to surge by $1.036 billion with a total welfare value of $134 million. Total trade creation would be $782 million. While trade diversion contributed by South African producers would amount to $254 million, which hurts welfare.

Yego and Siahi (2018) used the gravity model to analyze trade creation and trade diversion in the COMESA: Evidence of Kenya's import flows in food and live animals. Their study covers the period from 1976 to 2013. They also found evidence of trade creation and trade diversion. Russ and Swenson (2019), estimate trade diversion and trade deficits on the Korea-United States (KORUS) free trade over the period 2010 to 2016. They found that trade diversion was particularly strong for U.S. imports of consumption goods, in the two years following the implementation of KORUS. The diversion effect also went for trade partners who already had free trade agreements with the United States. Their estimates of trade diversion increased from $13.1 billion in 2013 to $13.8 billion in 2014.

Michael and Steven (2020) used the gravity model to investigate trade creation and diversion effects in the tripartite region. Their study covers the period from 2000 to 2015. They found mixed evidence of trade creation and trade diversion for EAC, SADC and COMESA blocs. Their findings reveal that EAC countries will not gain much in terms of trade creation because the EAC is already at a deeper level of integration (that is, customs union) than the tripartite agreement. They predicted an increase in the level of trade creation for the EAC economies once TFTA is implemented, which will result from a long-term dynamic effect of the agreement. For the SADC bloc, they found that trade diversion outweighs trade creation. While for COMESA, trade creation outweighs the trade diversion.

Literature Gap

The extant literature reviewed demonstrates the range of empirical approaches that have been applied in analyzing the trade and welfare effects of RTA in various economies. The results of the studies vary from case to case. The implication of an RTA depends on the initial tariff structure of a country and its trade pattern among other things. Also, it is evident that the estimation of trade creation and diversion effects of RTA is lacking in terms of theoretical underpinnings and is largely driven by econometric models which suffer from disaggregated data limitations. Theoretical evidence suggests that RTAs may be useful or harmful depending on the economies involved and the extent of trade creation relative to trade diversion. This paper contributes to the literature in two ways. First, by estimating trade creation and trade diversion effects of RTA specifically

for Nigeria, Second, by examining whether and how an RTA affects consumer welfare (by assessing the net effect of trade creation and trade diversion) in Nigeria. The partial equilibrium Software for Market Analysis and Restriction of Trade (SMART) model was used due to its ability to overcome data limitation problems. Also, in the WITS database, this study used the most recent available dataset (2016) for Nigeria and its African trading partners to examine the effects of RTA for Nigeria.

4. Methodology

4.1 Conceptual Framework

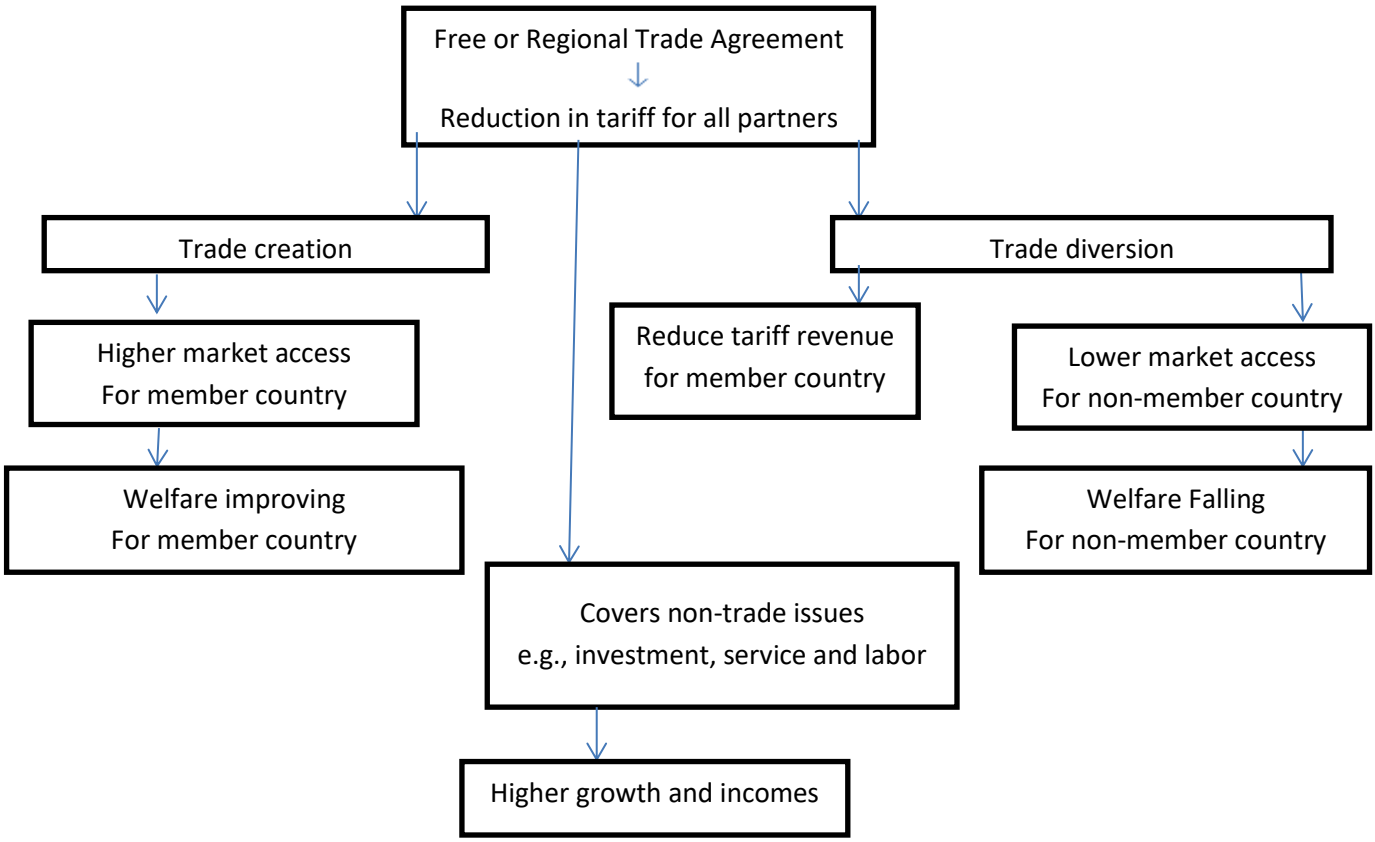
Trade liberalization is the removal or reduction of tariff and non-tariff barriers to the flow of goods and services across countries. Tariff barriers include duties and surcharges while non-tariff barriers include licensing rules, quotas, and other requirements. Member countries in a regional trade agreement remove trade barriers between them but maintain an existing tariff structure towards non-member countries. However, to project the impact of the agreement, the total effect of a reduction or elimination of tariffs on Nigeria's import from member countries is represented in SMART as the sum of two components, namely:

1. Trade creation (TC), which measures the increase in Nigeria's imports from member countries owing to a decrease in the relative price of these imports vis-à-vis domestically produced goods, resulting in a net increase in Nigeria's total imports and a net decrease in Nigeria's domestic production;

2. Trade diversion (TD), which measures the increase in Nigeria's imports from member countries owing to a decrease in the relative price of these imports vis-à-vis imports from non-member countries resulting in a different geographical composition of imports, whereby imports from member countries increase at the expense of imports from other sources (non-member countries), with no change in Nigeria's total imports.

The same calculation applies to the export side to assess the impact of the Agreement on Nigeria's exports to member countries. However, the agreement would lead to an increase in export at the expense of both member countries and non-member countries production (trade creation and trade diversion respectively). Figure 3.1 illustrates transmission channels of the expected effects of trade creation and trade diversion of RTA for Nigeria.

Figure 3.1: Effects of Tariff Elimination of RTA



Source: Author's Initiative, 2021

4.2 Analytical Framework and Modeling Structure

Before Viner's model was developed, the conventional wisdom was that regional trading agreements would tend to improve welfare because they included some degree of trade liberalization. Viner's model was important because it debunked this myth, showing that a regional trading agreement could hurt welfare. His model remains important as an analytical framework because it lays out some conditions that determine when an FTA would be useful or harmful. The key concepts in his model are trade creation and trade diversion.

In analyzing the welfare effects produced by trading blocs, Viner (1950) establishes a dichotomy between trade creation and trade diversion by pointing to trade creation as something that enhances welfare and trade diversion as something that reduces welfare. This could be explained in the Nigerian context. Suppose Nigeria form a Preferential Trade Agreements (PTA) with its regional partners, where zero tariffs make products of member partners cheaper in Nigeria and vice versa. If the regional members produce at lower costs than Nigeria, their commodities will be sold with more competitive prices at Nigeria's market and hence their imports will increase to Nigeria. This will lead to trade

creation in Nigeria. The Nigeria consumers of the regional member's products will pay less. This will wholly increase their surplus and hence, their welfare will improve. Thus, trade creation is related to an increase in welfare. We could now imagine the existence of non-partner countries with production costs of goods even lower than that of the PTA regional partners.

Suppose that the tariff of Nigeria for non-regional products is not higher to hinder their products from being sold at a cheaper rate. Surely, the non-regional partners' products will dominate the Nigerian market. If Nigeria and its regional partners form a bloc and the tariff reduction makes products cheaper than the ones from non-regional partners, Nigerian consumers will buy the products that are not produced at a lower cost. Hence, the trade of such products is diverted from the non-regional partners to the regional partners. This new allocation is not efficient and it represents a loss in consumer welfare.

The increased employment opportunities and higher income will increase demand for produced goods, which drive up factor returns and thus attract more investments. The country will be prepared to pay the largest return on capital invested by its citizens, as it gets most of the new investments. The positive effect of capital gains is another aspect of overall welfare gain (Jensen, Sandrey, and Vink, 2012). However, the revenue effect reflects the loss on the government accounts, as the removal or reduction in customs duties on imported goods results in loss or reduction of customs revenue (Viner, 1950).

The study relied on the Partial Equilibrium Model to examine trade creation and trade diversion effects of RTA for Nigeria. The focus will be on trade creation, trade diversion and consumer welfare. The PEM was chosen because it provides results at a more disaggregated level (SITC Rev.4 section 1 and 2 for this study). The PEM enables the calculation of direct trade effects (creation and diversion). A partial equilibrium framework is more suitable because it allows for the utilization of widely available trade data at granular level of detail that reflects the principle of special and differential treatment in the simulation analysis. Notably, PEM is static and only allows for comparative static comparison (Lang, 2006) which is the focus of this study. Hence, the WITS/SMART model emerged as the best choice not only because of the static effect but also because of its strength in analyzing the tariff effect of a single market on disaggregated product lines.

Trade Creation

The main objective of this study is to examine trade creation and trade diversion effects of RTA for Nigeria. The underlying theory is summarized below for the estimation of the trade effects. The exposition of the WITS/SMART theory is summarized by Laird and Yeats (1986). Trade creation captures the trade expanding aspects of RTA that leads to the displacement of inefficient producers in each preferential trading area (a free trade area for instance). It is assumed that there is a full transmission of price changes when tariff or non-tariff distortions (ad valorem equivalents) are reduced or eliminated. Laird and Yeats (1986) derive the equation that can be used to examine the trade creation effects. The derivation begins with the following basic trade model composed of simplified import demand and export supply functions and an equilibrating identity:

A simplified import demand function for country j from country k of commodity i:

$$M_{ijk} = f(Y, P_{ij}, P_{ik}) \dots\dots\dots\dots\dots\dots (1)$$

The export supply function of commodity i of country k can be simplified as:

$$X_{ijk} = f(P_{ikj}) \dots\dots\dots\dots\dots\dots\dots (2)$$

The equilibrium in the trade between the two countries is the standard partial equilibrium equation:

$$M_{ijk} = X_{ijk} \dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

Where M is import, X is export, Y is national income, P is price, TC is trade creation, i is subscript denoting commodity, j is subscript denoting domestic/importing country data, k is subscript denotes foreign/exporting country data, d implies change. P_{ijk} represents Price of commodity i in country j from country k (i.e. domestic price in j), P_{ikj}denotes Price of commodity i from country k to country j (i.e. export/world price j) and M_{ijk} denotes Imports of i by j from k and X_{ikj} is Exports of i by k to j.

In a free trade environment, the domestic price of commodity i in country j from country k would change with the change in an ad valorem tariff as follows:

$$P_{ijk} = P_{ikj}(1 + t_{ijk}) \dots\dots\dots\dots\dots\dots\dots (4)$$

To derive the trade creation formula, following Laird and Yeats (1986), the price equation (4) is totally differentiated to get:

$$dP_{ijk} = P_{ikj}dt_{ijk}(1 + t_{ijk})dP_{ikj} \dots\dots\dots (5)$$

Equations (4) and (5) are then substituted into the elasticity of import demand equation, $\frac{dM_{ijk}}{M_{ijk}} = \cap_i^m, \left(\frac{dP_{ijk}}{P_{ijk}}\right)$to get:

$$\frac{dM_{ijk}}{M_{ijk}} = \cap_t^m, \left(\frac{dt_{ijk}}{1 + t_{ijk}} + \frac{dP_{ijk}}{P_{ikj}}\right) \dots\dots\dots\dots (6)$$

From the identity in equation (3), $\frac{dM_{ijk}}{M_{ijk}} = \frac{dX_{ikj}}{X_{ikj}}$ can be used to derive the following expression for elasticity of export supply: $\frac{dP_{ikj}}{P_{ikj}} = \frac{1}{\gamma_i^0}\frac{dM_{ijk}}{M_{ijk}}$, which when used in equation 6, allows the computation of the trade creation effect. From equation (3) the trade creation effect is equivalent to exporting country k's growth of exports of commodity i to country j:

$$TC_{ijk} = M_{ijk} \cap_i^m \frac{dt_{ijk}}{\left((1 + t_{ijk})\left(1 - \cap_i^m/_{\gamma_i^0}\right)\right)} \dots\dots\dots\dots\dots (7)$$

If $\gamma_i^0 \to \infty$, then equation (3.7) can be simplified as follows:

$$TC_{ijk} = \cap_i^m M_{ijk}\frac{(1 + t_{ijk}^1)(1 + t_{ijk}^0)}{(1 + t_{ijk}^0)} \dots\dots\dots\dots\dots\dots\dots (8)$$

Where $TC_{ijk}$is the sum of trade created in millions of dollars over i commodities affected by tariff change and $\cap_i^m$ is the elasticity of import demand for commodity i in the importing country from the relevant trading partner. $M_{ijk}$is the current level of import demand of the given commodity i. t_{ijk}^0 andt_{ijk}^1represent tariff rates for commodity i at the initial and end periods respectively. Trade creation then depends on the current level of imports, the import demand elasticity and the relative tariff change.

Trade Diversion

Trade diversion is the phenomenon that occurs in a free trade area for example whereby efficient producers from outside the free trade area are displaced by less efficient producers in the preferential area. In the case of Nigeria and its Regional Partners (RP), trade diversion would take place, if as a result of this agreement, more efficient suppliers of the Rest of the World (RoW) into Nigeria are replaced by less efficient Regional Partners (RP) suppliers or conversely. Trade diversion can affect both suppliers of Nigeria (for example in China, Belgium, the Netherland, the USA and Italy) and suppliers of other regional partners. The theory underlying the measurement of trade diversion in SMART is also explained in Laird and Yeats (1986). To see the derivation clearly, first the expression for the elasticity of substitution is given. The

elasticity of substitution can be expressed as the percentage change in relative shares of imports from two different sources due to a one per cent change in the relative prices of the same product from these two sources:

$$\sigma_M \frac{\left(\sum_k M_{ijk} / \sum_K M_{ijk}\right) / \left(\sum_k M_{ijk} / \sum_K M_{ijk}\right)}{d(P_{ijK}/ P_{ijK})/(P_{ijK}/ P_{ijK})} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

Where k denotes imports from member countries and K denotes imports from the rest of the World (non-member countries). Equation (9) can be expanded, and through substitutions and rearrangements be used to obtain the expression for trade diversion, which is expressed as:

$$TD_{ijk} = \frac{M_{ijk}}{\sum_k M_{ijk}} \frac{\sum_k M_{ijk} / \sum_K M_{ijk} \frac{d(P_{ijK}/ P_{ijK})}{(P_{ijK}/ P_{ijK})} \sigma_M}{\sum_k M_{ijk} + \sum_K M_{ijk} + \sum_k M_{ijk} \frac{d(P_{ijK}/ P_{ijK})}{(P_{ijK}/ P_{ijK})} \sigma_M} \ldots\ldots\ldots (10)$$

Equation (10) can be simplified to the case of an RTA. The relative price movement terms in the equation as noted in Laird and Yeats (1986) capture the movement due to changes in tariffs or the ad valorem incidence of non-tariff distortions for RP and the rest of the world. Therefore, the trade diverted to the RP in the RTA, TD can be captured by reducing equation (10) above as follows:

$$TD^{RTA} = \frac{M^{RP} M^{RoW} \left(\frac{1+ t^1_{RP}}{1+ t^0_{RP}} - 1\right) \sigma_M}{M^{RP} + M^{RoW} + M^{RP} \left(\frac{1+ t^1_{RP}}{1+ t^0_{RP}} - 1\right) \sigma_M} \ldots\ldots\ldots\ldots\ldots\ldots (11)$$

Equation (11) shows the additional RP imports. M^{RP} and M^{RoW} are the current imports into Nigeria from the RP and RoW respectively. $t^1_{RP}$and t^0_{RP} are respectively the end and initial periods import tariffs imposed on RP imports in the destination to Nigeria witht^1_{RP}<t^0_{RP}.σ_M is the elasticity of substitution between RP and RoW imports into Nigeria. Trade diversion then depends on the current level of imports from the RP and RoW, the percentage change (reduction in this case) of tariffs facing RP imports with those for RoW remaining unchanged and the elasticity of substitution of the imports from the two sources. The higher the value of the elasticity of substitution, the greater will be the trade diversion effects.

4.3 Model Calibration and Parameter Estimation

This study will employ a partial equilibrium process to examine trade creation and trade diversion effects of RTA for Nigeria, through the SMART simulation model via WITS. The SMART simulation model is one of the analytical tools in WITS used for simulation purposes. SMART contains in-built analytical modules that support trade policy analysis, covering the effects of multilateral tariff cuts, preferential trade liberalization and ad hoc tariff changes. The underlying theory behind this analytical tool is the standard partial equilibrium framework that considers dynamic effects to be constant. WITS/SMART can help estimate trade creation and trade diversion.

Simulation Scenario(s)

In the partial equilibrium approach, only one simulation scenario will be considered at a time, due to the ceteris paribus assumption upon which PEM operates - hence only one-way liberalization is possible. The results that will be discussed are possible outcomes of reducing to zero the import duties that Nigeria will impose on regional partners' goods. An important advantage of the WITS/SMART model is that it allowed the analysis to be undertaken at the 1 to 6-digit level. Trade created from the full reciprocity scenario depends on the following three key elements, the initial level of trade (imports from the Regional Partners); the initial level of protection; and the price elasticity of import demand. The higher the initial protection level, the larger the change expected from the reciprocation policy will be.

The transmission mechanism for the trade effects is simple: the elimination of existing tariffs on RP imports reduces the prices that consumers in Nigeria face compared to domestic substitutes, while the responsiveness of demand to the price change influences the amount of trade created or diverted. The substitutability of RP goods for domestic goods is implicitly assumed. The Armington assumption is that goods imported from different countries are imperfect substitutes. It is also assumed that the supply response to the price reduction will allow RP producers and exporters to meet any demand arising in the importing countries as a result of price reduction. That is, exports supplies are perfectly elastic, meaning that world supplies of each variety of the goods by origin are given.

The Data

This study will use secondary data via simulation for the period, 2016. The data include Nigeria imports of industrial, agricultural and petroleum products, from partner countries (RP) and non-partner countries (RoW), the tariff and non-tariff data. The quantitative analyses will be performed at the SITC nomenclature because it consists of products that were mostly traded between Nigeria and the rest of Africa. This was confirmed via the "Data Visualization" feature in the WITS software, where countries products for trade flows can be viewed with their respective years, values and percentage shares. SITC is a trade classification that is maintained by the United Nations (UN) and is the latest in a series of four revisions of SITC which are used primarily for the analysis of trade flows. However, the study will employ a Preferential Tariff on the RTA partners (all African countries) and maintained the MFN tariff for other trading partners of Nigeria (non-Africa trading partners).

5. Discussion of Findings

This section presents findings from the study. The SMART model simulation analyzes trade creation, trade diversion and consumer welfare effects of Regional Trade Agreements on three different products groups: Industrial Products, Petroleum Products and Agricultural Products in Nigeria.

The import data of the aforementioned products from all African countries (Regional Partners) (i.e., Nigeria's imports of the above products from RP), and imports of these products from the rest of the world (Non-RP or RoW) were used. A complete tariff elimination scenario was considered for African countries to project the effects of an RTA on Nigeria, while the tariff on the selected products for the rest of the world was left unchanged. This was done to see the level of trade that will be created for Nigeria and trade that will be diverted as a result of the RTA.

The tariff change is complete elimination of tariff (equivalently, this could also entail a linear cut of 100%) and the Swiss formula coefficient is given as 16% which is a formula designed to cut and harmonize tariff rates in international trade. It defines the maximum final tariff. A complete tariff elimination scenario was chosen as a new preferential tariff rate on RP's imports to Nigeria. Swiss Preferential Tariff (for RPs) and MFN tariff (for non-RPs) were selected because the preferential tariff (zero) conforms to the attribute of zero-tariff RTAs. RTAs are kinds of Preferential Trade Agreements that charged zero preferential tariff rates on essentially all importing products from all regional members. All parties agree to give each other the benefits of lower or zero tariffs than their MFN rate. Hence, this suits the expectation of AfCFTA in this study. However, the MFN rate is a current rate that is applied as a non-

discriminatory tariff, charged on imports of goods from WTO members. It gives no special or preferential treatment to regional trade members, even if they are members of WTO. That is, all exporters get the same treatment on tariff reduction irrespective of their relationship with the importing country.

Nigeria's Trade Creation, Trade Diversion Effects with Regional Partners

Table 1 compares the baseline with the main results (that is, the before and the after outcomes of an RTA) of Nigeria's Trade Creation from Regional Partners for the three (agriculture, industrial and petroleum) most essential sectors of the economy. It's obvious from the results that the expected trade creation (US$ 43.59 million) largely outweighs the baseline trade creation (US$ 29.45 million). That is, the expected trade creation with tariff elimination after a full RTA largely exceeds the trade creation that occurred before such an agreement. Thus, the industrial sector yielded the highest expected trade creation for the country with US$ 30.40 million or (69.73%), followed by the agricultural sector with US$ 9.93 million or (22.78%), followed by the petroleum sector with US$ 3.26 million or (7.50%) respectively. In essence, the industrial sector constitutes the bulk of the imports from the RP countries while the agricultural sector is relatively minor. Therefore, the industrial sector represents roughly 70% of the combined expected total trade creation of the three sectors. The total percentage change of the trade creations from RPs stood at 48% for the three sectors.

Table 1: Trade Creation from Regional Partners

Sectors	**Simulated Trade Creation US$, Mill. (After an RTA)**	**Baseline Trade Creation US$, Mill. (Before an RTA)**	**Difference US$, Mill.**	**Percentage Change (%)**
Agricultural Sector	9.930053 (22.78%)	8.013474 (27.20%)	1.916579	23.9
Industrial Sector	30.40018 (69.73%)	6.241869 (21.19%)	24.158311	387.1
Petroleum Sector	3.26834 (7.50%)	15.19640 (51.59%)	-11.92806	-78.5
TOTAL	**43.59857**	**29.45174**	**14.14683**	**48.0**

Note: values in parenthesis imply sectoral shares

Table 2 below compares the baseline with the main results of Nigeria's Trade Diversion from Regional Partners for the three sectors. There exists a sharp decline in the trade that will be diverted from regional partner countries to Nigeria, resulting from an RTA, from US$ 22.11 million baseline trade diversion to US$ 13.98 million expected trade diversion. That is, the expected trade diversion from RP was significantly lesser

than the baseline trade diversion before the agreement, by US$ 8.12 million as shown in Table 2. However, the industrial sector recorded the highest expected trade diversion from the country with US$ 11.24 million or (80.38%), followed by the agricultural sector with US$ 1.82 million or (13.03%), followed by the petroleum sector with US$ 0.92 million or (6.60%) respectively. The total percentage change of the trade diversion from RPs amounted to 36.8% for the three sectors.

Table 2: Trade Diversion from Regional Partners

Sectors	**Simulated Trade Diversion US$, Mill (After an RTA)**	**Baseline Trade Diversion US$, Mill. (Before an RTA)**	**Difference US$, Million**	**Percentage Change (%)**
Agricultural Sector	1.821977 (13.03%)	2.934056 (13.26%)	-1.112079	-37.9
Industrial Sector	11.24251 (80.38%)	2.408536 (10.89%)	8.833974	366.8
Petroleum Sector	0.922858 (6.60%)	16.7742 (75.83%)	-15.85134	-94.5
TOTAL	**13.98735**	**22.11679**	**-8.12955**	**-36.8**

Note: values in parenthesis imply sectoral shares

The expected total trade creation (US$ 43.59 million) is projected to outweigh the expected total trade diversion (US$ 13.98 million) for the three sectors as presented in Tables 1 and 2 respectively. Sequence to this, consumers would benefit from the implementation of an RTA. That is, individual households would benefit from lower prices and they would be in a position to increase consumption, and therefore, welfare would rise. In essence, there would be welfare improvement for Nigeria because consumers of the imports whose prices fall would enjoy more product variety at a lower cost. These findings conform to that of Othieno and Shinyekwa (2011), Guei et.al, (2017), Yego and Siahi (2018) and Russ and Swenson (2019) who found evidence of trade creation trade diversion and welfare effects as a result of tariff reduction.

Table 3 below, however, compares the main findings and baseline results of Nigeria's consumer welfare effects from Regional Partners for the three sectors. Welfare gain for Nigeria increased from US$ 3.00 million baseline welfare to US$ 4.09 million expected welfare as a result of an RTA. Again, this would be beneficial to Nigeria as the expected welfare gain from an RTA significantly exceeds the welfare effects before it by US$ 1.09 million, as shown in the table below. However, the industrial sector yielded the highest expected welfare gain for the country with US$ 3.00 million or (73.30%), followed by the agricultural sector with US$ 0.95 million or (23.27%), followed by the petroleum sector, with US$ 0.14

million or (3.43%) respectively. The total percentage change of the welfare effects from RPs stood at 36.5% for the three sectors.

Table3: Welfare effects from Regional Partners

Sectors	**Expected Welfare US$, Million (After an RTA)**	**Baseline Welfare US$, Million (Before an RTA)**	**Difference US$, Million**	**Percentage Change (%)**
Agricultural Sector	0.95331 (23.27%)	0.60918 (20.30%)	0.34413	138.8
Industrial Sector	3.002693 (73.30%)	1.25735 (41.91%)	1.745343	56.5
Petroleum Sector	0.140627 (3.43%)	1.13351 (37.78%)	-0.992883	-87.6
TOTAL	**4.09663**	**3.000043**	**1.096587**	**36.5**

Note: values in parenthesis imply sectoral shares.

The welfare gains from the labour-intensive agricultural sector which is expected to contribute more to welfare improvement than the capital-intensive industrial sector could be because Nigeria as an agrarian economy has a greater comparative advantage in agricultural produces compared to other African countries. This could result in a little import of agricultural produce from its regional partners. Hence this prompts a relatively small welfare gain compared to the industrial sector. This explained why the industrial sector contributed more to the expected welfare gain than the agricultural sector.

Table 4: Top Partner and Non-partner Countries

TOP 3 PARTNER COUNTRIES WITH THE HIGHEST TRADE CREATION EFFECTS ON NIGERIA	
Country Trade Creation US$, Million	
South Africa	37.508876
Egypt	1.791227
Kenya	0.901747
TOP 3 PARTNER COUNTRIES WITH THE HIGHEST TRADE DIVERSION EFFECTS ON NIGERIA	
Country Trade Diversion US$, Million	
South Africa	0.017437007
Egypt	0.001519422
Morocco	0.000311997
TOP 3 NON-PARTNER COUNTRIES WITH THE HIGHEST TRADE DIVERSION EFFECTS ON NIGERIA	
Country Trade Diversion US$, Million	
The United States	0.000896229
Spain	0.000225985
China	0.00021769

Table 4 above shows that South Africa recorded the highest trade creation for Nigeria with US$ 37.50 million followed by Egypt with US$ 1.79 million, followed by Kenya with US$ 1.79 million respectively, as illustrated above. Also, South Africa recorded the highest trade diversion from Nigeria with US$ 0.02 million followed by Egypt with US$ 0.002 million, followed by Morocco with US$ 0.0003 million, as shown in Table 4. Amongst the Non-Regional Partners, the USA recorded the highest trade diversion from Nigeria with US$ 0.001 million followed by Spain with US$ 0.00023 million and China with US$ 0.00022 million.

Table 5 below compares the main findings and baseline result of Nigeria's Trade Creation from non-Regional Partners, where trade creation for Nigeria reduced from US$ 2.82 million to US$ 0.02 million as a result of an RTA. That is, RTA will reduce trade creation from non-regional partners to Nigeria by US$ 2.79 million. The non-regional countries altogether however recorded a mere total of US$ 0.02 million expected trade creation. The total percentage change of the trade creation from non-RPs recorded 99.2% for the three sectors.

Table 5: Trade Creation from non-Regional Partners

Sectors	Simulated Trade Creation US$, Mill (After RTA)	Baseline Trade Creation US$, Mill. (Before RTA)	Difference US$, Mill.	Percentage Change (%)
Agric Sector	0 (0%)	2.8094 (99.50%)	-2.8094	-100
Industrial Sector	0.023928 (100%)	0.0140991 (0.49%)	0.0098289	64.3
Petroleum Sector	0 (0%)	0 (0%)	0	0
TOTAL	**0.023928**	**2.8234991**	**-2.7995711**	**-99.2**

Note: values in parenthesis imply sectoral shares.

Table 6 however, compares the main results and baseline results of Nigeria's Trade Diversion from non-Regional Partners for the three sectors. Trade diversion will increase by US$ 0.17 million, from US$ 22.53 million to US$ 22.70 million as a result of an RTA. The non-regional countries altogether however recorded a total of US$ 22.70 million expected trade diversion, where the industrial sector recorded the highest trade diversion of US$ 19.98 million or (88.02%) from Nigeria, as presented in Table 6. The total percentage change of the trade diversion from non-RPs stood at 36.7% for the three sectors.

Table 6: Trade Diversion from non-Regional Partners

Sectors	Expected Trade Diversion US$, Million (After RTA)	Baseline Trade Diversion US$, Million (Before RTA)	Difference US$, Million	Percentage Change (%)
Agriculture Sector	1.79812 (7.91%)	3.508428 (15.56%)	-1.710308	37.9
Industrial Sector	19.9868 (88.02%)	2.25199 (9.99%)	17.73481	-366.9
Petroleum Sector	0.922855 (4.06%)	16.77417 (74.43%)	-15.851315	94.5
TOTAL	**22.7078**	**22.53459**	**0.17321**	**36.7**

Note: values in parenthesis imply sectoral shares.

Robustness Checks

Changing elasticity values in SMART will have the following impact on results: Import demand elasticity proportionally affects import change. Doubling this elasticity will double the change in imports. Substitution elasticity almost proportionally affects trade diversion among exporters, almost because trade diversion reaches its ceiling with existing trade. Doubling the substitution elasticity will almost double trade diversion and vice versa. Export supply elasticity is infinite by default in SMART (using the value 99) and entails the import quantity effect only. Changing to a finite elasticity will affect results by transforming part of the trade creation (quantity effect) into a price effect. Maximum trade creation is achieved with infinite export supply elasticity. Total trade effect (creation effect + price effect) will be lower with any alternative value of export supply elasticity.

To validate our main findings, a robustness check was conducted to validate earlier findings. Therefore, the supply elasticity and the substitution elasticity were adjusted from 99% to 49.5% and from 1.5% to 0.75% respectively (half of what was applied in the main findings). Other parameters that produced the robustness result below are New Rate (new tariff rate) = 0, Swiss Coefficient = 16% system defined and Demand Elasticity (system given).

After conducting the checks, the robustness result is in line with the main (first scenario) findings above, where trade creation exceeds trade diversion. The reduction in substitution elasticity from 1.5% to 0.75% reduces non-regional partner's trade diversion to half, from US$ 22.70 million to US$ 11.19 million as expected. For regional partners, trade diversion reduces from US$ 13.98 million to US$ 9.57 million. Also, the adjustment of supply elasticity from 99% to 49.5% changes the robustness result by transforming part of the trade creation effect into price effects of US$ 1.007 million and US$ 0.226 million from regional partners and non-regional partners respectively. The adjustment also reduces the total trade effect from US$ 57.58 million to US$ 50.86 million as expected. However, evidence of welfare improvement for Nigeria was also revealed. Hence, these validate the main findings of the study. These results conform to that of Othieno and Shinyekwa (2011), Guei, et.al, (2017), Yego and Siahi (2018) and Russ and Swenson (2019) who found evidence of trade creation trade diversion and welfare effects as a result of tariff reduction.

Conclusion and Policy Implications

One of the main theoretical arguments (the Liberal) opined that RTA is beneficial and countries tend to form a preferential agreement with partners that are nearby (partners that belong to one geographical region). This was presumed to be more beneficial than agreements outside the region. Therefore, RTAs such as the AfCFTA would be beneficial for Nigeria as the trade creation effect largely outweighs the diversion effect and also, the expected welfare effect after a full RTA significantly exceeds the welfare effect before it; therefore, there is adequate room to negotiate the inclusion of agriculture and industrial produce under the AfCFTA's 7% exclusive and 3% sensitive product list. This conclusion is very similar to that of Othieno and Shinyekwa (2011), who found evidence of increased trade creation and welfare effects that reflected from consumer surplus as a result of price reduction. It is pertinent to note that under full employment, trade creation could lead to welfare improvement due to inefficient producers who are negatively affected. This could lead to job losses especially in developing countries like Nigeria. The welfare gains from lower price of imports would therefore be neutralized by lower welfare from job losses and rising

unemployment.Thus, the net effect will result in welfare loss.

The study makes a case for policies that support economic integration with other African countries such as improved trade logistics infrastructure, protocols on the free movement of persons and capital, eliminating tariff barriers and harmonizing regulatory measures would be required to maximize the gains from the RTA. Also, the government should consider providing support to export-oriented sectors especially manufacturing as part of its diversification efforts. This is particularly critical given the high inter-sectoral linkage of manufacturing with other sectors of the economy. Tariff lines of products under the industrial sector should be considered during RTA negotiations of sensitive and exclusive products. The paper concludes that RTAs such as the AfCFTA would be beneficial for Nigeria as the trade creation effect largely outweighs the diversion effect. This provides ample opportunity to negotiate the inclusion of agriculture and industrial produce under the AfCFTA's 7% exclusive and 3% sensitive product list.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Effect of Ownership Structure on Environmental Disclosure of Listed Consumer Goods Companies in Nigeria

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Abstract

The insufficiency of financial statements to meet both financial and non-financial needs of various stakeholders has created the vacuum of information asymmetry, thereby raising agency costs of connected interest groups in firms. Ownership structure, to some extent, has narrowed the gap of information asymmetry, posing a new challenge that owners might comprise their environmental disclosure responsibility.This study examines effect of ownership structure on environmental disclosureof listed consumer goods companies in Nigeria. The study measures ownership structures with institutional, managerial, foreign and ownership concentrationas independent variables, while environmental disclosure, as a dependent variable is measured with the extent of the environmental disclosures in annual reports and financial statements of listed consumer goods companies based on GRI environmental disclosure criteria. The study adopts ex post facto research design relying *on secondary collected from the population, consumer goods companies listed on the Nigerian Stock Exchange for the period 2011-2020. The study used multiple regression analysis to test the hypotheses with the aid of E-views 9.The results of the regression analysis show thatinstitutional investment has a positive and statistically significant effecton environmental disclosures. On the other hand, managerial ownership has a negative and statistically significant effecton environmental disclosures of listedconsumer goods companies in Nigeria. However, other independent variables are found to be insignificant to the extent of environmental disclosure. The study concluded that the ownershipstructure is an important corporate attribute for predicting the level of environmental disclosures of firms.Hence, it is recommended that Government and relevant regulatory agencies should consider a review of ownership structureof listed firms in Nigeriato be robustly composed to cater for diverse interests of various stakeholder groups.*

Keywords: *Environmental Disclosure, Managerial Ownership, Ownership Concentration, Institutional Ownership and Foreign Ownership, Consumer Goods Companies in Nigeria.*

1.0 Introduction

The conventional accounting practice is normatively predicated on the protection of overriding interests of the owners of business, the wealthy capital providers. The ownership mindset is clearly demonstrated in the contents of financial statements, which serves as a bastion of accountability and stewardship. However, the insufficiency of financial statements to meet both financial and non-financial needs of various stakeholders has created the vacuum of information asymmetric among the various interest groups and stakeholders with connected interests in the organization. Over the years, there has been clamouring from stakeholders for enhanced accountability and disclosures about the operations of corporate organizations.

The financial performance objective of firms with its obsessed profit maximization mantra is misleading. This is because, a business as an open system interacts with the environment from where it obtains inputs for processing into goods and services in its day-to-day operations. Therefore, the environment is positively or negatively impacted by these activities. Thus, expectations that long-term profitability should go hand-in-hand with the protectionof the environment are gaining grounds. Often, firms have been challenged to account for their activities and impacts they exert on the environment.So, profit maximization mantra is not sufficient to satisfy the needs of various stakeholders in the business world.

In that context, social and environmental disclosure has emerged as an effective tool that enables firms to communicate their environmentally friendly activities and as an important information source about the environmental impacts of firms' operations for their stakeholders (Chowdhury, Dey & Abedin, 2020). Omoye and Wilson-Oshilin (2018) opined that many stakeholders, such as customers, governments and regulatory bodies, non-governmental organizations, local communities, investors, financial agencies and institutions, employees and society alike, have paid great attention to the negative environmental impacts of firms, i.e., emissions of greenhouse gases (GHGs), ozone-depleting substances and industrial toxic waste disposals. Consequently, an increasing number of firms all over the world have started to disclose social andenvironmental information, making environmental information disclosure and protection an important dimension of good corporate governance principles and financial reporting process (Chowdhury, Dey & Abedin, 2020; Yusuf, Fodio &Nwala, 2018; Brammer &Pavelin, 2006).

Ownership structure of a company plays a pivotal role in corporate climate strategy-making and environmental-friendly decisions. While the bar can be raised very high in some instances, there is also tendency that firms might compromisesocial andenvironmental policies and disclosures to minimize the agency cost (Juhmani, 2017; Gray & Nowland, 2015). A robustlycomposed ownership structure basically consists of proper mechanisms that allow stakeholders to exercise control over management, aiming at creating an optimum balance among different economic groups for transparency (Utomo, Wahyudi&Muharam, 2017; Sharif & Rashid 2014). Ownership structure of a firm affects decision making which in turn has influence on the success of the organization.

Ownership structure involves a variety of both endogenous and exogenous corporate governance mechanisms that are put in place to mitigate this agency problem by effectively monitoring managers and consequently reducing the agency cost (Mgammal, 2017; Jizi, Salama, Dixon &Stratling, 2014). For instance, internal governance mechanism presumed that, when

the managers of a company also form part of the equity investors, it makes the managers to act in the best interest of the shareholders. While for external governance device, the existence of large shareholders is good for governance, because large shareholders play a more active role in monitoring and disciplining managers than small shareholders. In the same vein, institutional ownership is good for governance, since institutional investors have stronger incentives and more resources to discipline managers than small individual investors.

The agency problems concerning managers and investors could be lower in family firms. This is because in family firms, the family usually owns a significant portion of the firm's equity and often maintains control over the management. To Emmanuel, Uwuigbe, Teddy, Tolulope &Eyitomi (2018); Mgammal (2017); Akrout and Othman (2016),in a firm with diffuse ownership structure and low level of a managerial shareholding, the managers might try to present the operating result of the firm in the most favourable manner possible to avoid shareholder unrest, or to lessen the probability of takeover attempts. In contrast, in a firm with more concentrated ownership, the managers do not need earnings manipulation as a job-preserving strategy, because the owners possess control of the firm (Almaida, Santos, Cabral, Santos & Pessoa, 2015). Therefore, less earnings manipulation, or higher earnings quality could be expected in family-owned firms, relative to firms with diffuse ownership structure. Conferring to Utomo, Wahyudiand Muharam(2017), concentrated ownership also reduces the attention toward stock market fluctuations in the short term and lowers market pressures caused by meeting or beating analyst forecasts. As the managers' incentives to report accounting information that deviates from the underlying economic performance is reduced, financial reporting quality of firms with concentrated ownership should therefore increase (Habtoor, Hassan &Aljaaidi, 2019).

Another major corporate attribute that is widely investigated in the environmental disclosure literature is managerial ownership. In a market without agency problem, corporate managers will choose investments that maximize the wealth of shareholders as a result of ownership which favours the management (Acar, Cahyurt& Yasemin, 2020). This goal congruence issue in the pursuit of corporate objective may be played down when the ownership structure is diluted. In practice, where management and ownership separate, competing objectives incompatible with shareholders wealth maximizing paradigm may be pursued (Habtoor, Hassan&Aljaadi, 2019). In a similar vein, EY (2021), Nguyen and Nguyen (2020) and Aluwong and Fodio (2019) observed that jurisdictions have varying legal constructs governing corporate disclosures as well as legal liabilities precepts either imposed by regulators or desirable from various Exchanges' listing rules. Thus, a foreign ownership may bear positively on the environmental disclosure quality because of the high standard of environmental disclosure of the foreign investors transferred from their countries of origin either imposed by the regulators or set as a standard among their peers and competitors.

There is a plethora of studies in the sphere of ownership structure and environmental disclosures; however, findings are diverse, inconsistent and inconclusive with respect to positive, negative and significant impacts of results, thereby necessitating further investigations. The objective of this study therefore is to examine the effect of ownership structure on the environmental disclosure quality of listedconsumer goods companies in Nigeria and it hypothesized that ownership structure attributes have no significant effect on environmental

disclosure quality of listed consumer goods companies in Nigeria.

The rest of this paper is organized as follows: Section 2 reviews the literature and present theoretical frameworks underpinning the study. Section 3 discusses the research methodology. Section 4 discusses the results. Finally, conclusions and recommendations are covered in Section 5.

2.0 Literature Review

Concept of EnvironmentalDisclosure

Evidence from the review of extant literature has shown that there is a plethora of definitions and concepts of environmental disclosures. A call for companies' environmental impact assessment and disclosure has assumed enormous dimensions over the decades. This clarion call aimed at providing a sustainable environment that will be conducive to the human and corporate organizations to operate efficiently (Elshabasy, 2017; Votsi, Kallimanis&Pantis, 2017; and Trireksani&Djajadikerta (2016). Environmental Disclosure is a means through which a company reports its environmental activities to the stakeholders (Hendri & Puteri, 2015). Through environmental disclosure, firms project their corporate governance effectiveness in promoting sustainability, accountability, and transparency (Egbunike&Tarilaiye, 2017; Akrout& Othman (2016); Ajibodade&Uwuigbe, 2013).The environmental issues and their care are modern topics. This is despite the many legislations and organizations that demand and are committed to preserving the environment. However, this is not enough unless community members realize the importance of the environment and protect it. Therefore, it is incumbent on society to work and contribute to changing the environmental behavior of individuals and organizations and to raiseawareness of environmental problems (Ayasrah, 2018).

Darwish (2009) defined environmental disclosure as a set of information items related to the performance and activities of the environmental management of the company and its past, present, and future financial implications. Previous studies have also indicated an increased number of companies that disclose environmental information in their annual financial reports to achieve the desires of investors and other stakeholders. Therefore, this led to an increase in the content of the disclosure of environmental information from a paragraph in the annual report to the preparation of independent environmental reports published by companies on their websites or in printed paper. This disclosure takes many of the descriptive forms such as data, quantitative facts, figures, and notes about the financial statements.

Nabulsi (2011) pointed that the economic, social developments and the emergence of international markets have played an important role in increasing the importance of disclosure and expansion especially after the accounting information has become a major source of decisions for customers in these markets. In addition, it also helps the owners and other parties such as consumers, investors, consumer protection agencies, the environment, and public opinion in making decision. However, this is because these parties have reciprocal relations with the organization, which placed accountability on the satisfaction of the needs of these parties and to meet their requirements. Hence, this forms a basis for its decision making.

Ghuslan and Saleh (2019) stated that disclosure as a relative concept achieves many advantages for investors, creditors, project management, and other beneficiaries. It aims at rationalizing the decision-making process and benefiting from the efficient use

of resources, thus improving the welfare of the national economy in general. The facilities that perform their duty towards the environment leads to the development of the activities of these enterprises. In contrast, increase the pressure on companies that do not perform their duty towards the environment, which leads to reduce the activity and bears the burden of remedying damage caused by environmental pollution.

Institutional ownership

Institutional ownership are shares owned by other organizations or institutions such as insurance companies, banks, investment companies and other organized owners. Institutional ownership is important in monitoring management because with institutional ownership it will encourage more optimal supervision. Jensen and Meckling (1976) claimed that institutional ownership has a very significant role in minimizing agency conflicts between managers and shareholders. The existence of institutional ownership is considered capable of being an effective monitoring device in any decision taken by the manager.

Managerial Ownership

Managerial ownership signifies the interest of managers in the equity shareholding of a firm. The motive behind the rise of this corporate governance variable is rooted in the agency theory, which assumes that manager's equity holdings inspire them to act in a way that maximizes the value of the firm. Warfield, Wild and Wild (1995) suggest that the interest of both shareholders and management start to converge as the management holds a portion of the firm's equity ownership. This implies that the need for intense monitoring by the board should decrease (Jensen and Meckling, 1976).Rudiger and Rene (2007) in their study reviewed theories of the determining factor of managerial ownership and their insinuations for the relation between firm value and managerial ownership. They deliberate three notions: the agency notion, the contracting notion, and the managerial discretion notion.Agency idea predicts that low managerial ownership indicates poor alignment interest among managers and shareholders (Jensen & Meckling, 1976). The convergence assumption states that managerial ownership will be seen as monitoring device when they acquire some portion of the company equity, they will prevent manager's opportunistic behavior, and the magnitude of discretionary accruals is predicted to be negatively associated with insider ownership (Warfield, Wild & Wild (1995).

Ownership Concentration

Ownership concentration is an amount of the existence of large block holders in a firm (Thomsen &Pedersan, 2000). Usually, a stockholder who holds 5% or more of a company equity is reflected a major stockholder. The shareholding of an owner should be significant enough to provide for monitoring the action of the management. The major shareholder can be an individual, a domestic foreign corporation, an institutional investor and or the state. Large block holders have greater incentive to monitor management as the costs involved in monitoring is less than the benefits to large equity holdings in the firm. Akrout and Othman (2016) pointed out that increased ownership concentration provides large block holders with sufficient incentives to monitor managers. Demsetz and Lehn (1985) and Stiglitz (1985) found that large block holders have the incentive to bear fixed cost of collecting information and to engage in monitoring mechanisms. In contrast dispersed ownership leads to weaker management monitoring. That is in a situation where the shareholders hold lower stock in a firm the incentive to monitor management is low because the costs involved in monitoring outweigh the benefits

to be derived. Therefore, Thomsen and Pedersen (1999) as cited in Wen (2010) defined ownership concentration as the share of the largest owner and are influenced by absolute risk and monitoring costs. Composition of Ownership of a firm is one of the main dimensions of corporate governance and is widely seen to be a determining factor in ascertaining good corporate performance as well as ensuring qualitative financial reporting.

Foreign Ownership

Foreignownershipis the total number of shares of a company held by foreigners. With the continuation of economic and financial liberalization in the world, the participation by foreign investors in the local market has increased over the years, as discussed and shown in a large amount of literature. Many countries open their capital markets and allow foreign investors to participate for some purposes such as to increase the supply of capital, reduce the cost of capital and finance economic growth (Bekaert & Harvey, 2000; Bekaert & Harvey, 2001; Ramaswamy & Li, 2001), and thus also, ensure liquidity and efficiency of these markets (Bekaert & Harvey, 2000). In addition, Stulz (1999) and Doidge, Karolyi, and Stulz (2004) provide evidence that foreign investors play a potential monitoring role and provide emerging market firms with the tools and incentives to improve corporate governance.

Empirical Review

Yusuf, Fodio and Nwala (2018) examined the effect of voluntary disclosure of listed financial firms in Nigeria between 2008 and 2017, relying on secondary data obtained from Nigerian Stock Exchange. The study found that block ownership has a positive and significant effect on voluntary disclosures, whereas institutional and managerial disclosures have insignificant effect on voluntary disclosures. The study presented a new insight into the emerging issues of voluntary disclosures. However, the study was conducted in 2017, an update will provide the current perspectives since 2017 when the study was conducted.

Ali and Isa (2018) investigated the impact of ownership structure attributes on corporate social responsibility disclosures, based on exploratory review of literature in Nigeria. The study found that managerial ownership, institutional ownership and blocking holding have influence on firms' corporate social responsibility (CSR) disclosure. The study is rich in corporate attributes variables, the study revealed inconsistent results of both positive and negative impact, necessitating a need for further studies to validate the study in a greater depth.

Malik, Ahsan, and Khan (2017) studied the impact of ownership structure on corporate social responsibility in the companies listed in Pakistan Stock Exchange for a period of 10 years from 2005 – 2014. The study consisted of a population of 100 companies out of which a population sample of 71 companies were selected. Panel data was collected and result of Hausman testconducted, favoured fixed effect model. The study found that all ownership variables, except for government ownership have significant relationship with CSR. It was found that institutional individuals and foreign ownership have positive impact on CSR, whereas managerial ownership has a negative impact on CSR. The study's data was collated in 2014. An update will reveal the recent development in this area.

Mgammal (2017) investigated the effect of ownership structure on voluntary disclosure of non-financial firms listed in Saudi Arabia for the year 2009, utilising multiple regression model. The population of the study consists of 89 companies listed on the Saudi Stock exchange as at 2009. Relying on secondary data, the study collected data from

annual reports of the sampled companies. The study proxied ownership structure with managerial ownership, government ownership, and family ownership) on voluntary disclosure. The study found that all the independent variables have a positive effect on voluntary disclosure. However, the study was limited to 2009 when the data was collected. This study therefore presents a more current information in terms data and country validation as this study is carried out in Nigeria.

Angelstig and Gustavsson (2016) studied the impact of ownership structure on the sustainability reporting assurance practices in Sweden, using logistic regression with a sample of listed firms in NASDAQ Stockholm in the financial year of 2013. The study sought to determine factors that influence the choice of sustainability reporting assurance and the study revealed that a positive relationship between the sustainability reporting and ownership structure. This indicated that a higher level of institutional ownership increases the propensity of environmental and sustainability disclosure level of firms. The study used several firms listed on NASDAQ, however, the study covered only a period of one year. This period is considered too short to study the longitudinal effect of the relationship between the variables.

Haladu and Salim (2016) examined the relationship that subsisted between environmental information disclosure and ownership structure of firms listed on the Nigerian Stock Exchange using the GRI G4 latest version of methodology. The study found that a significant relationship exists between environmental information disclosures and ownership structure. The study population cut across various industries listed on the Nigerian Stock Exchange from Agriculture, Construction/Real Estates, Healthcare, Industrial Goods, Natural Sciences and Oil and Gas. The result of the findings of the study, however, are inconsistent as some ownership structure variables are positively significant, while others have inverse correlation to sustainability reporting and disclosure.

Theoretical Framework

Agency Theory

Agency theory connection is defined as a contract under which one or more persons (the principal) engage another person (the agent) to perform some service on their behalf that involves delegating some decision-making authority. As propounded by Jensen and Meckling (1976), the theory essentially describes the relationship between two parties: owner as a principal and management as an agent. The theory states that the separation of ownership from control of the modern-day business has turned the relationship between the owners (shareholders) and controllers (managers) to that of an agent and a principal. As such the managers are supposed to treat this fiduciary link with ultimate sense of transparency and accountability. However, in practice, the existence of information asymmetry that gives the managers a privilege information may lead to the breach of the agency arrangement as the managers are tempted to use their positions for self enhancement, hence the agency problem. Similarly, Fama and Jensen (1983) advocate that agency problems that arise from the separation of ownership and control could be reduced if the residual claimants (shareholders) and the decision agents (managers) in a firm are the same. This is because, the interests of shareholders and managers are closely aligned.

Legitimacy Theory

Legitimacy theory is derived from the concept of organizational legitimacy. The theory was propounded by Dowling and

Pfeffer in 1975. It grants an organization the right to carry out its operations in an agreement with society's interests. Hence organizations seek to operate within the norms and aspirations of their respective communities. When there is a disparity between two value systems, there is a threat to the company's legitimacy. The argument surrounding legitimacy theory is that companies can only survive if they are operating within the framework of the society's norms and values. Greiling and Grüb (2014) stress that an organization must be accountable for its actions. Legitimacy theory is perceived as a possible reason for the recent rapid increase in environmental disclosure as corporate entities strive to be greenish in their operations (Braam,Hauck&Huijbregts, 2016; Prasad, Mishra &Kalro, 2016; Almaida, Santos, Cabral, Santos & Pessoa, 2015). Corporate disclosures represent a response to environmental pressures and the urge to legitimate their existence and actions. Companies disclose social and environmental information voluntarily to maintain their legitimacy. They aim to obtain the impression of the society that they are socially responsible. This reality of this perception lies in the strict adherence to the rule of law, and investors and citizen's right to a healthy environment enshrined in the Constitution.

Stakeholder Theory

Stakeholder theory is also considered as an explainable theory for corporate environmental accounting (Deegan & Blomquist, 2006; Depoers, Jeanjean& Jérôme, 2016).Propounded by Edward Freema in 1984, stakeholder theory involves the recognition and identification of the relationship existing between the company's behaviours and its impact on its stakeholders. The stakeholder theory perspective takes cognizance of the environment of the firm, including customers, suppliers, employees, and other segments of the society. As a result of this relationship, the company requires support from the stakeholders to survive. The connection must be managed if the company considers the stakeholders important. One of the ways of maintaining that relationship is by providing information through voluntary social and environmental disclosures to gain support and approval of these stakeholders. These stakeholders of the enterprise and lobbying decisions of these individuals are determined by the stakeholders who possess power, urgency, and legitimacy (Ahmad, 2015).

The two theories described above are related and relevant theories to this research work (i.e. legitimacy and stakeholders' theories). While the investors and shareholders have every right and legitimacy to profit for risks taken by putting together other factors of production such as Land, Capital and Money in line with Legitimacy theory, however, this should be realized without usurping the rights of other stakeholders. Stakeholders' theory recognizes the individual rights of all stakeholders in the community and that each and every one can benefit without hurting one another. This study therefore anchors on the legitimacy and stakeholders' theories.

3.0 Methodology

The study adopts a descriptive ex-post facto regression design relying on secondary data obtained from the population of the study. The population of this study comprises all the 21consumer goods companieslisted on the Nigerian Stock Exchange as at 2019, using stratified and purposive sampling techniques based on the population'sindustries. However, through filtering process of data availability and ease of results comparability from the population, 16 of the companies were taken as sample size.The data was collected from the annual reports and financial statements of the sampled

companies for a period of ten (10) years (2011 to 2020).

The study employs multiple regression technique as the technique of analysis with aid of E-views statistical tool for analysis. The data for the study is panel in nature and to check for endogeneity, the study used the Hausman specification test. Additional diagnostics tests adopted in this study includes the test for Multicollinearity using the Tolerance and Variance Inflation Factor (VIF), and the Breusch-Pagan test for heteroscedasticityto check for the fitness of model and reliability of findings.

The regression model used for this study is presented in the equation below:

ED (OC, MO, IO, FO) ……..….(1)

This equation can be rewritten econometrically as;

$ED_{it} = b_o + \beta_1 OC_{it} + \beta_2 IOit + \beta_3 MO_{it} + \beta_4 FO_{it} \varepsilon_{it}$…….…… (2)

Where:

ED= Environmental Disclosure, MO= Managerial Ownership, OC= Ownership Concentration, IO= Institutional Ownership, FO= Foreign Ownership, b0 = intercept (constant), i= cross-sectional time, t=time series, ε = Error term

Measurement of Variables

Environmental Disclosure: The extent of environmental disclosure based on Global Reporting Initiative (GRI) G4 environmental disclosure criteria. 1 = Companies that disclose environmental information in their annualreport; otherwisefor non-disclosure,=0.

Managerial Ownership: The percentage of shareholding of directors and their immediate families in an accounting year

Ownership Concentration: The percentage of largest shareholding from individual shareholders

Institutional Ownership: Proportion of shareholding by institutional investors in the company

Foreign Ownership: The percentage of shareholding from foreign investors in the company

4.0 Result and Discussions

This section presented the data and discussed the results of the analyses and interpretations. The descriptive statistics and other univariate test results are first presented and interpreted. Thereafter, the results of the panel data were analyzed, as well as those of correlation matrices and diagnostic tests were presented and interpreted as well. Inferences derivable from these results, as reflected in the reviewed literature, were discussed after the tests of the hypotheses earlier formulated by the study.

Descriptive Statistics

This section contained the description of the properties of the variables ranging from the mean of each variable, minimum, maximum and standard deviation. The summary of the descriptive statistics of the variables were presented in table 2 below.

Table 1: Descriptive Statistics

	ED	OC	IO	MO	FO
Mean	0.374326	0.595829	0.192749	0.081837	0.276664
Maximum	1	0.861000	0.701000	0.385000	0.933318
Minimum	0	0.110000	0.092000	0.001000	0.000000
Std. Dev.	0.523270	0.187974	0.081108	0.082963	0.324653
Observations	160	160	160	160	160

Source:E-viewsoutput,2021.

The descriptive statistics in Table 4.1 indicates that the measure of extent of environmental and social disclosure quality of consumer goods firms has an average value of 0.374326 with standard deviation of 0.523270, a minimum and maximum values of 0 and 1 respectively. This indicates that the deviation between companies is very large hence, there are differences in the disclosure levels of sampled consumer goods companies. The table one shows that ownership concentration (OC) has a mean value of 0.595829 and a corresponding standard deviation of 0.187974. This shows that 59% of the firms under study have concentrated ownership. However, the value of the standard deviation which is far from the means is an indication disagreement with this outcome. It shows that that data is not clustered around the mean. The Table also indicates that the sampled firms have an average institutional ownership (IO) of 0.192749 with standard deviation of 0.081108 respectively. This means that on average 19% of companies have institutional shareholders. The figure of the standard deviation shows that there is a high level of agreement in the outcome. The minimum and the maximum as shown by the table is 0.092000 and 0.701000. This implies that the minimum is 9% while the maximum is 70% respectively.

The descriptive statistics from Table 4.1 also indicates that the mean of managerial ownership (MO) is 0.081837 which signifies that on the average it can be said that approximately 8% of the firms have managerial shareholders. The managerial shareholding shows a minimum and maximum of 0.001000 and 0.385000 respectively. The descriptive statistics in Table 4.1 shows that on average, foreign ownership among the sampled firms during the period of the study stood at 27%, from the mean value of 0.276664 with standard deviation of0.324653. This shows that on average 32% of consumer goods companies have foreign owners. The value of the standard deviation which is closer to mean serves as a confirmation to the reliability of this outcome. The value for minimum and maximum is 0.000000 and 0.933318 respectively.

Correlation Matrix

A correlation matrix is a table showing correlation coefficients between variables. Each cell in the table shows the level of association between two variables.

Table 2: Correlation Matrix

	ED	OC	IO	MO	FO
ED	1.000000				
OC	0.016136	1.000000			
IO	0.205961	0.083083	1.000000		
MO	0.007450	-0.214542	0.500285	1.000000	
FO	0.010557	0.012671	0.201457	0.024121	1.000000

Source: E-views output, 2021.

Table 2 shows the correlation between the dependent variable, environmental disclosure quality and the independent variables, ownership concentration, institutional ownership, managerial ownership and foreign ownership. Generally, high correlation is expected between dependent and independent variables while low correlation is expected among independent variables. According to Gujarati (2004), a correlation coefficient between two independent variables 0.80 is considered excessive and thus certain measures are required to correct that anomaly in the data. From Table 2, it is observed that the variables correlate fairly well below 0.80 (between -0.21 and 0.50).

Regression Diagnostics Tests

The following regression diagnostic tests were carried out to find out whether data used for analysis were reliable.

Test for Multicollinearity

Non-existence of Multicollinearity is a key assumption of linear regression analysis. Multicollinearity occurs when the explanatory variables are not independent of each other. Multicollinearity is examined using tolerance and variance inflation factor (VIF) values. The result of Multicollinearity test is shown in the table below.

Table 3: Tolerance and VIF Values

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
OC	29.62052	12.33218	1.109960
IO	216.1512	10.07814	1.508033
MO	1.002247	1.518592	1.485650
FO	4.038261	1.474212	1.065613
C	24.95941	26.63654	NA

E-views output, 2021.

Based on the evidence presented in Table 3, it can be concluded that there is no Multicollinearity problem. This is because the VIF values for all the variables are less than 10 and the tolerance values for all the variables are greater than 0.10 (rule of thumb) (Gujirati, 2004).

Test for Heteroscedasticity

Heteroscedasticity arises when the error terms along the regression are not equal. Heteroscedatiscity was tested using Breusch Pagan's Test. Based on the results, it can be concluded that there is no problem of heteroscedasticity as the chi square is 12.67, with a corresponding probability of 0.14584 which is insignificant, implying absence of heteroscedasticity.

Hausman Speciation Test

In panel data analysis (the analysis of data over time), the Hausman Test can help to choose which between fixed effects model or a random effects model is appropriate for interpretation.

Table 4: Hausman Speciation Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	18.087970	6	0.0060

The Hausman Speciation Test is conducted to choose between the fixed and random effect model. The result of the Hausman Test revealed that the value of chi2 is 18.087970 and the prob>chi 0.0060. The significant value as reported by the probability of chi2 indicates that the Hausman Test is in favour of fixed effect model.

Table 5: Fixed Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OC	2.414808	10.30303	0.234378	0.8150
IO	90.96059	24.61331	3.695585	0.0003
MO	-3.135503	1.242641	-2.523257	0.0128
FO	-2.538845	2.670799	-0.950594	0.3435
C	10.25912	9.909722	1.035259	0.3024

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.294015	Mean dependent var	1.011000
Adjusted R-squared	0.186583	S.D. dependent var	12.55642
S.E. of regression	11.32459	Akaike info criterion	7.818910
Sum squared resid	17698.00	Schwarz criterion	8.241747
Log likelihood	-603.5128	Hannan-Quinn criter.	7.990609
F-statistic	2.736744	Durbin-Watson stat	1.329376
Prob(F-statistic)	0.000247		

Source: Eviews Output, 2021.

The R-square value shows the level at which the explanatory variables explain the dependent variable. Table5 reveals that the R-square is 0.294015. This means that the ownership structure variables in the study explains environmental disclosure quality to the tune of 29%. The value of F - statistic is 2.736744 with probability of chi2 = 0.000247. The probability of chi2 is significant at 5%, indicating that the model is fit. This serves as substantial evidence to conclude that the ownership structure variables selected are suitable for the study.

Based on the explanatory variables, the result indicates that ownership concentration has a coefficient of 2.414808, a t-value of 0.234378 and a p-value of 0.8150. This suggests that ownership concentration has a positive coefficient with environmental disclosure of consumer goods firms in Nigeria. However, the p-value shows that this is insignificant at 5% level of confidence implying that ownership concentration cannot be used to predict the environmental disclosure.

The regression result shows that institutional ownership has a t-value of 3.695585, a coefficient of 90.96059 and a p-value of 0.0003 which is significant at 5%. This means that institutional ownership has a significant positive relationship with environmental disclosure of listed consumer goods firms in Nigeria. The 5% significance level reveals that institutional ownership promotes and supports firms' propensity for environmental disclosure in the consumer goods firms in Nigeria. The finding above agrees with Ali and Isa (2018), Malik, Ahsan, and Khan (2017); Mgammal (2017) andAngelstig and Gustavsson (2016).

Furthermore, the regression result shows that managerial ownership has a significant negative effect on the share price volatility of listed consumer goods firms in Nigeria, from the coefficient of -3.135503 and a p-value of 0.0128 which is statistically significant at 5% level of confidence. The result statistically shows that managerial ownership is necessary factor in improving the quality of environmental disclosure of listed consumer goods firms in Nigeria. This is because from the finding, it has preponderance of compromising the environmental disclosure required of firms due to agency problem as encapsulated in Jensen and Meckling (1976).

Finally, the result shows contrary to expectation that foreign ownership has an insignificant negative effect on environmental disclosure of sampled consumer goods firms in Nigeria, from the coefficient of -2.538845 and a p-value of 0.3435 which is statistically insignificant at 5% level of significance. This result suggests that the presence of foreign ownership insignificantly decreases environmental disclosure in the area covered by the study.

5.0 Conclusion

This study examined the effect of ownership structure on the extent of environmental disclosure of consumer goods companies listed on the Nigerian Stock Exchange from 2010 to 2019. The dependent variable of the study, the extent of environmental disclosure, is measured by the 1 = Companies that disclose environmental information in their annual report 0 = Otherwise. On the other hand, in the light of previous literature, four ownership structure dimensions were considered as independent variables that may have a relationship with the extent of environmental reporting of companies, namely, ownership concentration, managerial ownership, institutional ownership and foreign ownership.

The findings of the study revealed that for ownership structures considered in the study, institutional ownership and managerial ownership have a statistically significant effect on the extent of environmental disclosure, hence it is concluded that this structure have strong explanatory power on the extent of environmental disclosure.

On the other hand, the result provided statistical evidence ownership concentration and foreign ownership have no significant effect on environmental disclosure of listed consumer goods companies in Nigeria. The study, therefore, concluded that ownership concentration and foreign ownership are necessary factors to be considered in predicting the level of environmental disclosure of consumer goods companies in Nigeria.

Recommendations

The following recommendations were forwarded:

It is recommended that Government and relevant regulatory agencies should consider review of ownership structure of listed firms in Nigeria to be robustly composed to cater for diverse interests of various stakeholder groups.

It is also recommended that the Nigerian companies should consider encouraging higher level of institutional shareholding, since they have the resources to influence management towards improving corporate disclosure and consequently reducing information asymmetry, which not only clarifies the conflicts of interests between shareholders and management but also makes management more accountable.

Also, companies should particularly allot a portion of their shareholding to management since they are at the fore front of encouraging companies to key into the sustainability reporting framework in order to meet expectations of the various stakeholders on their demand for voluntary information disclosure and bridge the gap in information asymmetries.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Energy Pricing and Regulation: Implications of Oil Pricing On Demand and National Output

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Abstract

This study examines the effect of gas pricing and gas demand on National output (GDP). The interactions among gas demand, gas price and GDP were investigated using the structural vector auto-regressive (SVAR) model. Time series monthly data were collected from 1996 -2019 on gas demand, gas supply, gas retail price, petrol retail price and GDP. The result indicated that gas price has a significant impact on gas demand and gas demand also determines gas pricing; gas demand has a significant impact on GDP. Furthermore the impulse response and variance decomposition all showed that gas demand contributed most to the variations and shocks in GDP compared to the other variables under study. Also petroleum retail price significantly affect Gas Demand positively, indicating that the higher the price of petrol the higher the gas demand as consumers will substitute gas for petroleum product. Finally, the causality testindicated bi-directional causality between GDP and Gas demand, bi-directional causality between gas price and gas demand and unidirectional causality from gas price to GDP

1.0 Introduction

The Gas sub-sector is recognised as a key sector capable of transforming the Nigerian economy through vital sub-sectors, such as electricity, petro-chemicals, cement, iron and residential. The sub-sector, therefore, had attracted special attention from Government in Nigeria. Among the efforts is the Gas Master Plan, aimed at providing a framework that would ensure the realisation of maximum value from the country's gas resources. It is intended to leverage on the multiplier effect of gas in the domestic economy and optimise the nation's share of the high value export market. Specifically, the Plan was targeted at addressing impediments to the development of the domestic gas sector, engender the monetisation of gas, reduce gas flaring and guarantee long-term gas security for Nigeria (Adeniji 2016). The plan is also expected to facilitate timely and cost-effective gas production to meet global and domestic demands. The plan was hinged on three critical elements, namely Gas pricing policy (the policy); domestic gas supply regulations (the regulation); and gas infrastructure blueprint (the blueprint). Other efforts include: the Gas-to-Power; Gas Processing Facility; the Nigeria LNG Company Limited; and the Nigeria Gas Company. The gas sub-sector is an area where government effort has produced significant results. Earnings from gas exports stood at US$ 9.6 billion in the last 10 years, while

domestic supply increased by about 1,827.0 percent in the same period (CBN, 2015) .

Nigeria ranked 8th in the world in terms of proven reserves of Oil and Gas; it is the largest in Africa. This huge gas reserve has remained largely untapped since the ascendancy of crude oil as the nation's major cash earner. In fact, petroleum experts regard Nigeria "as a gas province with little oil". In Nigeria, natural gas is obtainable in two main forms, which are associated natural gas (AG) and non-associated natural gas (Non-AG). However, many of the gas fields discovered (or non-associated gas) was incidentally discovered in the course of searching for oil. Several of such fields remained largely unapprised or abandoned. Nigeria's proven natural gas reserve was estimated at 184 trillion cubic feet (TCF) in 2008 of which 209 billion cubic feet is produced annually (CBN, 2015). Out of this figure produced annually 44.82% are presently fared. This level of gas still flared is capable of generating 69GW of electricity and translating to a lost in economic value of $5 billion dollars annually (CBN, 2015). As at June 2020, proven natural gas reserve is estimated at 203.16 tcf (DPR). The onshore activities centred mainly in the Niger Delta area where massive wealth is being generated for the nation. Unfortunately, the oil industry has created serious health and environmental pollution problems for the host communities largely through gas flaring and oil spillage. The environmental impacts of these activities have been of concern to government regulatory agencies, oil companies' operators as well as the host communities. No wonder why gas flaring has reduced from 46.21 % of total gas produced in 2003 to 24.30% in 2014 (CBN, 2015). Yet, concerned parties have not shown adequate commitments and sincerity towards having robust environmental restoration and preservation. Various control programs and policies that are articulated by government for the mitigation of the environmental hazards have not been sincerely implemented. Violent protests by communities are the most eloquent testimonies of the resistance to the general pollution of the environment due to the activities of the oil companies. The government's amnesty and post-amnesty programs since 2010 have to some extent helped to bring peace to the area.

The major objective of this study is to examinethe interactions between gas pricing, gas demand and national output in Nigeria. In order to achieve this, time series quarterly data will be used to examine if there is a link between gas price, gas demand and national outputin Nigeria.

1.1 The Nigerian Gas Industry

The strategies of many countries are often woven around, and influenced by available resources such as mineral deposits, oil and natural gas. In view of this, one can say that the presence of natural resources plays an important role in national development strategy. This notwithstanding, the existence of natural resources does not always translate to development; situations that had led to the resource curse problem might have influenced certain views. In spite of these observations, in Nigeria for instance, there seems to be a determination to correct the perceived imbalances in the management of the oil and gas sector. For example, rather than allow the flaring of associated gas, the Nigerian National Petroleum Corporation (NNPC)

hopes to transform Nigeria into a leading Liquefied Natural Gas (LNG) producing and utilization nation by commercializing Nigeria's abundant gas reserves and promoting a viable LNG industry. Nigeria intention to reduce flared gas from the current 7% to 2% by 2017 corroborates this desire (Adeniji and Sipasi, 2016). This is a laudable vision as better exploitation of natural gas resources, especially those underutilized in West Africa is seen as a significant way to satisfy the world's increasing natural gas demand, which has been projected to grow by 1.9% annually, estimated to reach 4700 billion cubic metres (bcm) in 2030, and to account for 24.4% of expected energy consumption (Adeniji and Sipasi, 2016). However, this vision can only be realized if established management principles and procedures are adopted. First, those assets and capabilities that could enhance the efficiency and effectiveness of adopted development strategies need to be identified.

As at 2001, the gas sector was largely undeveloped and most of the gas produced wereflared. Issues such as third party access to sector infrastructure, pipeline ownership, tariff structure, gas transportation code were either largely absent or not treated in the legal framework which was largely written for oil, and did not sufficiently address gas as a hydrocarbon (Udoh, 2009). Gas supply was controlled by the national oil company, the Nigerian National Petroleum Corporation (NNPC), in partnership with a number of international oil companies. Gas transmission and distribution was also controlled by NNPC through its subsidiary, the Nigerian Gas Company. The regulator, the Department of Petroleum Resources, was ineffectual in the regulation of the sector and effectively ceded policy making to the NNPC. Some gas - based industries such as the steel complex and an aluminium smelter plant had become comatose, and wholesale gas offtake was limited to a few government–owned power plants. Gas pricing was regulated and considered uneconomic by producers, whilst the main off-takers frequently default on payments for gas supplied. The two gas networks, located in the western and eastern parts of the country, were limited in coverage and unconnected to each other and often had operational issues due to gas quality, maintenance and pipeline sabotage. Fiscal incentives introduced by government in fact stimulated some export projects, mainly for liquefied natural gas (LNG) or natural gas liquids (NGLs). However, the incentives effectively subsidized these projects from government's share of oil taxation and resulted in significant losses in government's share of economic rent from project revenues.

1.3 Natural Gas Demand in Nigeria

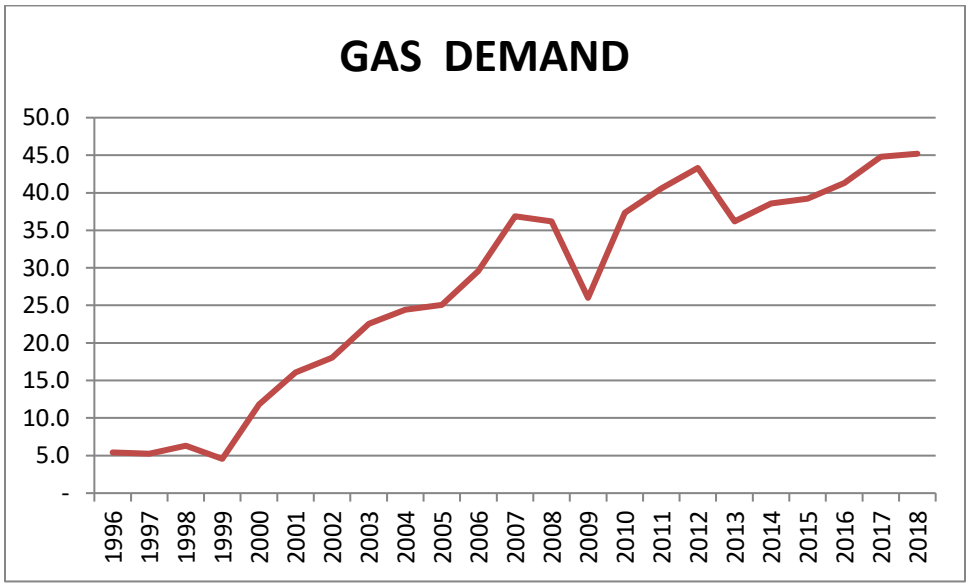
The global demand for natural gas was noted to have grown from 450.0 Mscf to 1,827.0 Mscf in the period 2000 - 2010 (IEA, 2013). The growth was projected to expand to 40 Bcf/d by end- 2018 and over 50 Bcf/d by 2025. The significant expansion in the projected global demand for natural gas was attributed to the growing desire in many countries to adopt cleaner energy.

Analysis of Energy Market Conditions in Nigeria shows that the rising demand for natural gasis propelled by the quest for reducing the impact of rising oil-based energy costs. The preference for natural gas as a source of energy is basically on account of its

low carbon emissions, which is 43.0 per cent less than coal and 30.0 per cent lower than oil per every unit of energy supplied. The emerging economies of Asia, particularly China and India, including the Middle East and the South America, are ranked among the fastest growing gas markets in the world. The growing desire for gas in the international market is also driven by its cost-effectiveness among clean energy sources.

Gas demand in Nigeria hascontinued to increase over the years. Gas demand has notably increased between 2013 and 2018in Nigeria. Certain factor such as the increase in the price of other local energy resources like kerosene and petrol and the imposition of electricity tariff are responsible for the increase in gas demand in Nigeria. Figure 1 shows the trend in gas demand in Nigeria from 2013 to 2018, indicating rapid increment over the last Nine years (2013-2018).

Figure 1: Gas Demand in Nigeria



Source: International Energy Agency (IEA) 2018. http://www.bp.com/statisticalreview

2.0 Empirical Review and Theoretical Considerations

Literature on the interaction of natural gas and economic growth is very sparse compared with literature regarding coal. Energy-growth nexus or natural gas-growth nexus can be described by the following four hypotheses: growth hypothesis, conservation hypothesis, feedback hypothesis, and neutrality hypothesis. According to the growth hypothesis energy/gas use is critical for economic growth. So a reduction in energy/gas use lowers GDP implying that the economy is energy/gas dependent. The conservation hypothesis positsthe existence of a unidirectional causality from economic growth to energy/gas use. Therefore, economic growth may not be much affected by any policy to reduce energy/gas consumption. The feedback hypothesis assumes the existence of a bidirectional causality implying that energy/gas consumption and economic

growth affect each other. Neutrality hypothesis states that lower energy/gas consumption does not affect economic growth, and vice versa.

Some empirical studies have been carried out linking natural gas resource and economic growth in gas producing nations. Soheila and Nikos (2014) used ARDL to examine the short-run and long-run relationship between Natural Gas consumption and economic Growth in Iran. They concluded that there exist a long run equilibrium relationship between Gas and Growth. Other studies such as Mohammed et al. (2012) also discovered that natural gas is an engine of economic growth with evidence from Pakistan economy. However, limited studies have been conducted in sub-Saharan Region as regards the linkage between Natural Gas and economic growth.

Yu and Choi (2012) found neutral effect between natural gas consumption and economic growth in case of USA and Poland, but one-way relationship from economic growth to natural gas consumption for UK which flows from Natural Gas to economic growth. Applying Sims and Granger causality technique on UK time series data for the post-war period1980 to2006, they find evidence of unidirectional causality running from natural gas consumption to economic growth.

Yang (2013) utilizing a time series data from 1980-2007 for Taiwan, found a one-way Granger causality from natural gas consumption to economic growth, but no cointegration between the two variables.

Aqeel and Butt (2011) studied causal relationships between real GDP and natural gas consumption for Pakistan. The first study used data from 1955 to 1996, and the second study used data from 1970 to 2009. They found absence of cointegration and causality between natural gas consumption and economic growth in Pakistan over the period investigated.

Fatai et al. (2009) used data from 1960 to1999 and employed ARDL, Johnson's Maximum Likelihood (JML) and Toda and Yamamoto causality test methods, and reported no cointegration between natural gas consumption and economic growth for New Zealand but found cointegration for Australia while neutral effect is validated between both variables.

Lee and Chang (2015) explored the importance of structural breaks using data of 1965 - 2012 in case of Taiwan including adopting export promotion and financial liberalization policies and found that Taiwan natural gas consumption Granger causes economic growth. This implies that a decrease in the volume of natural gas consumption will slow economic growth in case of Taiwan. However, with conventional vector error correction model, the study does not find long-run equilibrium.

Zamani (2007) used the vector error correction model for empirical purpose in case of Iranian economy over the period of 1967-2003. The author found the bidirectional causal relationship between natural gas consumption and economic growth in long run, but a unidirectional causality running from agricultural value added to gas consumption and a unidirectional causality from gas consumption to industrial value added. Therefore, it can be argued that the conversation of natural gas may have no effect

on the agricultural output but detrimental effect on the industrial output in Iran.

Sari et al. (2010) identified cointegration relationship between natural gas consumption and economic growth, taking monthly data for the period of 2001:1-2005, they applied the ARDL bounds testing approach which can detect cointegration even for small samples. Their findings reveal no significant impact of industrial production on natural gas consumption in the long run.

Reynolds and Kolodziej (2013) conducted a study on the former Soviet Union to explore cointegration, and use Engle and Granger causality test. They found no causal relationship between natural gas consumption and economic growth mainly because Soviet Union has stable level of natural gas consumption due to low variable costs of production.

Lean and Smyth (2010) correctly identified some problems of using the bivariate framework in analyzing the relationship between energy and GDP. They argued that energy is not the only input to spur aggregate output. Actual output growth depends on the combination of inputs used, and the degree to which energy, capital and labour act as complements.

In addition, Nondo and Kahsai (2009), and Chien(2007) applied the techniques of panel unit root tests, panel cointegration, panel error correction and dynamic panel GMM causality test to estimate the causal relationship between Gas usage and total factor productivity for 19 COMESA countries for the period 1980-2005. Their analyses revealed that causation ran from energy usage to total factor productivity for low income COMESA countries.

Pradhan (2010) applying intertemporal growth model using the Computable General Equilibrium (CGE) and data from China found that total factor productivity is dependent on energy usage with infrastructure and transport as additional variables which also reports the importance of energy in the production function.

Employing different methodology and different time period for China, Shunyun and Donghua (2011) examined the causality between Gas and fuel usage and productivity for the period 1985-2007 within a multivariate framework by applying fully modified OLS (FMOLS), the results indicated the presence of bidirectional relationship and productivity which contradicted the findings of Pradhan (2010).

From the literature reviewed, most of the studies on the response of economic growth to Natural gas use have been conducted on developed countries, and majority of the study used time series analysis in terms of ARDL models, VAR, ECM and time series simulation for their empirical analysis as such these studies did not consider the role of Gas, Gas pricing and its effect on key macroeconomic variables and the entire economic system. Very few study used the general equilibrium framework to model Gas in relation to the economic system but studies on Nigeria Gas industry is limited as such there is a need to examine the gas policies, pricing, gas demand and its effect on the economic system in Nigeria so as to determine the extent to which productivity in Nigeria is driven by gas use.

Theoretical Considerations

Reproducibility is a key concept in the economics of production. Some inputs to production are non-reproducible, whereas others can be manufactured at a cost within the economic production space. Primary factors of production are inputs that exist at the beginning of the period under consideration and are not directly used up in production (though they can be degraded and can be added to), whereas intermediate inputs are created during the production period under consideration and are used up entirely in production. Mainstream economists usually think of capital, labour, and land as the primary factors of production, and goods such fuels and materials as the intermediate inputs. The prices paid for all the different inputs are seen as eventually being payments to the owners of the primary inputs for the services provided directly or embodied in the produced intermediate inputs. In the theory of growth, this approach has led to a focus on the primary inputs, in particular on capital and land, and a much lesser and somewhat indirect treatment of the role of energy in the growth process. The primary energy inputs are stock resources such as Natural Gas and oil deposits. But these are not given an explicit role in the standard growth theories, which focus on labour and capital. However, capital, labour, and, in the longer term, even natural resources are reproducible factors of production, whereas energy is a non-reproducible factor of production, although, of course, energy vectors (Gas and fuels) are reproducible factors. Therefore natural scientists and some ecological economists have placed a very heavy emphasis on the role of energy and its availability in the economic production and growth processes. The first law of thermodynamics (the conservation law) implies the mass-balance principle. In order to obtain a given material output, greater or equal quantities of matter must enter the production process as inputs, with the residual as a pollutant or waste product. Therefore, there are minimum material input requirements for any production process producing material outputs. The second law of thermodynamics (the efficiency law) implies that a minimum quantity of energy is required to carry out the transformation of matter. All production involves the transformation or movement of matter in some way, and all such transformations require energy. Therefore, there must be limits to the substitution of other factors of production for energy. Energy is also an essential factor of production. Though all economic processes required energy, some service activities may not require the direct processing of materials. However, this is only true at the micro level. At the macro level (economy-wide level), all economic processes require the indirect use of materials, either in the maintenance of labour or in the production of capital goods. Some aspects of organized matter—that is, information— might also be considered to be non-reproducible inputs. Several analysts argued that information is a fundamentally non reproducible factor of production in the same way as energy.

3.0 Methodology

This research will use the Structural Vector Autoregressive (S-VAR) model to estimate the interaction between Gas price, Gas Demand and GDP in Nigeria. Structural Vector Autoregressive is chosen because it is not athereotic like the unstructured

(traditional) VAR. it is an extension of the traditional (unstructured) VAR analysis that attempts to identify the atheoretic restriction used in traditional VAR (McCoy, 1997). Its major strength lies in its ability to capture the feedback, shock transmission on variables having considered the economy concerned and the dynamic relationships among macroeconomic variables (Udoh 2009).

The study of Reynolds and Kolodziej (2009) will be adopted. Reynolds and Kolodziej (2009) conducted a study on North America to explore the gas supply and forecasting, their model is expanded to include gas prices as regards to natural gas price and liquefy natural gas price.

The structural model is adopted from the theoretical framework.

The endogenous linear equations can be explicitly specified as follows:

$A_oY_t = a + A_1Y_{t-1} + A_2Y_{t-2} + \ldots + ApY_{t-1} + E_t$…… (1)

Yt = {GDP, GD, GS, NGP, LNGP} is an nx1 dimensional vector of endogeneous variables.

a = vector of constant term

$A_o, A_1 \ldots\ldots A_p$ = the matrix of the coefficients of the variables in the system

E_t = the vector of random disturbance error term, which are assume to be independently and identically distributed error term with zero mean and finite variance.

Note;

GDP is Gross Domestic Product

GD is Gas Demand

GS is Gas Supply

GRP is Gas Retail Price

PRP is Petroleum Retail Price

Under the condition that the inverse of the matrix $A_o$exists, the $SVAR_P$ can be expressed in a Reduced-Form VAR representation of the $SVAR_P$ as

$Y_t = b + B_1Y_{t-1} + B_2Y_{t-2} + \ldots + BpY_{t-1} + U_t$…… (2)

Note: the information about contemporaneous causal dependence is incorporated exclusively in the residuals (not modeled among the variables) in the ordinary VAR model, once its structure is identified and recovered, the estimation of the lagged autoregressive coefficients permits us to identify the SVAR model by placing the necessary restriction (Pfaff and Taunus, 2008). Nesting both the recursive and non-recursive schemes for proper model specification using the traditional Cholesky identification ordering and the alternative to the Cholesky's (non-recursive scheme) are presented equation (3) Here, all the endogenous and exogenous variables are all nested in the VAR model (Alessio et al. 2011).

$$AY_t = A_1^*Y_{t-1} + \cdots + A_p^*Y_{t-p} + B_p^*X_{t-p} + CD_t + B\lambda_t$$

…….. (3)

The idea of equation (3) is to nest both the endogenous and exogenous variables in the system. The A's and B's are n x n coefficient matrices and C is the coefficient matrix associated with the possible deterministic terms D_t(Bates and Hachicha, 2009).

From equation (3), the reduced-form model can be deduced since the inverse of A exists.

$$Y_t = z_0 + z_1 Y_{t-1} + \cdots + z_p Y_{t-p} + w_0 X_{t-p} + \cdots + w_p X_{t-p} + v_t \quad \ldots\ldots\ldots\ldots(4)$$

z_i $A_i^* \ (i = 0, 1 \ldots p)$ w_i $B_i^* \ (i = 0, 1 \ldots p)$

and =A^{-1}

The relationship between the reduced-form VAR residual (v_t) and the SVAR residual ($B\lambda_t$) is called the AB-model and presented below.

From the above, the identification problem is solved by imposing restrictions on the A and B matrices assumed to be nonsingular. When B = I_n, we have A model as the required restrictions can now be imposed on the contemporaneous residual of matrix A in the AB-model in the E-views software statistic package. The contemporaneous residual relationship of the variables can now be modeled as:

$$GDP = \sum_{k=0}^{n} h_{11}(k)\varepsilon_{1t-k} + \sum_{k=0}^{n} h_{21}(k)\varepsilon_{2t-k} + \sum_{k=0}^{n} h_{31}(k)\varepsilon_{3t-k} + \sum_{k=0}^{n} h_{41}(k)\varepsilon_{41t-k} + \sum_{k=0}^{n} h_{51}(k)\varepsilon_{5t-k} \quad \ldots.. (5)$$

$$GD = \sum_{k=0}^{n} h_{11}(k)\varepsilon_{1t-k} + \sum_{k=0}^{n} h_{21}(k)\varepsilon_{2t-k} + \sum_{k=0}^{n} h_{31}(k)\varepsilon_{3t-k} + \sum_{k=0}^{n} h_{41}(k)\varepsilon_{41t-k} + \sum_{k=0}^{n} h_{51}(k)\varepsilon_{5t-k} \quad \ldots.. (6)$$

$$GS = \sum_{k=0}^{n} h_{11}(k)\varepsilon_{1t-k} + \sum_{k=0}^{n} h_{21}(k)\varepsilon_{2t-k} + \sum_{k=0}^{n} h_{31}(k)\varepsilon_{3t-k} + \sum_{k=0}^{n} h_{41}(k)\varepsilon_{41t-k} + \sum_{k=0}^{n} h_{51}(k)\varepsilon_{5t-k} \quad \ldots.. (7)$$

$$GRP = \sum_{k=0}^{n} h_{11}(k)\varepsilon_{1t-k} + \sum_{k=0}^{n} h_{21}(k)\varepsilon_{2t-k} + \sum_{k=0}^{n} h_{31}(k)\varepsilon_{3t-k} + \sum_{k=0}^{n} h_{41}(k)\varepsilon_{41t-k} + \sum_{k=0}^{n} h_{51}(k)\varepsilon_{5t-k} \quad \ldots.. (8)$$

$$PRP = \sum_{k=0}^{n} h_{11}(k)\varepsilon_{1t-k} + \sum_{k=0}^{n} h_{21}(k)\varepsilon_{2t-k} + \sum_{k=0}^{n} h_{31}(k)\varepsilon_{3t-k} + \sum_{k=0}^{n} h_{41}(k)\varepsilon_{41t-k} + \sum_{k=0}^{n} h_{51}(k)\varepsilon_{5t-k} \quad \ldots.. (9)$$

Thus, the SVAR equations above in a vector

$$\begin{pmatrix} GDP \\ GD \\ GS \\ GRP \\ PRP \end{pmatrix} = \begin{pmatrix} C_{11}(k) & C_{21}(k) & C_{31}(k) & C_{41}(k) & C_{51}(k) & C_{61}(k) \\ C_{12}(k) & C_{22}(k) & C_{32}(k) & C_{42}(k) & C_{52}(k) & C_{62}(k) \\ C_{13}(k) & C_{23}(k) & C_{33}(k) & C_{43}(k) & C_{53}(k) & C_{63}(k) \\ C_{14}(k) & C_{24}(k) & C_{34}(k) & C_{44}(k) & C_{54}(k) & C_{64}(k) \\ C_{15}(k) & C_{25}(k) & C_{35}(k) & C_{45}(k) & C_{55}(k) & C_{65}(k) \end{pmatrix} \begin{matrix} E_{1t} \\ E_{2t} \\ E_{3t} \\ E_{4t} \\ E_{5t} \end{matrix} \quad \ldots\ldots(10)$$

The E_{1t} are uncorrelated white noise disturbances and their individual coefficients are expressed as $C_{ij}(k)$. Equation 3.11 is compactly expressed as:

$$Yt = C(k)\, E_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(11)$$

In order to properly estimate the parameters in the SVAR, there is need to place some restrictions on the model.

	GDP	GD	GS	NGP	LNGP
GDP	1	0	0	0	0
GD	*	1	*	0	0
GS	*	*	1	0	0
GRP	*	0	0	1	*
PRP	*	*	0	0	1

The system above is identified with n(n-1)/2 zero restrictions on A_o. The non-recursive restrictions above are over-identified. The restrictions placed were based on theory of how the economic variables relates with one another. The zero (0) elements are restrictions, while the asterisks (*) elements are the matrix estimated elements.

Variance Decomposition

Forecast error variance decomposition (FEVD) is an econometric tool used by many economists in the Vector autoregressive (VAR). It aids in the interpretation of a Vector autoregressive (VAR) model once it has been fitted. The variance decomposition indicates the amount of information each variable contributes to the other variables in the autoregressive. Also, it determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables.

Impulse Response Function

Impulse response function (IRF) of a dynamic system is its output when presented with a brief input signal. An impulse response, generally, is the reaction of any dynamic system in response to an external shock.

Stability Tests

Stability test is performed to ascertain whether the estimated SVAR model is stable or not. The estimates of SVAR model are valid if the estimated SVAR model is stable. The test of stability of the estimated SVAR will be achieved using the autoregressive (AR) root test. The AR roots report the inverse roots of the characteristic AR polynomial indicating whether the estimated SVAR equation is stable or not. If all roots have modulus less than one and lie inside the unit circle, then the estimated SVAR is stable. Assuming the estimated SVAR equation is not stable, the impulse response standard errors result would be invalid and the variance decomposition is inefficient (Lütkepohl, 2007).

Data

The Study employed time series data on Nigeria's selected macroeconomic variables (Gas Demand, Gas Supply, Gas Price and GDP) covering the period 1996 – 2018 on a monthly basis which represents sample 324 months. In specific terms, the data employed represent series from January 1996 to December 2018. The series for Gas Demand

and Gas supply was sourced from the statistical review of word energy. Gas Retail Price and was sourced from the CBN Annual Report (various editions). GDP was sourced from the CBN statistical bulletin 2018. It should be noted that the series were obtained in Quarterly form but was sliced to monthly using the cubic spleen method incorporated in R console 3.4.1.

4.0 Data Analysis and interpretation of result

The data were analyzed with R console 3.4.1 and Econometric views (E-views) 9.0 using various econometric techniques to determine the direction of interaction amongst the variables under consideration. Graphical analysis was carried out in order to observe trend flows in the variables under consideration. Diagnostic tests were conducted on the data to be sure the data were valid enough for relevant inferences.

4.1 Descriptive Statistics and Trend Analysis

Table 1 shows the descriptive statistics of the variables in the study. The descriptive analysis gives the characteristics and properties of the time series in terms of mean, median, maximum and minimum values, coefficients of variation etcetera. The trend analysis shows the behavior of each variable over the time.

Table 4.1: Descriptive Statistics

	GD	GDP	GRP	GS	PRP
Mean	2.473842	37700.85	5.721007	25.93286	9.443409
Median	2.557986	28745.90	5.795196	26.16161	7.361769
Maximum	3.715225	97624.56	11.25137	43.93682	16.94025
Minimum	1.229295	3669.142	1.457337	3.780215	2.759878
Std. Dev.	0.734715	32140.07	3.077885	13.19985	5.149124
Skewness	-0.182509	0.598733	0.102578	-0.365693	0.247010
Kurtosis	1.811432	1.907734	1.597036	1.719438	1.376479
Jarque-Bera	16.23230*	27.58317*	21.10917*	22.83501**	30.23871*
Probability	0.234529	0.236501	0.355026	0.040211	0.895431
Sum	623.4081	9500615.	1441.694	6535.082	2379.739
Sum Sq.	135.4915	2.59E+11	2377.818	43733.22	6654.882
Observations	280	280	280	280	280

Note: * = 1per cent level of significance; ** = 5per cent level of significance; *** = 10per cent level of significance

Source: *Computed using E-Views 9 Software Package*

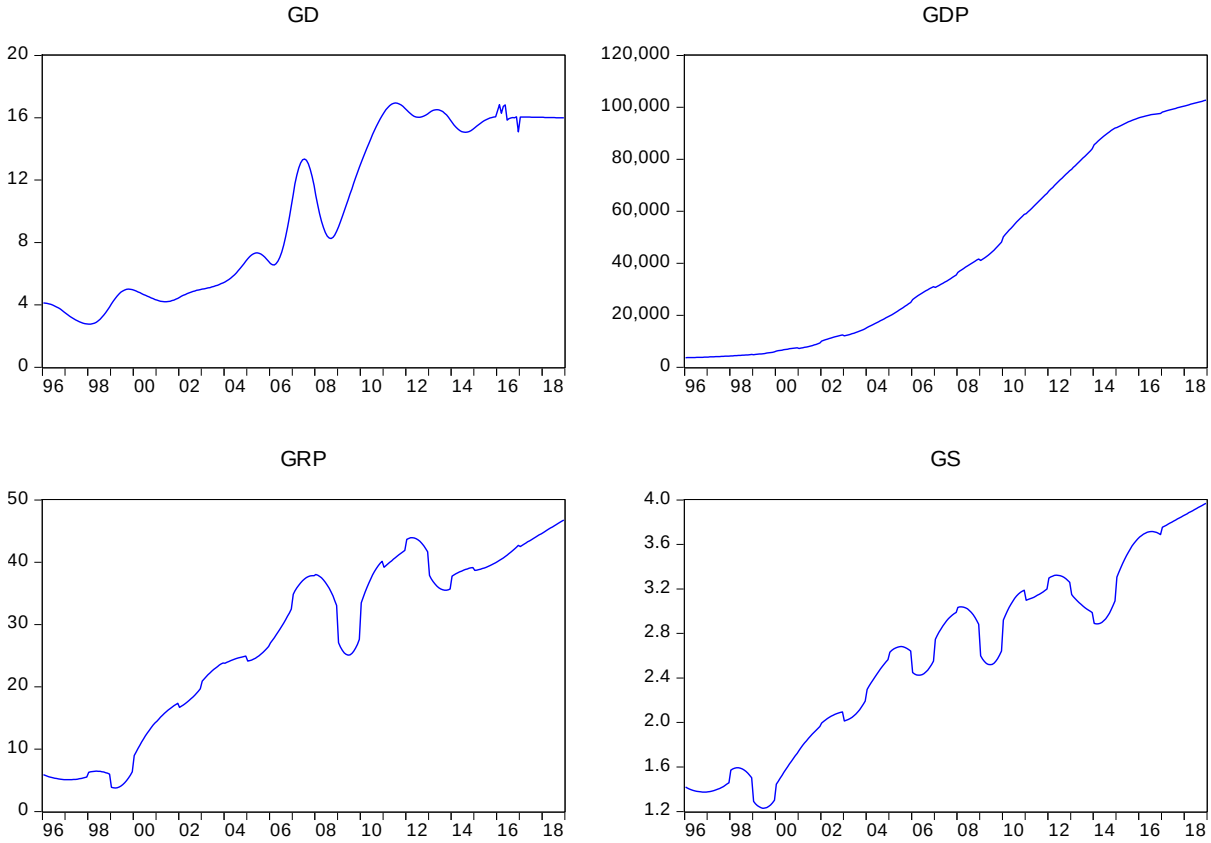


Figure 1. Graphical Trend on Data

From figure 1, all the variables fluctuate over the period investigated except GDP that exhibit an upward trend from 1996 January to 2019 December.

4.2 Unit Root Tests

The results of the unit root tests is shown in Table 4.2

Table 4.2: Unit root test using the SIC and Newey-West Bandwidth Criterion

Variables	ADF Test Statistic	Longest Lag	Order of Integration	PP Test Statistic	Longest Bandwidth	Order of Integration
GDP	-3.974267*	14	I(0)	-3.714131*	4	I(0)
GD	-11.11705*	14	I(1)	-10.95364*	5	I(1)
GS	-20.03443*	14	I(1)	-19.98948*	1	I(1)
GRP	-13.83175*	14	I(1)	-13.88077*	4	I(1)
PRP	-3.546240*	14	I(0)	-3.823885*	4	I(0)

Note: *= 1per cent level of significance; ** = 5per cent level of significance; *** = 10per cent level of Significance

Source: *Computed using R console 3.4.1 Software Package*

As seen in table 4.2, Augmented Dickey Fuller (ADF) test for stationarity at various lag lengths using selected by the SIC criterion shows that GD, GS and GRP are not stationary at their levels but stationary at their first difference, while GDP and PRP arestationary at their level. The Philip Perron (PP) test confirms the same results. Thus, we can conclude that the series are integrated of order one, I(1). In addition, the results suggest that the variables need to be transformed in order to be devoid of spuriousness.

4.3 Co-integration

With the observation that all the variables were stationary at their levels, a co-integration test becomes a necessity. This test is carried out using the Johansen approach. *Table 4.3*is an extract from the co-integration result.

Table 4.3: Cointegration Test

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.46253	361.1595	95.75366	0
At most 1 *	0.356925	236.983	69.81889	0
At most 2 *	0.272348	148.6844	47.85613	0
At most 3 *	0.217986	85.0978	29.79707	0
At most 4 *	0.110609	35.92124	15.49471	0

Source: *Computed using R console 3.4.1 Software Package*

Table 4.3 shows co-integration result using Johansen Co-integration test. The result indicates 5 co-integrating equations, which means that all the variables are co-integrated at 1% level of significance; indicating the existence of a long-run equilibrium relationship among the variables.

4.4 VAR Lag Order Selection Criteria

Table 4.4: Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-4412.980	NA	3.67e+09	36.21295	36.28462	36.24182
1	-1399.453	5878.849	0.084373	11.71683	12.14681	11.89000
2	-1197.685	385.3431	0.019818	10.26791	11.05621*	10.58539
3	-1150.967	87.30919	0.016597	10.08989	11.23651	10.55169
4	-1098.242	96.37367*	0.013239*	9.862643*	11.36757	10.46874*
5	-1085.745	22.33220	0.014696	9.965119	11.82836	10.71553
6	-1077.328	14.69519	0.016883	10.10105	12.32261	10.99577
7	-1069.830	12.78243	0.019565	10.24451	12.82439	11.28354
8	-1063.426	10.65586	0.022906	10.39694	13.33513	11.58028

Source: *Computed using E-Views 9 Software Package*

In order to properly estimate VAR model which is an input in estimating SVAR model, it is necessary to get the optimal lag length using Lag length selection criteria. Lag length selection criteria of VAR starts with the specification of maximum lag of 8. An asterisk (*) indicates the selected lag from each column of the criterion statistic. From the result as shown in table 4.6, we considered the fourth (4) lag length as the optimal lag length for each endogenous variable based on the Schwarz information criterion (SIC). Schwarz information criterion is chosen because it has been shown to have a higher degree of precision when compared to other criteria such as the Akaike information criterion (AIC).

4.5. Estimated Vector Autoregressive (VAR) Model.

Table 4.5 shows VAR estimates considering the fourth lag length selected based on SIC.

Table 4.5 VAR Estimates

Vector Autoregression Estimates
Date: 09/03/17 Time: 08:16
Sample (adjusted): 1996M05 2016M12
Included observations: 248 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GDP	GD	GS	GRP	PRP
GDP(-1)	1.321908	1.99E-06	-1.26E-05	-7.14E-06	3.27E-05
	(0.08733)	(2.1E-05)	(0.00035)	(0.00017)	(6.2E-05)
	[15.1367]	[0.09571]	[-0.03627]	[-0.04098]	[0.52542]
GDP(-2)	-0.044809	-4.23E-08	4.65E-05	2.82E-05	2.57E-05
	(0.14788)	(3.5E-05)	(0.00059)	(0.00029)	(0.00011)
	[-0.30302]	[-0.00120]	[0.07908]	[0.09566]	[0.24374]
GDP(-3)	-0.021378	-4.44E-07	4.42E-05	3.76E-05	2.54E-05
	(0.14791)	(3.5E-05)	(0.00059)	(0.00029)	(0.00011)
	[-0.14453]	[-0.01261]	[0.07516]	[0.12752]	[0.24131]
GDP(-4)	-0.260594	-8.86E-07	-7.99E-05	-6.78E-05	-7.85E-05
	(0.08789)	(2.1E-05)	(0.00035)	(0.00018)	(6.3E-05)
	[-2.96504]	[-0.04229]	[-0.22851]	[-0.38686]	[-1.25437]
GD(-1)	259.8283	1.124544	-0.431044	0.314202	0.046957
	(402.031)	(0.09579)	(1.59947)	(0.80177)	(0.28625)
	[0.64629]	[11.7400]	[-0.26949]	[0.39189]	[0.16404]
GD(-2)	-71.11336	-0.032168	-0.100035	-0.063743	-0.112874
	(618.939)	(0.14747)	(2.46243)	(1.23435)	(0.44069)
	[-0.11490]	[-0.21814]	[-0.04062]	[-0.05164]	[-0.25613]

GD(-3)	-60.17829	-0.021433	-0.115805	-0.091042	-0.081539
	(618.951)	(0.14747)	(2.46248)	(1.23437)	(0.44070)
	[-0.09723]	[-0.14534]	[-0.04703]	[-0.07376]	[-0.18502]
GD(-4)	-29.74355	-0.128096	0.692534	0.178705	-0.007258
	(396.828)	(0.09455)	(1.57877)	(0.79139)	(0.28255)
	[-0.07495]	[-1.35483]	[0.43865]	[0.22581]	[-0.02569]
GS(-1)	-26.22547	0.002130	1.223078	-0.004219	-0.004115
	(27.5450)	(0.00656)	(0.10959)	(0.05493)	(0.01961)
	[-0.95210]	[0.32449]	[11.1608]	[-0.07681]	[-0.20982]
GS(-2)	0.668471	-0.000549	-0.049514	-0.003819	0.002599
	(44.6510)	(0.01064)	(0.17764)	(0.08905)	(0.03179)
	[0.01497]	[-0.05156]	[-0.27873]	[-0.04289]	[0.08174]
GS(-3)	-1.350309	-0.000517	-0.036140	-0.003342	0.001386
	(44.6560)	(0.01064)	(0.17766)	(0.08906)	(0.03180)
	[-0.03024]	[-0.04860]	[-0.20342]	[-0.03752]	[0.04359]
GS(-4)	23.22691	0.002509	-0.144750	0.010575	0.007382
	(27.9394)	(0.00666)	(0.11116)	(0.05572)	(0.01989)
	[0.83133]	[0.37690]	[-1.30222]	[0.18979]	[0.37109]
GRP(-1)	-57.53994	-0.001605	-0.063623	1.024342	-0.002165
	(38.1002)	(0.00908)	(0.15158)	(0.07598)	(0.02713)
	[-1.51023]	[-0.17686]	[-0.41973]	[13.4812]	[-0.07982]
GRP(-2)	7.318828	0.000500	0.011005	-0.024609	0.014404
	(56.1811)	(0.01339)	(0.22351)	(0.11204)	(0.04000)
	[0.13027]	[0.03737]	[0.04923]	[-0.21964]	[0.36008]
GRP(-3)	4.577136	0.000392	0.006834	-0.014725	0.009949
	(56.1775)	(0.01338)	(0.22350)	(0.11203)	(0.04000)
	[0.08148]	[0.02930]	[0.03058]	[-0.13143]	[0.24872]
GRP(-4)	36.47983	-0.005859	-0.017339	-0.085245	-0.004748
	(37.3988)	(0.00891)	(0.14879)	(0.07458)	(0.02663)
	[0.97543]	[-0.65749]	[-0.11653]	[-1.14294]	[-0.17832]
PRP(-1)	-29.32126	0.005346	0.042775	-0.190161	1.285737
	(89.4218)	(0.02131)	(0.35576)	(0.17833)	(0.06367)
	[-0.32790]	[0.25093]	[0.12024]	[-1.06632]	[20.1940]
PRP(-2)	27.30542	-0.000292	0.043572	0.057452	-0.202302

	(157.711)	(0.03758)	(0.62745)	(0.31452)	(0.11229)
	[0.17314]	[-0.00776]	[0.06944]	[0.18266]	[-1.80157]
PRP(-3)	26.27159	0.002085	0.092583	0.036699	0.470037
	(157.991)	(0.03764)	(0.62856)	(0.31508)	(0.11249)
	[0.16629]	[0.05538]	[0.14729]	[0.11647]	[4.17844]
PRP(-4)	8.471941	-0.008665	-0.132393	0.156764	-0.600364
	(93.9920)	(0.02239)	(0.37394)	(0.18745)	(0.06692)
	[0.09013]	[-0.38694]	[-0.35405]	[0.83631]	[-8.97092]
C	-156.7014	0.080443	0.102033	-0.456684	0.275179
	(108.204)	(0.02578)	(0.43049)	(0.21579)	(0.07704)
	[-1.44820]	[3.12029]	[0.23702]	[-2.11633]	[3.57179]
R-squared	0.999975	0.997201	0.997573	0.988915	0.999500
Adj. R-squared	0.999972	0.996954	0.997359	0.987939	0.999456
Sum sq. resids	6453024.	0.366318	102.1399	25.66510	3.271423
S.E. equation	168.6043	0.040171	0.670787	0.336247	0.120048
F-statistic	447758.4	4043.503	4664.275	1012.593	22674.61
Log likelihood	-1612.559	456.2957	-241.8982	-70.62797	184.8005
Akaike AIC	13.17386	-3.510449	2.120147	0.738935	-1.320972
Schwarz SC	13.47137	-3.212941	2.417655	1.036443	-1.023464
Mean dependent	38249.33	2.491041	26.25849	5.784221	9.529604
S.D. dependent	32104.26	0.727898	13.05182	3.061702	5.145180

Determinant resid covariance (dof adj.)	0.008041
Determinant resid covariance	0.005166
Log likelihood	-1106.552
Akaike information criterion	9.770581
Schwarz criterion	11.25812

Source: *Computed using E-Views 9 Software Package*

Table 4.5 presents the estimates of VAR model. The decision not to give the practical interpretation of the result above is due to the fact that it serves as an input to the estimation of Structural Vector Autoregressive (SVAR) which is our main model.

4.6. Estimated Structural Vector Autoregressive (SVAR) Model.

Table 4.6: SVAR Estimates

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	477.8454	23.83276	20.04994	0
C(2)	32.8879	1.640299	20.04994	0
C(3)	6.859805	0.342136	20.04994	0
C(4)	-1.62778	0.081186	-20.0499	0
C(5)	-0.49773	0.024825	-20.0499	0
C(6)	22.08835	1.101667	20.04994	0
C(7)	0.168989	0.071535	2.362335	0.0182
C(8)	-0.14376	0.07129	-2.01652	0.0437
C(9)	0.07026	0.070767	0.99282	0.3208
C(10)	0.00908	0.070647	0.12854	0.8977
Log likelihood	1197.761			
LR test for over-identification:				
Chi-square(3)	0.254855	Probability		0.9683

Extimates of Matrix A					
GDP		**GD**	**GS**	**GRP**	**PRP**
GDP	477.8454	0	0	0	0
GD	0	32.8879	0	0	0
GS	0	0	6.859805	0	0
GRP	0	0	0	-1.62778	0
PRP	0	0	0	0	-0.49773

Extimates of Matrix B					
GDP		**GD**	**GS**	**GRP**	**PRP**
GDP	1	22.08835	0	0	0
GD	0	1	0	-0.14376	0.168989
GS	0	-0.02961	1	0	0
GRP	0	0.07026	0.00908	1	0
PRP	0	0	0	0	1

Source: *Computed using E-Views 9 Software Package*

The equations below are extracted from table 4.8:

GDP = 477.8454 + 22.08835GD (4.1)

Prob. (0.0000) (0.0000)

GD = 32.8879 – 0.14376GRP + 0.168989PRP (4.2)

Prob. (0.0000) (0.0437) (0.0182)

GRP = -1.62778 + 0.07025GD + 0.00908GS (4.3)

Prob. (0.0000) (0.3208) (0.8977)

Where:

GDP is Gross Domestic Product

GD is Gas Demand

GS is Gas Supply

GRP is Gas Retail Price

PRP is Petroleum Retail Price

The structural VAR model is interpreted as follows;

A unit change in Gas Demand (GD), will results in increase in GDP by approximately 22.08835 units, while holding other variables constant. The positive sign on gas Demand (GD)fulfilled the*apriori* expectation. With an increase in gas demand, more output will be produced. The lower probability value of 0.0000 when compared to the conventional

level of significance of 0.05 (5 percent level) denotes the impact is significant.

A unit change in Gas retail Price (GRP), while holding other variables constant will lead to decrease in Gas Demand (GD) by 0.1437 unit. The results satisfy basic economic *apriori* reasoning of inverse demand price relationship. The change is significant judging by the probability value of 0.0437 which is lower than the conventional level of significance of 0.05.

A unit increase Petroleum Retail Price(PRP) will increase Gas Demand (GD) by approximately 1.68989 units, with other variables being held constant. The PRP coefficient is not significant considering the probability value of 0.0182 which is higher than the conventional level of significance of 0.05.

A unit change in Gas Demand (GD) with other variables held constant will increase Gas Prices (GP) by approximately 0.07025 units. The probability value of 0.3208 is higher than the conventional level of significance (0.05), which means the Gas Demand (GD) coefficient is insignificant.

Gas Price will increase by approximately 0.00908unit if there is a unit increase in Gas Supply (GS) with other variables held constant. This result does not follow the law of demand and supply which stats that the higher the supply the lower the price, the reason could be because gas is an essential commodity for cooking and thus may not follows the law of demand and supply as consumers may still buy gas even when the price is increasing as it is superior to most forms of cooking energy. The impact of a unit change in GS is insignificant as shown by the probability value of 0.8977 which is higher than the conventional level of significance of 0.05.

4.7 SVAR Forecast Error variance decomposition

Table 4.7 Variance Decomposition

Variance Decomposition of GDP:						
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	176.4030	76.35688	23.64312	0.000000	0.000000	0.000000
2	333.3528	80.23185	18.19875	0.202867	1.363006	0.003531
3	489.4533	80.41804	15.85986	0.477607	3.224024	0.020474
4	640.4417	79.51213	14.79155	0.713520	4.833771	0.149029
5	784.8135	78.30123	14.30456	0.890516	6.057735	0.445954

Variance Decomposition of GD:

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.040281	0.000000	20.56155	78.98978	0.000000	0.448668
2	0.063098	0.000135	19.90387	79.34254	0.019110	0.734342
3	0.079059	0.000203	17.96505	80.67585	0.287282	1.071616
4	0.090919	0.002020	15.66660	81.69734	1.103507	1.530530
5	0.100453	0.008530	13.43713	81.75557	2.652672	2.146106

Variance Decomposition of GRP:

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5
1	0.367236	0.000000	96.78716	3.16E-09	3.212836	0.000000
2	0.549807	0.002202	94.93580	0.040105	3.370019	1.651876
3	0.683220	0.008982	92.38554	0.125647	3.312338	4.167494
4	0.786371	0.069501	90.05432	0.261199	3.150256	6.464724
5	0.866890	0.207338	88.26705	0.461882	2.959771	8.103962

Source: *Computed using E-Views 9 Software Package*

Variance decomposition indicates the amount of information each variable contributes to the other variables in the autoregressive. It determines how much of theforecast error variance of each of the variables can be explained by exogenous shocks to the other variables.It is generated from the estimated SVAR. *Table 4.7*considering five periods.Shock1 represent GDP, Shock2 represent GD, shock3 represent GRP, shock4 represent GS, and Shock5 represent PRP. From the variance decomposition for GDP, Gas Demand (GD) contributes the most to the variations in GDP followed by Gas Supply. From the Variance decomposition for Gas Demand (GD), Gas Retail Price (GRP) contributes the most to the variations in Gas Demand. Finally, from the variance decomposition of GRP (Gas Retail Price), Gas Demand (GD) contributes the most to the variations in Gas Retail Price (GRP).

4.8 Impulse Response Function

Impulse is an unexpected shock on an economy variable, the reaction of another economy variable to the impulse is referred to as response; it is derived from the estimated SVAR. Just like the Variance Decomposition, Shock1 represent GDP, Shock2 represent GD, shock3 represent GRP, shock4 represent GS, and Shock5 represent PRP.Impulse Response Function (IRF) graphical representation for five periods is given as:

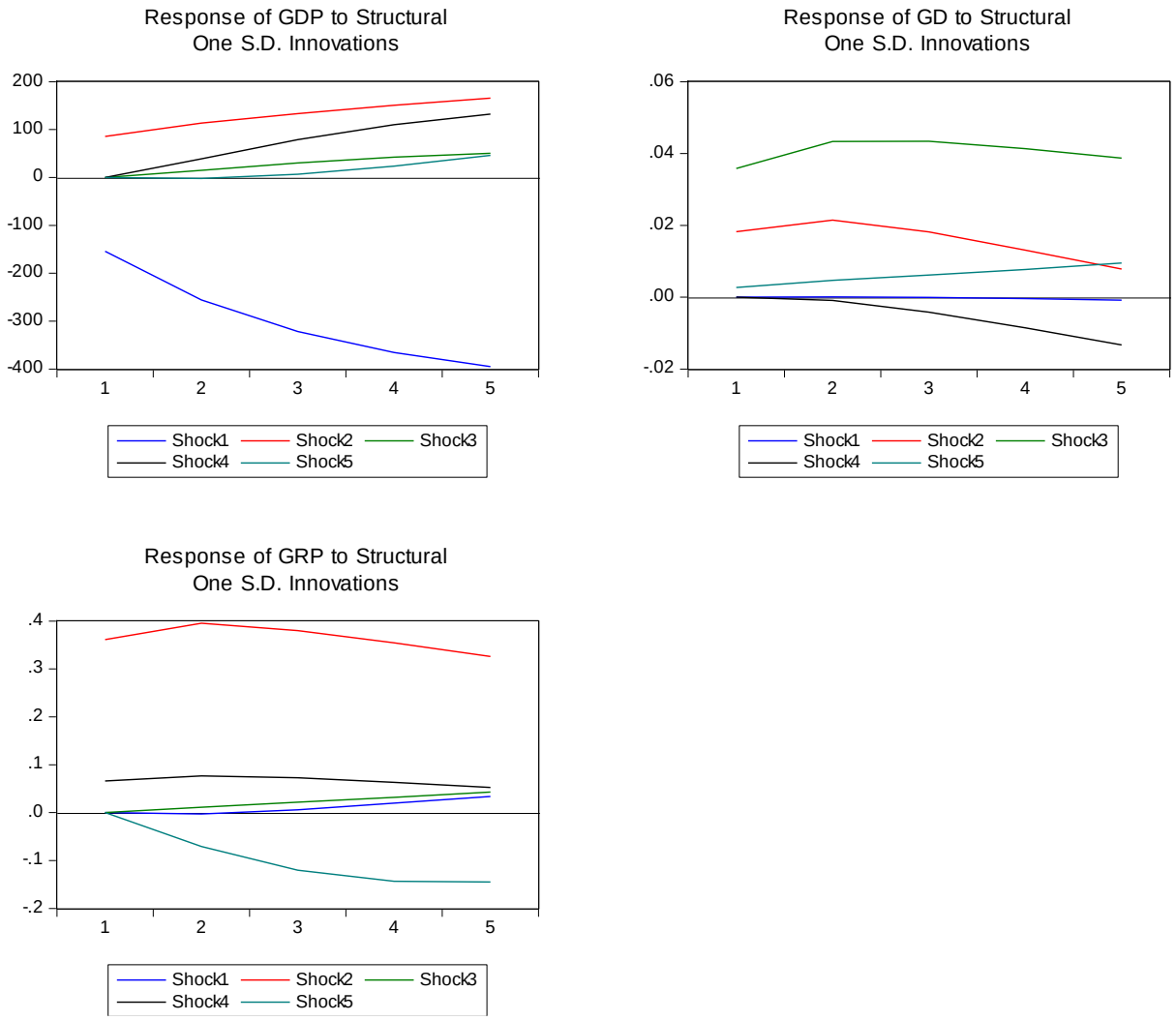


Figure 4.2 ***Source:*** *Computed using E-Views 9 Software Package*

From GDP impulse response graph, GDP respond positively to changes in the variable but negatively to changes in GDP itself over the five periods. From Gas Demand (GD) impulse response graph, GD respond positively to changes in GDP, GS and GRP but negatively to changes in Petroleum Retail Price (PRP). From Gas Retail Price (GRP) impulse response function, GRP respond positively to changes in the variables under study except Gas Supply (GS).

4.9 Granger Causality Test

Table 4.8 Causality Test

Null Hypothesis (H0)	Chi-Square	Probability	Decision
GD does not cause GDP	10.51789	0.0917	Reject Ho
GDP does not cause GD	13.74877	0.0081	Reject Ho
GRP does not cause GD	14.90053	0.0877	Reject Ho
GD does not cause GRP	10.60593	0.0314	Reject Ho
GRP does not cause GDP	4.986681	0.2887	Accept Ho
GDP does not cause GRP	10.96944	0.0269	Reject Ho

Source: Author's Computation

Table 4.8 is granger causality test it illustrate the direction of causality among the variables under study. From the table 4.8, there is bi causality between GDP and GD (Gas Demand). This means that gas demand Granger causes GDP and GDP Granger cause Gas Demand.

There is two-way causality between GRP (Gas Retail Price) and GD (Gas Demand); this means that Gas Retail Price Granger cause Gas Demand and Gas Demand Granger cause Gas Retail Price.

There is one way causality between GRP (Gas Retail Price) and GDP. The causality flows from GDP to Gas Retail Price. This means that GDP granger cause Gas Retail Price.

4.10 Post Estimation

It is a necessity to test the SVAR model for stability to validate the Impulse response function and variance decomposition results. This can be done using the AR Root method. The conditions to declare a model stable using AR roots are: all roots must lie within the polynomial bound and the roots must be less than one. Below is the tabular and graphical representation of the AR Roots test.

Table 4.9: SVAR Stability Test

Roots of Characteristic Polynomial	
Endogenous variables: GDP GD GRP GS PRP	
Exogenous variables: C	
Root	Modulus
0.898715	0.898715
0.851265	0.851265
0.565784	0.565784
-0.331091	0.331091
0.216677	0.216677
-0.039658	0.039658
No root lies outside the unit circle.	
VAR satisfies the stability condition.	

This shows that values of the roots are less than unity. Also, the modulus values are also less than unity and the inverse roots of the AR characteristic polynomials lie within the unit circle. This is as shown in table 4.9. Based on these observations we conclude that the estimated SVAR model is stable.

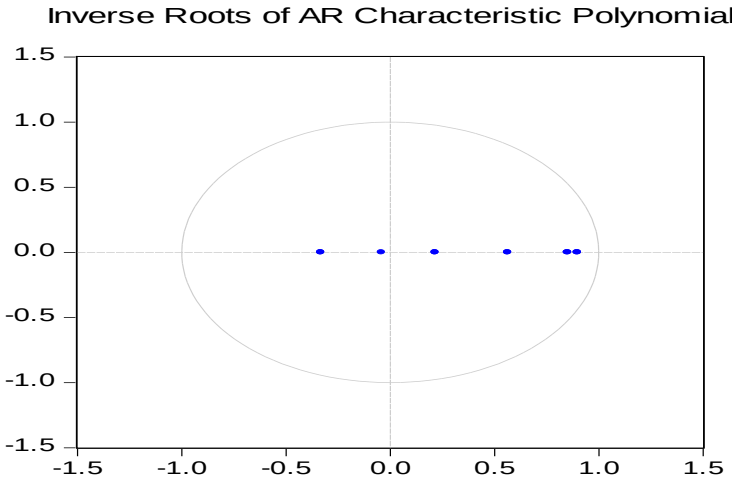


Figure 4.3 AR Stability Test

The laying of all the roots within the polynomial is an indication that the model is good and stable and can be used for forecasting and policy decision.

6.0 Conclusion and Recommendations

The research empirically established the significant impact of gas demand on national output and it is observed that gas price significantly determine gas demand in Nigeria during the periodunder consideration. The result of Structural VAR model and Granger Causality indicate that Gas Demand significantly affects GDP and Gas Price significantly affects Gas Demand. Also petroleum retail price significantly affect Gas Demand positively, indicating that the higher the price of petrol the higher the gas demand as consumers will substitute gas for petroleum product. Impulse Response and Variance Decompositionall show that variation in GDP is caused by changes in Gas demand compared to the other variables under study. Thus, the study recommends that government should strive to make Gas available since it has a positive impact on GDP. Also gas retail price should be regulated to promote more gas demand in the country. Gas supply should be increased to meet the rising gas demand so as to avoid escalating gas prices which will hamper energy access to the populace.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Assessment of the Determinants of Demand for Money in Nigeria: 1981-2020

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Abstract

This study examined economic reassessment of the demand for money and behaviour of its determinant: Empirical evidence from Nigeria using time series annual data from 1981-2020 which constitutes 40 years. The Augmented Dickey-Fuller unit root test was employed to establish the stationarity of the variables, bound tests analyses indicated that there is a long-run equilibrium relationship between the understudied variables and short-run equation of ARDL model was estimated to determine the speed of adjustment of the broad money supply to long-run equilibrium at three lags selected. The findings were that there was evidence of a long-run equilibrium relationship between independent variables (LRGDP, INT, INF, EXR, TRO) on the money supply (LBMS) in Nigeria. It was found that exchange rate has significant negative effects the money demand in the long-term but positively in short-term and also an increase in RGDP will raise money demand. From the findings, the recommendation made included; that Nigeria can use interest rate and control economic as a tool to adjust money demand and conduct of monetary policy in Nigeria should continue to focus on monetary aggregates, especially their growth rates.

Key words: *Demand for Money; Real Income; Interest Rate: Inflation Rate: Exchange Rate: Trade Openness*

1.0 Introduction

"Demand for money as a concept has over the years attracted the interest of great economists and it keeps being a subject of interest to many. Unlike the demand for goods, it is not restricted to one market but also involves other markets (Money market, capital market commodity market and foreign exchange market), hence it has a direct bearing on monetary policy and so relevant to the study of macro-economics. The focus on the demand for money is attributed to the fact that monetary policy will only be effective if the demand for money function is stable. Stability of the demand for money is crucial in understanding the behaviour of critical macro-economic variables (Essien, Onwioduokit and Osho. 1996).

Practically speaking, demand for money is the demand on the part of individuals and businesses to hold purchasing power in the

form of cash and checkable deposit. Demand for money has been defined also as the amount of money balance held for certain purpose rather than putting i them into immediate consumption expenditure. In the Nigerian society and other developing I countries of the world today, demand for money has increasingly been a focus of economic; analysis of which several studies have extensively been carried out as to what factors principally determine the demand for money in Nigeria.There have been tremendous theoretical and empirical studies on the demand for money. Pinpointing these with the seminal work of Tomon (1972) which has led to comments and criticism through the famous "Tatoo debate" of the 1970s that demand for money is influenced by real income and interest rate. And this was criticized by theother researchers like Ojo and Teriba (1974) that poorly specified demand for money functions makes the research conducted unreliable and spurious as there is unstable demand for money function estimation.

Also, the identification of the demand for money function is important as it plays an essential role in the transmission mechanism of both monetary and fiscal policy. Furthermore, the temporarystability of such identified function is also significant if monetary policy is to have a predictableeffect on the ultimate objective of economic policy (Oresotu and Mordi 1992). Thus, estimationof demand for money function is important as the positive fall out of anti-inflationarystabilization policy depend on a stable demand for money function (Nwabanmwen 2002).

Even as with many other issues in economic theory, disbelief (controversy) has split the economists and policy maker into different schools of thought, namely the classical, theKeynesian, neo-classical and the monetarists.The classicalists for instance argued that the demand for money, the medium of exchange as a | simple means of carrying out transaction Jhingan (2003).

Jhingan (2003), Keynes argued that the nominal interest rate affects real money holding,although that demand for money is determined by both income and interest rate, but emphasizing that interest rate is more superior. According to this same Jhingan, Keynes argued that decisionto either to hold cash, invest in bond or borrowing is pre-determined by the rate of interest.

The monetarist in their analysis however, refute Keynes' prediction tendency that interest rate and income determine demand for money. Rather they maintained that permanent income, influence the decision to hold money, Jhingan (2003).In spite of the controversies among the economists, the analysis of the demand and the supply ofmoney still play tremendous role in the economic policy both in the developed and developingeconomies.

In light of this, the research will look at economic reassessment of the demand for money and the behavior of its determinants: Empirical evidence from Nigeria from 1981 to 2020. As a result, the study's main objectives are:

(i) Examine the impact of real income on money demand in Nigeria

(ii) Access the impact of inflation rate on money demand in Nigeria

(iii) Investigate the impact of interest rate on money demand in Nigeria

(iv) Analyze the impact of exchange rate on money demand in Nigeria

(v) Evaluate the impact of trade openness on money demand in Nigeria

This paper is divided into five sections to fulfill these goals, with the introduction as the first. The second section is a literature review. The methodology is examined in the third section. The fourth section focuses on the presentation and discussion results. The summary, findings, policy recommendations and contribution to knowledge are all covered in section five.

2.0 Review of Related Literature

2.1 Theoretical Review

2.1.1 The Classical Theory of Demand for Money

The classical economists did not unambiguously devise demand for money thesis but their outlooks are intrinsic in the volume of thesis of money. They highlighted the transactions demand for money of exchange and smooth the progress of the exchange of goods and services.

In Fisher's Equation of Exchange

$$MV = PT \quad \text{----------1}$$

Where M is the total volume of money, V is its velocity of circulation, P is the price level and T is the aggregate amount of goods and services exchanged for money.

The right-hand side of this equation PT represents the demand for money which actually based on the value of the transactions. MV represents the supply of money which is specified and in symmetry parities the demand for money. This transaction demand for money, in turn is ascertained by the level of full employment earnings. This is due to the classicists assumed in Say's Law whereby supply created its own demand, presuming the full employment level of earnings. Thus, the demand for money in Fisher's approach is invariable ration of the level of transactions which in turn abides and invariable association to the level of national earnings.

2.1.2 Keynesian Theory of Demand for Money

The transactions demand for money mounts from the medium of exchange role of money inmaking regular payments for goods and services. As per Keynes, it relates to "the need for cashfor the current transactions for personal and business exchange." It is further more sectioned into earnings and trade motives.The earnings motive is meant "to bridge the interval amidst the receipt of earnings and its disbursement." Likewise, the trade motive is meant "to bridge the interval amidst the time of incurring trade costs and that of the receipt of earnings is the sale proceeds.They are based on the level of earnings, the rate of interest, the business proceeds, the normal period amidst the receipt and disbursement of earnings etc.The transactions demand for money is a direct proportional and positive fiction for the level of earnings and is given as follows:

Lr = kY---------- 2.8

Where Lr, is the transactions demand for money, k is the ration of earnings which is kept for transactions purposes and Y is the earnings.

2.1.3 Friedman's Restatement of Quantity Theory Money

In the reformulation of the volume thesis, Friedman asserts that "the quantity thesis is in the firstinstance a theory of demand for money. It is not a theory of output or of money income or of the

price level."The demand for money on the part of maximum prosperity holders is formally identical with that of the demand for a consumption service. He considers the amount of real cash balance (M/P) as a product which is demanded for the reason that it capitulate services to the person who holds it.Therefore, money is an asset or capital good and the demand for money forms part of wealth thesis. For maximum prosperity holders the demand for money in real terms may be expected to be an operation primarily of the succeeding erratic; total Affluence, the division of affluence amidst human and non-human forms, the anticipated rates of return on money and other assets, and other variables.

2.2 Empirical Review

Folarin and Asongu (2019) investigated the financial liberalization and long-run stability of money demand in Nigeria. The study employed ARDL bounds approach and CUSUMSQ tests to conduct co-integration and stability test respectively. The results revealed that there is a long-run relationship between demand for money and its determinants, also the CUSUMSQ outcomerevealed that demand for money is stable within the period of financial deregulation consideredthe study. In addition, it was also revealed that inflation rate will be a better proxy for anopportunity variable when compared to interest rate.

Tule, Okpanachi, Ogiji, and Usman (2018) re-examined broad money (M2) demand and its Stability in Nigeria using the Autoregressive Distributed Lag (ARDL) bounds testing procedure. First, the results indicate that a stable long-run relationship exists between M2 and its determinants including GDP, stock prices, foreign interest rates and real exchange rate.

Furthermore, stock prices showed a significant and positive effect on the long-run broad money demand, which in some ways reflect increased 'financialization' and integration of the Nigerian economy into the global economic system. Overall, the findings of this study lend credence to the continued relevance of the broad money aggregate, M2, as a benchmark for monetary policy implementation in Nigeria.

Asongu, Folarin and Biekpe (2018) examined the stability of money demand in the proposed West African Monetary Union (WAMU). The study uses annual data for the period' 1981 to 2015 from thirteen of the fifteen countries making-up the Economic Community of West African states (ECOWAS). A standard money demand function is designed and estimated using a bound testing approach to co-integration and error-correction modeling. The findings show divergence across ECOWAS member states in the stability of money demand. This

divergence is informed by differences in co-integration, stability, short run and long-term determinants, and error correction in event of a shock.

El-Rasheed *et al* (2017) investigated the determinants of money demand (M2) in Nigeria. The scope of the study was between 1980 and 2014. The study also employed the autoregressive distributed lag model for its estimation and it was revealed that monetary uncertainty has significant influence on the demand for money function in Nigeria.

Manamba (2017) investigated the determinants of demand for money and its stability in (Tanzania using annual time series data spanning from 1966 to 2015. Johansen co-integrationresults reveal that there is a long-run relationship between real money balances and the [explanatory variables namely, real GDP, deposit interest rate, real exchange rate and inflation rate. Consistent with money demand theory, the VECM results show that the demand for real money balances is positively related with scale variable (real GDP) but it responds inversely to opportunity cost of holding money (deposit interest rate and inflation rate). Moreover, results provide evidence that the demand for real money balances and real exchange rate are positively associated.

Dennis and Vaclav (2016) examined the demand for broad money and its stability in Ghana within the period of 1990 to 2014. Unit root test and Johansen's co-integration approach reveals that the variables were non stationary and co-integrated, therefore, an error correction model, was used to determine the factors that influence real money aggregate in Ghana from 1990 to 2014. The results show that, GDP affects the level of demand for money in the long run while the interest rate affects it in the short run. The error correction term in each of the cases shows, 18% of deviations in the real demand for money is corrected annually. The CUSUM tests of parameter stability showed that, the money demand function was stable over the period and the Chow test indicated that there were no structural breaks.

Ben-Salha and Jahidi (2014) investigated the determinants of money demand in developing countries: a case study of Tunisia. The study used annual time series data ranging between 1970 and 2011. It employed ARDL bound test and the result revealed a long-run relationship between broad money demand and its determinants, namely final consumption expenditure, expenditure on investment goods, export expenditure and interest rate. The Error correction model result shoed that demand for money is only affected by interest rate and expenditure on investment goods in the short run, while in the long run final consumption expenditure and interest rate are the major determinants of demand for money.

3.0 Methodology

3.1 Model Specification

The study adapts Iyoboyi and Pedro's model (2013). In their work titled "Determinants of money Demand (Ml) in Nigeria", they specified the model: Ml = f (real income, short term interest rate, real exchange rate and inflation rate).Thus, the general functional form of the adapted model is specified as follows:

M2 = (RGDP; LDIR, INFR, EXR, TRO) (3.1)

The econometric version of this model can be stated as follow;

$$LBMS = Y_0 + Y_1\ RGDP + Y_2LDIR + Y_3INFR + Y_4EXR + Y_4TRO + \mu \ldots\ldots\ldots (3.2)$$

Where;

BMS = Broad money supply (M2), RGDP = Real Gross Domestic Product., LDIR = Lending Interest Rate, INFR = Inflation Rate, EXR= Exchange Rate and TRO= Trade Openness.

A priori Expectation

It is expected that based on a priori functional relationship between dependent and independent variables that the coefficient of RGDP>1, LDIR<1, INFR>1, EXR>1 and TRO>1.

3.2 Data Estimation Technique

The Augmented Dickey-Fuller (ADF) test was adopted to test the time-series properties of data and determine the order of integration to stationarity.ARDL bounds testing approach was used to determine the long relationship between the variables. Hence, the ARDLrepresentation of equation 3.2 can be presented as thus;

$$\Delta BMSt = \beta_0 + \beta_1 BMS_{t-1} + \beta_2 RGDP_{t-1} + \beta_3 LDIR_{t-1} + \beta_4 INFR_{t-1} + \beta_5 EXR_{t-i} + \beta_6 TRO_{t-i} + \beta_7 \Delta RGDP_{t-i} + \beta_8 \Delta LDIR_{t-i} + \beta_9 \Delta INFR_{t-I} + \beta_{10} \Delta EXR_{t-I} + \beta_{11} \Delta TRO_{t-i} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.3)$$

Where; Δ is the first-difference operator, and β's shows the long run coefficients and short run coefficients. Hence, the null hypothesis (H_0) of no cointegration states that, H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = \beta_{10} = \beta_{11} = 0$ and the alternative hypothesis of existence state that; $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq \beta_8 \neq \beta_9 \neq \beta_{10} \neq \beta_{11} \neq 0$

3.3 Data Types and Sources

The annual time series data required for the estimation of the models include Broad Money supply (M2), Real GDP, Lending Interest Rate, Exchange Rate, Trade Openness and Inflation Rate. The data for M2 and RGDP are sourced from the Central Bank of Nigeria's Statistical Bulletin (2020, Vol. 30), while data for Lending Interest Rate and Inflation Rate are sourced from the World Bank Development Indicator's Data bank.

4.0 Data Analysis

4.1.1 Unit Root Test.

The unit root test will be carried out based on the augmented dickey fuller (ADF) test at 5% level of significance.

Table 4.1.1.1: Unit Root Test Results for Stationarity (ADF at 5 percent levels)

Variables	ADF Statistics	5% Critical Value	Order of Integration
BMS	-4.807638	-3.533083	I(1)
RGDP	-2.996894	-2.941148	I(0)
INT	-10.30522	-1.949856	I(1)
INF	-6.112895	-1.949856	I(1)
EXR	-3.388354	-1.949856	I(1)
TRO	-7.654953	-1.949856	I(1)

Source: Author's Computation, E-views version 9.0

Based on the above result of the Augmented Dickey-Fuller unit root test,the variables are mixture of 1(1) and I (0) and are significant at 5% level of significance. This means that the null hypothesis will not be accepted. We therefore conclude that the time series collected are all stationary.

4.1.2 ARDL Bound Test Result

Table 4.1.2 ARDL Bond Test Results

Dependent Variable: LBMS **Functions:** (LRGDP, INT, INF, EXR, TRO) **F-statistics:** 6.937636		
K	**5**	
Critical Value Bounds		
Significant	**Lower Bound**	**Upper Bound**
5%	2.62	3.79

Source: Author's Computation, E-views version 9.0

The ARDL bound test results presented above show that F-statistics value of the mode 6.94 greater than I (1) bound test value of 3.79 at 5% significant level. Therefore, we reject the null hypothesis of no co-integration and concluded that there exist long run relationship among the variables in the model.

4.1.3 Results of the Short-Run Equation of ARDL Model

Table 4.1.3 Short Run Results of ARDL Model

Dependent Variable: D(BMS)
Method: Least Squares
Date: 08/30/21 Time: 22:20
Sample (adjusted): 1986 2020
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BMS(-1))	0.344866	0.183037	1.884131	0.0791
D(BMS(-2))	0.064360	0.165123	0.389769	0.7022
D(BMS(-3))	0.481252	0.173489	2.773955	0.0142
D(RGDP(-1))	-0.627400	0.190508	-3.293299	0.0049
D(RGDP(-2))	0.727393	0.282908	2.571133	0.0213
D(RGDP(-3))	0.024304	0.242791	0.100103	0.9216
D(INT(-1))	35.45790	48.38982	0.732755	0.4750
D(INT(-2))	-69.76912	57.82756	-1.206503	0.2463
D(INT(-3))	-118.7897	45.08418	-2.634842	0.0188
D(INF(-1))	-2.916170	10.62061	-0.274576	0.7874
D(INF(-2))	10.90799	9.636126	1.131989	0.2754
D(INF(-3))	5.826661	9.910419	0.587933	0.5653
D(EXR(-1))	-6.227334	11.43220	-0.544719	0.5940
D(EXR(-2))	26.48813	11.03645	2.400059	0.0298
D(EXR(-3))	1.435494	11.36219	0.126340	0.9011

D(TRO(-1))	-1.138286	19.26886	-0.059074	0.9537
D(TRO(-2))	58.45012	21.84465	2.675718	0.0173
D(TRO(-3))	11.43683	18.68053	0.612233	0.5496
C	-55.51464	253.9148	-0.218635	0.8299
ECM(-1)	-1.290010	0.456444	-2.826215	0.0128

R-squared 0.894157

Source: Author's Computation, E-views version 9.0

The coefficient of the error correction in the table 4.1.3, has -1.29 and significant at 0.05 level. This sign indicates that broad money supply will converge to its long-run equilibrium when there is a short-term relationship between the real gross domestic product, band deposit interest rate, inflation rate, exchange rate and trade openness. This also means that the errors will continue to be corrected at 1.29%.

4.1.4 Stability Test

Recursive least square tests (CUSUM TESTS) have been also applied for checking parameter stability for the quarterly data of the variables. In figure 4.1.1 shows recursive coefficients estimates where estimated values of parameter for regressand variables i:e BMS and explanatory variables i:e RGDP, INT, INT, INF, EXR and TRO are plotted against each iteration. The graphs show the stability analysis during the year 1981to 2020. During the intervals the data look stable because it falls with 0.05%.

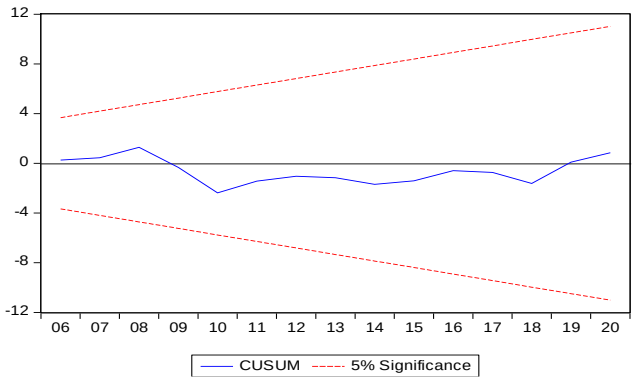

Figure 4.1.1 Stability Test (LBMS, LRGDP, INT, INF, EXR, TRO)

Source: Author's Computation, E-views version 9.0

4.2Discussion of Results

The results of the bound tests analyses indicated that there is a long-run equilibrium relationship between the understudied variables. Furthermore, the estimated coefficient in the tables 4.2.5 shows or explains the long-run impact of independent variables (LRGDP, INT, INF, EXR, TRO) on the money supply (LBMS) in Nigeria.The exchange rate significantly negatively affects the money demand in the long-term but positively in short-term. It shows that the economic entity considers the opportunity cost

of holding money, thereby adjusting the money supply.

Also, an increase in RGDP will raise the national income so that people will need more money to purchase, it will lead to an increase in money demand, In the long run, continued exchange rate appreciation (and appreciation expectations) will reduce demand for money. This implies broad money supply parameter, is seriously influenced by interest rate, inflation rate and other variables used in the study. Based on their performance, these variables are perceived to provide buffer against loss. More so, error correction result indicated that broad money supply will converge to its long-run equilibrium when there is a short-term relationship between the real gross domestic product, band deposit interest rate, inflation rate, exchange rate and trade openness. means that the errors will continue to be corrected at 1.29%. Interestingly, recursive least square tests (CUSUM TESTS) were applied to check parameter stability for the variables. The graphs showed the stability analysis during the year 1981 to 2020. During the intervals the data look stable because it falls with 0.05%.

5.1 Summary

The paper examines the determinants of the demand for money in Nigeria. the results showed the long-run impact of independent variables (LRGDP, INT, INF, EXR, TRO) on the money supply (LBMS) in Nigeria.The exchange rate significantly negatively affects the money demand in the long-term but positively in short-term. It shows that the economic entity considers the opportunity cost of holding money, thereby adjusting the money supply.Also, an increase in RGDP will raise the national income so that people will need more money to purchase, it will lead to an increase in money demand, In the long run, continued exchange rate appreciation (and appreciation expectations) will reduce demand for money. More so, error correction result indicated that broad money supply will converge to its long-run equilibrium when there is a short-term relationship between the real gross domestic product, band deposit interest rate, inflation rate, exchange rate and trade openness. means that the errors will continue to be corrected at 1.29%. In addition, recursive least square tests (CUSUM TESTS) were applied to check parameter stability for the variables. The graphs showed the stability analysis during the year 1981 to 2020. During the intervals the data look stable because it falls with 0.05%.

5.2 Conclusion

The finding suggested that the real GDP has a positive and significant impact on money demand in the short run and this confirms the economic theories. The interest rate also showed that it has negative and significant impact on demand for money in short run. While the coefficient of the exchange rate showed that it has a negatively relation with the demand for money in the long run. At the same time, the finding showed that the inflation has no impact on affect the money demand in the long run. While trade openness has positive and significant impact on demand for money in the long run.

5.3 Recommendations

On the basis of the findings that have been established and the conclusion drawn from the study, following recommendations are necessary:

(i) Since the RGDP and interest rate are the key factors affect money demand in Nigeria, we suggest that Nigeria can use interest rate and interventions as a tool to adjust money demand.

(ii) The conduct of monetary policy in Nigeria should continue to focus on monetary aggregates, especially their growth rates.

(iii) Policy makers in Nigeria should allow for more trade openness, so as to reduce the country's inflation over time, increase the demand for money and also boost the economy for better productivity.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Foreign Debt Accumulation and Inclusive Growth in Nigeria

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Abstract

The study examined foreign debt accumulation and inclusive growth in Nigeria using time series data for the period of 1981 to 2019. The study used the sum of Gini coefficient and GDP per capita as proxy for inclusive growth being the dependent variable while foreign debt, foreign debt service payment and exchange rate were the independent variables. The study used ARDL as its estimation technique. The study result revealed that foreign debt had negative impact on inclusive growth in Nigeria. Based on its major finding, the study concluded that increase in led to decrease in inclusive growth in Nigeria. The study based on the finding, recommended that Nigerian government should ensure that borrowing from the rest of the world is reduced to the barest minimum in order to achieve the desired level of economic growth in Nigeria. This is necessary because as a country continues to borrow from the rest of the world, the productive capacity of economy might be reduced due to mismanagement of the foreign debt. Therefore, due to mismanagement and misappropriation of public fund such as foreign debt, there is need for the Nigerian government to change her borrowing orientation by encouraging production and discouraging consumption so as to boost savings and investment for capital accumulation towards achieving the desired level of inclusive growth in Nigeria.

Key Words: Foreign debt, accumulation, debt service payment and inclusive growth

1.0 Introduction

1.1 Background to the Study

Debt right from time immemorial has been a major source of livelihood for the government and individuals across most developing countries of the world. Obviously, most developing countries like Nigeria depend on foreign borrowing to finance her governmental projects which is characterized by low savings and investment (Ebi & Imoke, 2020). The provision of social and infrastructural facilities for the improvement of standard of living of citizens in developing countries among others include availability of financial resources, good governance, political will, external loan accessibility and interest rate on loanable fund (Adepoju, Salawu & Obayelu, 2017). Nigeria like many other developing countries is indebted to the rest of the world as most of the countries such as; Madagascar, Burundi, Benin, Chad, Cameroon and Kenya are characterized by low savings, low investment and low capital accumulation (Rafindadi, & Musa, 2019). Hence, foreign debt becomes a wellspring of assets for capital accumulation which assists the attainment of desired level of inclusive growth in an economy. Nigerian economy had been indebted to numerous nations of the world through foreign debt accumulation which is used in boosting inclusive growth through the creation of opportunities for all the teeming population (Tajudeen, 2020). Thus,

economic growth generated through foreign debt has to be inclusive so as to ensure the wellbeing of the entire population. This is because inclusive growth requires full respect for human rights (Victor, Fefa & Mile, 2016).

Particularly, inclusive growth has long been recognized as economic growth distributed fairly across the populace to reduce poverty (Eboreime & Sunday, 2017). Thus, in order to reduce abject poverty through enhanced inclusive growth, Nigerian government year on year accumulated foreign debt. This debt stood at N438.89billion in 2007, N523.25billion in 2008, N590.44 billion in 2009, N689.84 billion in 2010, N896.85 billion in 2011, N1,026.90 billion in 2012, N1,387.33 billion in 2013, N1,631.50 billion in 2014, N2,111.51 billion in 2015, N3,478.91 billion in 2016, N5,787.51billion in 2017, and N7,759.20billion in 2018 (Central Bank of Nigeria, 2018). Succeeding foreign debt accumulation in Nigeria to reduce poverty, GDP per capita stood at N1131.147 billion in 2007, N6951376 billion in 2008, N857449 billion in 2009, N1091.968 billion in 2010, N527.2314 billion in 2011, N963.537 billion in 2012, N2514.1 billion in 2013, N2486.22 billion in 2014, N2739.852189 billion in 2015, N297.9 billion in 2016, N484.415 billion in 2017, N3203.244296 billion in 2018 and N2640.290739 billion in 2019 (World Bank, 2019).

Despite increase in foreign debt accumulation to boost GDP per capita of the populace, many Nigerians have been living below expectations as poverty based on income measurement stood at $2.00 (World Bank, 2020). Foreign debt has important effect on the inclusive growth and investment of a country to the extent, increases the amount of foreign debt servicing affect the amount of inclusive growth as changes from engaging in private investment to repay the accumulated debts to the rest of the world (Umaru, Hamidu & Musa, 2013). Foreign debt is positively related to the inclusive growth rate of a nation if the amount of the accumulated debt is minimal and vice versa. Notwithstanding government determination in handling the nation's debt, the focus of debt has still been a problem to the Nigerian economy.

1.2 Statement of the Problem

Foreign debt is supposed to enhance the recipient economy through increase in capital accumulation and production capacity, employment generation, new technology and knowledge, improvement of the country's balance of payments, new sales and marketing techniques, new business opportunities and high tax revenue to fill savings and investment gap. This is because most developing economies like Nigeria are characterized by low savings and investment (Ebi & Imoke, 2020). Obviously, Nigeria is currently ranked among Sub-Saharan Africa as one of the heavily indebted countries with a stunted GDP growth rate as its value stood at 0.8% in 2019 and -1.79% in 2020, retarded export growth rate, fast dwindling income per capita as its Gini index stood at 35.1% in 2019 and 43.4% in 2020 with an increasing poverty level (World Bank, 2020).

To this end, Victor, Joseph & Godoo (2020) submitted that the utilization of excessive borrowing from the rest of the world without appropriate planning for investment left the Nigerian economy in heavy debt burden and high debt service payment with a resultant effect of declining standard of living of her citizens. Looking at some of previous studies such as; Shkolnyk and Koilo (2018), Elwasila (2018) and Victor, Fefa and Mile (2016) in this area of research, much attention was given to the impact of external debt (foreign debt) on economic growth as a whole without any attempt on foreign debt accumulation and inclusive growth in Nigeria. It is against this backdrop the study examined the effect of foreign debt accumulation on inclusive growth in Nigeria.

1.3 Research Questions

The following questions guided the study

i. What is the effect of foreign debt accumulation on inclusive growth in Nigeria?

ii. What is the effect of foreign debt service payment on inclusive growth in Nigeria?

1.4 Objectives of the Study

The main objective of the study is to examine foreign debt accumulation and inclusive growth in Nigeria. The specific objectives are;

i. To determine the effect of foreign debt accumulation on inclusive growth in Nigeria

ii. To ascertain the effect of foreign debt service payment on inclusive growth in Nigeria

1.5 Hypotheses of the Study

For the purpose of answering the research questions, the following hypotheses in null form are raised. These include;

i. H_{01}: Foreign debt accumulation has no significant effect on inclusive growth in Nigeria

ii. H_{02}: Foreign debt service payment has no significant effect on inclusive growth in Nigeria

2.0 Literature Review

2.1 Conceptual Literature

2.1.1 Foreign Debt

Conceptually, Audu (2014) viewed foreign debt as that part of the total debt that is owed to lenders outside the country. Foreign debt is a portion of a nation's debt incurred from the rest of the world. Foreign debt is the ratio of a country's debt that is acquired from foreign sources such as foreign corporations, government or financial institutions (Didia & Ayokunle, 2020). Foreign debt is a crucial domestic financial resource when there is inadequate fund to enhance the consumption of public goods that raise the well-being to bring about economic growth (Yusuf & Saidatulakmal, 2021). Foreign debt is a fund obtained from other countries usually in other currencies from the rest of the world and is interest- bearing to finance specific project(s). Arnone, Bandiera and Presbitero (2015) conceptualized foreign debt as that part of a country's debt that was borrowed from foreign lenders including commercial banks, governments or international financial institutions. Foreign debt is the amount of money owed to non-residents repayable in terms of foreign currency, food or service (World Bank, 2004). Foreign debt is the amount of money owed by the government to the rest of the world (Hassan & Akhter, 2012).

2.1.2 Foreign Debt Servicing

Foreign debt service payment refers to the payments due under foreign debt contracts. It includes the payment of interest as it becomes due, and redemption payments, this usually have an adverse effect on the Nigerian economy (Didia & Ayokunle, 2020). Foreign debt service payment is the amount of money required to make payments on the principal and interest on outstanding external loans (Audu, 2014). Foreign debt service payments are the sum of principal repayments and interest payments actually made in the year specified. Foreign debt service payment is the amount of money required in a given period to pay for the interest expense and principal of an existing foreign loan (Umaru, Hamidu & Musa, 2013).

2.1.3 Inclusive Growth

Inclusive growth is a concept that advances equitable opportunities for economic participants during economic growth benefits incurred by every section of society (Özşahin & Uysal, 2017). Inclusive growth is economic growth that is distributed fairly across society and creates opportunities for all (Adu,

Marbuah & Mensah, 2013). Inclusive growth is that which strikes a balance between economic and sustainable development to create opportunities for all. Anyanwu and Oaiklem (1995) defined inclusive growth as the rise overtime in an economic capacity of nation to provide goods and services needed to revamp the social welfare of the citizenry. Element of inclusive growth include; poverty reduction, employment generation and increase in quantity and quality of employment, agriculture development, industrial development, social sector development, reduction in regional disparities, protecting the environment and equal distribution of income.

2.2 Theoretical Literature

2.2.1 Debt Overhang Theory

Myers (1977) stated that debt overhang occur when debt stock of a country is more than its future debt service payment. Hence, the nation's debt stock is over and above its capability to pay back the debt. Debt overhang theory occurs in a country if the debt to GDP ratio is high with low savings, low investment and decline in economic growth. Debt overhang theory stated that debt accumulation burden results to low private investment. Hence, decline in economic growth. This is because high debt stock performances causes high debt service payment, low private sector investment and poor economic growth.

2.2.2 The Dual-Gap Theory

Chenery and Bruno (1962) stated that the shortage of savings and investment to enhance economic growth results to external borrowing. The theory also stated that the economic growth of a country is determined by investment and the investment is necessitated by saving domestically (Oloyede, 2002). The theory also stated that excess import over export results to low savings and low investment. Hence, the gap between import and export leads to external borrowing. This gap is therefore represented mathematically as demonstrated in Equation

[1] Investments-Savings=Import-Export

The Equations [1] shows that excess import over export results to low savings and low investment. Thus, implies the reason for external borrowing by such country due to high ratio of import to export and low ratio of investment to savings.

2.2.3 Dependency Theory

Chenery (1956) propounded dependency theory. The theory states that the advanced nations employ foreign capital as a tool to enforce a progressive arrangement that is not harmonious with the domestic requirements of the developing countries. The theory also stresses that external borrowing serves as a modern-day slavery device whereby the Empire Countries demand more than what they have given in order to further enslave the developing countries (who were their former colonies) and rob them of the independence they claim to have gotten. These Empire Countries use inflows from debt servicing arrangement to further impoverish the developing countries, deny them of desired economic development while at the same time enlarging their empires to remain stronger, better and unbeatable. The consequence of reliance on external debt accumulation is that it becomes a mechanism through which industrialized countries exercise control over the unindustrialized nations by deciding the type of projects, level of expertise, equipment to be provided, number of expatriates and local workers, as well as all pricing decisions. In addition, the theory contends that the dependency on external funds gives rise to too much fund outflow referred to as debt servicing which takes away the meager resources of highly indebted poor countries as well as hinder their economic growth.

2.3 Empirical Literature

Yusuf and Saidatulakmal (2021) investigated the effect of government debt on Nigeria's economic growth using annual data from 1980 to 2018 and the Autoregressive Distributed Lag technique for data analysis. The empirical results showed that external debt constituted an impediment to long-term growth while its short-term effect was growth enhancing. Domestic debt had a significant positive impact on long-term growth while its short-term effect was negative. In the long term and short term, debt service payments led to growth retardation confirming debt overhang effect. The findings suggested that the government should direct the borrowed funds to the diversification of the productive base of the economy. This will improve long-term economic growth, expand the revenue base and strengthen the capacity to repay outstanding debts when due. Fiscal improvements that encourage domestic resource mobilization, efficient debt management strategies and reliance on domestic debt rather than external debt for increased deficit financing to engender greater growth are the main contribution of the study.

Didia and Ayokunle (2020) examined external debt, domestic debt and economic growth: the case of Nigeria utilizing data from the Central Bank of Nigeria, and the World Bank for the period of 1980-2016. The Vector Error Correction Model (VECM) was its estimation technique for data analysis. The study revealed that domestic debt has a statistically significant positive relationship with economic growth in the long run while external debt exhibiting a negative relationship with economic growth was not statistically significant. As a policy recommendation from this study, the Federal Government of Nigeria may want to start paying more attention to the mix of domestic debt and external debt in Nigeria's loan portfolio.

Egboi and Ajibo (2019) examined the effect of external debt burden on economic growth in Nigeria using time series data sourced from CBN Statistical Bulletin. The study used Ordinary Least Squares (OLS) estimation technique for data analysis. The variables of interest include; real GDP, money supply and external debt. The result revealed that external debt burden had a negative and insignificant effect on the Nigeria economic growth. Based on the findings the study recommends alternative sources of government revenue to be utilised fully for this will minimize over dependence of government on foreign debt and therefore foster economic growth.

Shkolnyk and Koilo (2018) examined the relationship between external debt and economic growth in Ukraine using time series data for the period of 2006 to 2016. The study employed econometric technique of Ordinary Least Squares for data analysis. The study based on the ordinary least squares results revealed that external debt is positively related to economic growth in Ukraine. The study concluded that increase in external debt resulted to increase in economic growth in Ukraine.

Elwasila (2018) examined the effect of external debt on the economic growth of Sudan using time series data for the period of 1969 to 2015. The study employed Vector Error Correction technique of (VECM) for data analysis. The study based on the results revealed that external debt had significant negative effect on economic growth in Sudan. The study concluded that increase in external debt resulted to decrease in economic growth in Sudan.

Victor, Fefa and Mile (2016) examined the relationship between external debt and economic growth in Nigeria using time series data for the period of 1981 to 2014. The study used ordinary least squares technique of estimation for data analysis. The study based

on the regression results revealed that external debt is positively related to economic growth while external debt service is negatively related to economic growth in Nigeria. The study concluded that increase in external debt resulted to increase in economic growth while increase in external debt service payment led to decrease in economic growth in Nigeria.

Mukui (2013) examined the impact of external debt and debt servicing payment on economic growth of Kenya using time series data for the period of 1980 to 2011. The study used Ordinary Least Squares for data analysis. The study based on the regression results revealed that external debt is positively related to economic growth while external debt service is negatively related to economic growth in Nigeria. The study concluded that increase in external debt resulted to increase in economic growth while increase in external debt service payment led to decrease in economic growth in Nigeria.

Ejigayehu (2013) examined the effect of external debt on the economic growth of eight selected heavily indebted African countries (Benin, Ethiopia, Mali, Madagascar, Mozambique, Senegal, Tanzania and Uganda) through the debt overhang and debt crowding out effect with ratio of external debt to gross national income as a proxy for debt overhang and debt service export ratio as a proxy for debt crowding out. Panel data covering the period 1991-2010 was used. The empirical investigation was carried out on a cross-sectional regression model with tests for stationarity using Augmented Dickey Fuller tests, heteroskedasticity and ordinary regression for data analysis. The concluding result from estimation showed that external debt affects economic growth through debt crowding out rather than debt overhang.

Siddique, Selvanathan, and Selvanathan (2015) examined the impact of foreign debt on economic growth in selected poor countries. The study made use of panel data estimation of an ARDL model. The results revealed that the foreign debt of these poor countries had a negative impact on economic growth both in the long run and in the short run. The study also revealed that foreign debt service payment had negative impact on economic growth in the selected poor countries. The study concluded that increase in foreign debt and debt servicing payment led to decline in economic growth in the selected poor countries.

Saxena and Shaner (2015) examined the relationship between economic growth and external debt in India using time series data for the period of 1991 to 2015.The study utilized Ordinary Least Squares technique as it method of data analysis. The study revealed that economic growth and external debt are positively related in India. The study concluded that despite increase in economic growth India's economic still faced external debt stock.

Amos (2015) examined the impact of foreign debt on economic growth in Zimbabwe using time series data for the period of 1980 to 2013. Ordinary Least Squares (OLS) estimation technique was employed as the technique of analysis. The results indicated that external debt negatively impacted economic growth in Zimbabwe. The study concluded that increase in external debt resulted to decrease in economic growth in Zimbabwe.

Kasidi and Said (2013) examined the impact of external debt on the economic growth of Tanzania using time series data for the period of 1990 to 2010. The study used Ordinary Least Squares (OLS) method to analyze the data. The results showed that external debt stock had a significant positive impact on economic growth while external debt servicing exerted a significant negative impact on economic growth. The study concluded that increase in external debt resulted to increase in economic growth while

increase in external debt service payment led to decrease in economic growth in Tanzania.

Umaru, Hamidu and Musa (2013) studied the impact of external debt on economic growth in Nigeria within the time frame of1970-2010. The study used Ordinary Least Squares method and granger causality. The result based on the Ordinary Least Squares revealed that external debt possessed a negative impact on economic growth while causality test revealed a bi-directional causation between external debt and economic growth in Nigeria. The study concluded that increase in external debt led to decrease in economic growth in Nigeria.

Rifaqat and Usman (2012) assessed the impact of external debt on the economic growth of Pakistan using time series data for the period of 1970-2010. The study employed Ordinary Least Squares (OLS) estimation technique. The study based on the findings revealed that external debt had a significant negative impact on economic growth in Pakistan. The study concluded that increase in external debt led to decrease in economic growth in Pakistan.

Ajayi and Okei (2012) examined foreign debt burden and economic growth and development of Nigeria. Ordinary Least Square (OLS) technique was used for the analysis. The result showed that foreign debt burden had a negative effect on the national income and per capita income of Nigeria. It was found that huge level of foreign debt acquisition brought about declined in economic growth and development in Nigeria. The study concluded that increase in foreign debt burden led to increase in economic growth and development in Nigeria.

Considering most of the extant studies reviewed in this area of research interest such as; Yusuf and Saidatulakmal (2021), Shkolnyk and Koilo (2018), Elwasila (2018) and Victor, Fefa and Mile (2016), much attention was given to the impact of external debt (foreign debt) on economic growth as a whole without little attention given to foreign debt accumulation and inclusive growth in Nigeria. However, the macroeconomic objective of the government is not to achieve economic growth alone through borrowing, but to realize desired level of economic growth that can create opportunities for virtually all the teeming population. It is against this, the study examined the effect of foreign debt accumulation on inclusive growth in Nigeria using Autoregressive Distributed Lag Model to achieve the objectives of the study.

2.5 Theoretical Framework

The study of this nature is anchored on debt overhang theory propounded by Myers (1977). The study is anchored on this theory because it stated that debt overhang occurs when debt accumulated by a country is more than her future debt service payment. Hence, the nation's debt accumulated is over and above her capability to pay back the debt. Debt overhang theory also occurs in a country if the debt to Gross Domestic Product ratio is high with low savings, low investment and decline in growth rate. Debt overhang theory stated that debt accumulation burden results to low private investment which culminates into decline in growth expansion. This theory is applicable in the Nigeria context because Nigerian economy is stocked in foreign debt accumulation, but faced with reduction in the capacity and capability to service the debt due to both exogenous and endogenous factors. The framework of this theory is analytically expressed as showed in Equation [2];

$$[2] \qquad Q_t = \pi_0 + \lambda_0 FD_t + \lambda_0 DSP_t$$

Where; Q_t represent growth rate, FD_t represents foreign debt and DSP represents debt service payment. This implies that growth rate of output in an economy is functionally determined by the amount of foreign debt and debt service payment.

3.0 METHODOLOGY

3.1 Type and Sources of Data

The study utilized time series data for the period of 1981 to 2019, sourced from World Bank Popular Indicator database (2019) and CBN Statistical Bulletin, 2019. The study employed foreign debt (FRD), Foreign Debt Service Payment (FSP) and Exchange Rate (EXR) as the independent variables while inclusive growth was proxy by the sum of Gini coefficient and GDP per capita (SGG). The Autoregressive distributive lag (ARDL) was used as its technique of estimation. ARDL is a least squares regression approach involving the lag of both the endogenous variable and exogenous variables. ARDL model is normally denoted using ARDL notion (p_1 q_1, q_2, q_3, …….q_k). P denotes the number of lags of the endogenous variable and q1 is the number of the lags of the first exogenous variable, and q_k is the lags of the k^{th} exogenous variable.

3.2 Model Specification

In building the ARDL model for the study, the functional, mathematical and stochastic forms of the model were presented in Equation [3], and [4] respectively.

[3] SGG=F (FRD, FSP, EXR)

FRD represents foreign debt, FSP represents Foreign Debt Service Payment and EXR represents Exchange Rate as the independent variables while SGG represents the sum of Gini coefficient and GDP per capita as proxy inclusive growth.

The ARDL model was used to examine the impact of foreign debt on inclusive growth in Nigeria. The ARDL model based on the functional form in Equation [3] was represented as showed in Equation [4]

$$[4] \quad \Delta LSGG_t = \alpha_0 + \sum_{i=1}^{p} \delta_i \, \Delta LSGG_{t-1} + \sum_{k=0}^{p} \beta_k \, \Delta LFRD_{t-k} + \sum_{k=0}^{p} \in_k \Delta LFSP_{t-k} + \sum_{l=0}^{p} \gamma_l \, \Delta LEXR_{t-l} + \lambda_1 LSSG_{t-1} + \lambda_2 LFRD_{t-1} + \lambda_3 LFSP_{t-1} + \lambda_4 LEXR_{t-1} + \mu_t$$

Where α_0 and μ_t is the autonomous component and white noise respectively. The expression with the signs of summation in the equation is error correction. The parameter coefficient denotes the short run effects while lambda (λ) is the corresponding relationship in the long run.

3.3 Method of Data Analysis

The study utilized Autoregressive Distributed Lag (ARDL) estimation technique to achieve objective one and two while Granger Causality test was used to achieve objective three of the study. The choice of the ARDL estimation technique is that it could be applied in the estimation process irrespective of the order of integration of the variables.

Analysis of Data

Table 1: Descriptive Statistics

	SGG	FRD	FSP	EXR
Skewness	5.260001	8.478574	3.497042	6.113166
Jarque-Bera	5.948250	7.239833	7.564767	4.604732
Probability	0.138883	0.017315	0.017315	0.01068
Obs	39	39	39	39

Source: Researcher's Computation**,** 2021

Table 1 indicated 39 observations for all the variables. Based on the descriptive statistic, all the variables were positively skewed. The Jarque-Bera result showed that individually, all the variables were not normally distributed. The result of their probability also confirmed absence of normal distribution among individual variables since their p-values were less than 0.05 based on the rule of thumb. Due to this result, the need for the conduct of unit root test for stationarity.

Table 2: Unit Root Test Results

Variables	ADF Statistic at level	ADF Statistic at first difference	Critical values of 5% at level	Critical values of 5% at first difference	P-values at level	P-values at first difference	Order of integration
SGG	-1.353872	-8.382392	2.960411	-2.963972	0.5736	0.0002	I(1)
FRD	-1.493736	-6.398763	-2.960411	-2.963972	0.0765	0.0000	I(1)
FSP	-3.487392	-2.384738	-2.960411	-2.963972	0.0034	0.0456	I(0)
EXR	-2.349839	-5.483923	2.960411	-2.963972	0.3458	0.0000	I(1)

Source: Researcher's Computation, 2021

The unit root test in Table 2 was conducted to account for the order of integration of the variables. It revealed that all other variables were stationary at first difference except FSP that was stationary at level.

Table 3: Bound Co-integration Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.45	10%	1.89	2.89
K	4	5%	2.17	3.23
		1%	2.73	3.91

Source: Researcher's Computation, 2021

Since the calculated F-statistic (4.45) is greater than the lower bound and upper bound critical values at 1%, 5% and 10% level of significance, the null hypothesis of no long-run relationship among the variables of the selected ARDL(1,0,0,0) is to be rejected. Thus, the variables employed in this study are co-integrated.

Table 4: Estimated ARDL Model

Dependent Variable: D(LNSGG)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.658743	1.598473	0.412108	0.7213
Short Run Model				
D(LNSGG(-1))	0.345769	0.024763	13.96313	0.0001
D(LNFRD(-1))	-0.529584	0.084349	-6.278486	0.0278
D(LNFSP(-1))	-0.474893	0.108732	-4.367556	0.0164
D(LEXR(-1))	-0.401348	0.064453	-6.226987	0.0019
ECT(-1)	-0.644983	0.091562	7.044221	0.0093
Long Run Model				
LNSGG	0.328749	0.287564	1.143221	0.6213
LNFRD	-0.457853	0.085153	-5.376828	0.0042
LNFSP	-0.538473	0.074532	-7.224722	0.0152
LNEXR	-0.483456	0.053463	-9.042815	0.0061
R-squared	0.815764		Durbin-Watson stat	1.745778
Adjusted R-squared	0.508695			
F-statistic	17.37483			
Prob(F-statistic)	0.000002			

Source: Researcher's Computation using Eviews 10, 2021

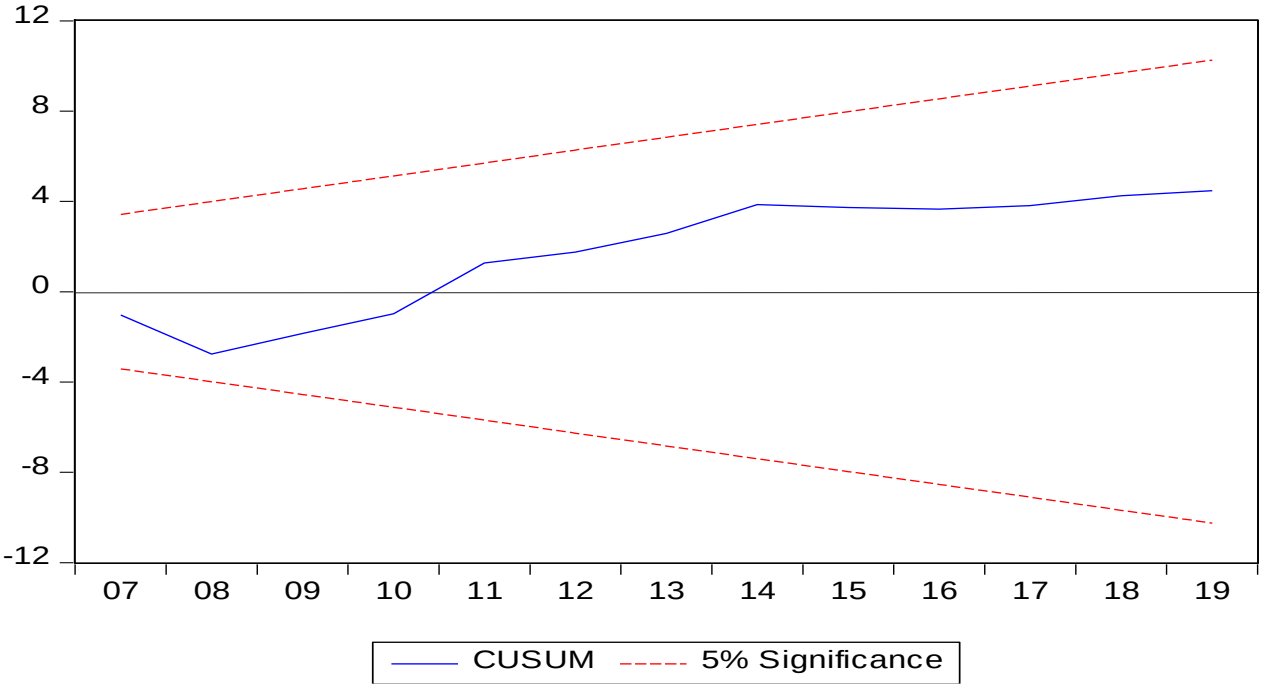
The result of the short run and the long run models in table 3 revealed that the independent variables foreign debt, debt service payment and exchange rate explained about 82% of the

total variations in the sum of Gini coefficient and GDP per capita as proxy for inclusive growth while the remaining 19% unexplained is captured by the error term. Considering the prob (F-statistic) of 0.000002 the entire model is robust and is devoid of the presence of autocorrelation problem. The short run model accounts for the speed of adjustment to long run equilibrium of the variables employed. Hence, the speed of adjustment of the model to long run equilibrium is measured by the coefficient of the first lag of the error correction term (ECT (-1)).

The error correction term (-0.64) has the right a priori sign and it is statistically significant. Hence, the result of the ECT (-1) showed that 64% of the deviation of the variables in the short run will be restored in the long run within one year. Based on the long run form of the ARDL model, foreign debt has an estimated coefficient of -0.46 meaning a 1% increase in foreign debt led to 46% decrease in the sum of Gini coefficient and GDP per capita in Nigeria. Hence, foreign debt had significant negative impact on inclusive growth in Nigeria within the study period.

Foreign debt service payment has an estimated coefficient of -0.54 meaning a 1% increase in foreign debt service payment led to 54% decrease in the sum of Gini coefficient and GDP per capita in Nigeria. Hence, foreign debt service payment had significant negative impact on inclusive growth in Nigeria within the study period. Exchange rate has estimated coefficients of -0.48. This implied that 1% increase in exchange rate led to 48% decrease in the sum of Gini coefficient and GDP per capita in Nigeria. This implied that increased in exchange rate led to decline in inclusive growth in Nigeria.

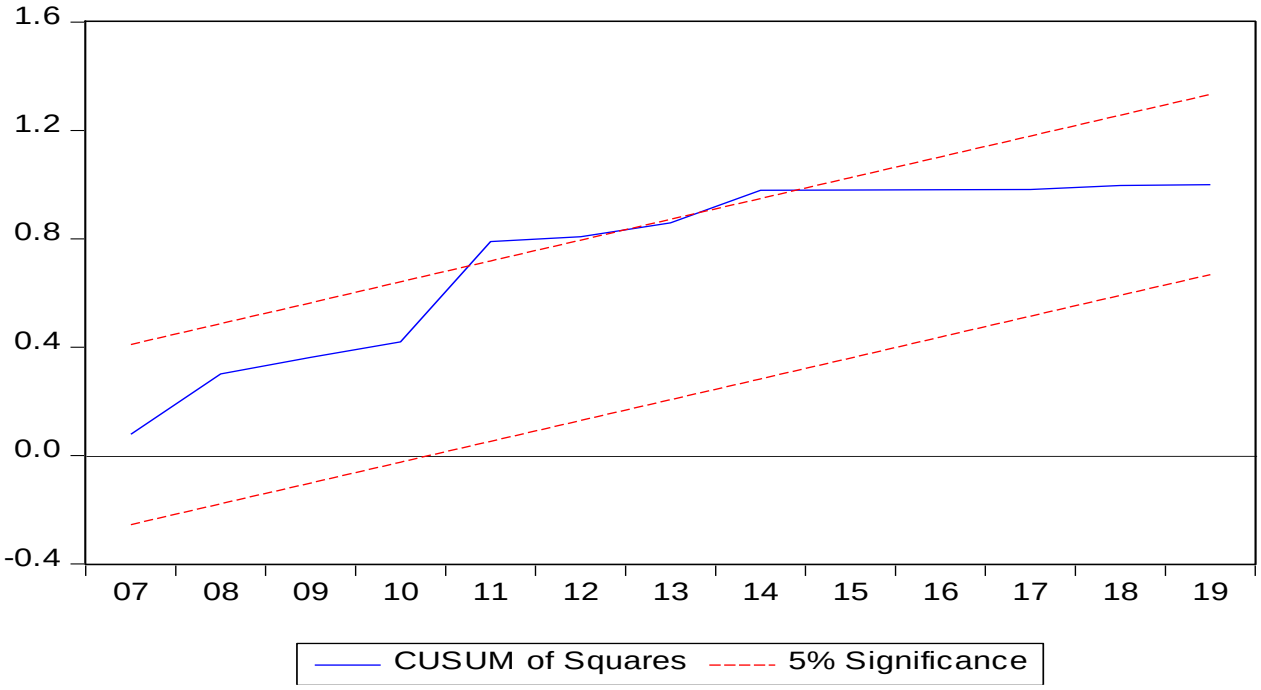
Fig 1.0: Stability Test: CUSUM test



Source: Researcher's Computation, 2021

The result of the CUSUM test in figure 1.0 which is the necessary condition for stability of a model shows that the blue lines lies inside the dotted red line and it indicates that the model is dynamically stable at 5% level of significance.

Fig 1.1: Stability Test: CUSUM of Squares test



The result of the CUSUM of squares test in figure 1.1 which is the sufficient condition for stability of a model shows that the blue lines lies inside the dotted red line and it indicates that the model is dynamically stable at 5% level of significance.

Conclusion

Based on the findings, the study concluded that increase in foreign debt led to decrease in inclusive growth proxy by the sum of Gini coefficient and GDP per capita in Nigeria. The study also generalized that foreign debt had significant negative impact on inclusive growth in Nigeria within the study period. Furthermore, the study also concluded that increase in foreign debt service payment led to decrease in inclusive growth proxy by the sum of Gini coefficient and GDP per capita in Nigeria. Thus, foreign debt service payment had significant negative impact on inclusive growth in Nigeria within the study period. Finally, the study concluded that increase in exchange rate led to increase decrease in inclusive growth proxy by the sum of Gini coefficient and GDP per capita in Nigeria. This implied that exchange rate had significant negative impact on inclusive growth in Nigeria.

Recommendations

From the result of the findings, the following recommendations were made.

i. Nigerian government should ensure that borrowing from the rest of the world is reduced to the barest minimum level in order to achieve the desired level of economic growth in the Nigerian economy. This is necessary because as a country continues to borrow from the rest of the world, the productive capacity of economy might be reduced due to mismanagement of the foreign debt. Therefore, due to mismanagement and misappropriation of public fund such as foreign debt, there is need for the Nigerian government to change her borrowing orientation by encouraging production and discouraging consumption so as to boost savings and investment for capital

accumulation towards achieving the desired level of inclusive growth in Nigeria.

ii. Nigerian government should ensure that borrowing from the rest of the world is reduced to the barest minimum level in order to minimize the level of service payment in terms of borrowing so as to achieve the desired level of inclusive growth. This is necessary because excessiveness of foreign debt increases foreign debt service payment to the rest of the world. Therefore, to attain desired level of inclusive growth in the Nigerian economy, there is every need for the government to reduce foreign debt vis-à-vis decline in foreign debt service payment in order to accomplish the desirable level of inclusive growth in Nigeria.

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Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Impact of Human Capital Development on Inequality in Nigeria

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Abstract

This study assessed the impact of the Human capital development on inequality in Nigeria. The main objective of this study was to determine the impact of human capital development on inequality in Nigeria. The research study employed Auto-Regressive Distributed Lag (ARDL) technique. The result of the study revealed that there is long run relationship between human capital development and inequality in Nigeria. There is an interrelationship among human capital development and inequality in Nigeria. It was observed at the end of the study that about 10.96% (inequality) of the short-run inconsistencies are being corrected and incorporated into the long-run equilibrium relationship in each period. Effort of the government should be at increasing government expenditure on education and health in order to reduce inequality in the short run and long run respectively. Policy that promotes education without the productive capacity of labour would not lead to reduction in inequality, also, policies of reducing income inequality in Nigeria should invariably incorporate productivity growth measures for such policies to be sustainable.

Keywords: Human Capital; Inequality; (ARDL) technique; Productivity Growth.

Introduction

Recently, developing countries have been classified generally by high income inequality, poor literacy level, low income, poor health care system, and low standard of living (Todaro and Smith, 2011). Moreover, spending by the government on health care and education, which are the main precondition infrastructure necessary to improve human capital development in developing countries, is extremely low. Low level of human capital results in a range of socio-economic challenges, which includes income inequality, poverty and unemployment in an economy, and has been on the rise over the years in a number of developing countries especially those of Sub Sahara Africa countries such as Nigeria. Countries that developed human capital significantly, on the other hand, enjoy quite a number of benefits such as equitable income (low-income inequality), reduced poverty, increased employment opportunities, wealth distribution, income equality and sustainable economic growth rate. Countries that failed to develop her human capital adequately have the following demographic indicators such as low life expectancy, and high mortality rate. (Ajibola, Loto&Enilolobo 2019)

Nigeria, in attempt to develop her human capital embarked on some educational programs in the past such as Universal Basic Education (UBE), etc ; but these have only served as conduits to transfer money to the corrupt political leaders and their cronies.

It is evident that accumulation of human capital positively and significantly affects the

income level of individuals and the entire nation. Consequently, individuals with low education have lesser prospects to earn as much income as those with better education. Inequality has negative consequences on the economy and more acute for developing nations than the developed nations. The implications are poverty, poor health of the people, low life expectancy, high level of illiteracy. (Chani, Jan, Pervaiz and Chaundhary 2014).

According to World Bank (2011) , Human Development Index (HDI) in 2011 puts Nigeria at 156th position among 177 countries as compared to the 151st position in 2002. (National Bureau of Statistics - NBS, 2012; UNDP, 2013). Thus, this study seeks to examine the effect of human capital (education and health) on inequality, by bridging the gap between the rich and the poor i.e., reducing inequality.

1.2 Statement of the Problem

Nigeria as one of Africa's biggest economies has been faced with the problem of human capital development over the years. In spite of all the abundant resources of the nation such as crude oil, bitumen, fertile land for agriculture, and so on, Nigeria has failed to realize her full development potential in terms of sustainable human capital development or people-oriented development, like many other prosperous economies with similar or even less naturally endowed.

Various other policies have been done in Nigeria to reduce income inequalities which include the National Economic Empowerment Development Strategy for the period of 2003 and 2007, which was aimed at sustainable wealth creation, poverty reduction, employment generation and value re-orientation. The programme was spread to the State level, and named State Economic Empowerment Development Strategy. The policy was to ensure that the nation has her income equitably distributed. Yet, income inequality worsened between 2004 and 2013 from 35.6 to 41 percent, and continues to get worse by every yearly. The inequality rate hits its peak in Nigeria at 0.55 according to the GINI index (Oxfam international 2018).

Private universities have increased by over 100 percent in Nigeria. Consequently, it increased the cost of education and made education unaffordable for the low-income earners. In response to this, various researchers have investigated the factors affecting human capital and inequality in Nigeria with diverse views and their outcomes remain inconclusive and unsatisfactory for the essential empirical needs of policy makers. A few of the research studies are Ajibola, Loto and Enilolobo (2019), Ewubare and Okpani (2018), Lucky and Achebelema (2018) which examined the relationship between poverty and inequality in Nigeria. Also Sharimakin, Oseni and Adegboye (2015) examined the role of education and productivity on income inequality in Nigeria. Researchers like Chani, Jan, Pervaiz and Chaudhary (2014) examined the causal relationship between human capital and income inequality in Pakistan. None of the above previous studies examined the relationship between human capital development and inequality in Nigeria, which is the central focus of this study. These form the gap, the needs, and justification for this study.

With the aim to successfully carry out this research, the succeeding question was raised: What is the impact of human capital on inequality in Nigeria?

The broad objective of this study is to examine the impact of human capital development on inequality in Nigeria.

Literature Review

Inequality is the differences in the sharing pattern of something among people where the share is more for some than others. Income inequality refers to material dispersion across

the country that has an influence on the position of individuals. Krugman (2002) income inequality occurs when an individual or a group of people are beneficiaries of resources, while another individual or group of people are denied of the same resources. Income inequality is the inequitable distribution of resources (income) among the population of an economy.

Functionalist Inequality Theory

The functionalist argue that inequality is functional for a country since it ensures that those who exhibit the most prospective gifts are confident to increase their gifts by gaining qualifications through education and training with the aim of higher incomes. The country is in layers like a pyramid of unequal people, and the layers ensures that the best people stay at the top of the pyramid and the rest at the bottom part of the pyramid with less power and are given less rewards than the people at the top of the pyramid.

Davis and Moore (1945) propounded that inequality ensures that most functionally important jobs are done by the most qualified people. So, it is justifiable for the head of an organisation to earn more money than the cleaner because his job is functionally more important in that organisation. The functional importance of a job was ascertained by the extent to which the job is unique, level of skills and the number of years for training, which implies that only a few (those who are qualified) can perform those functions.

They were some criticisms against the functionalist theory. Firstly, it is difficult to ascertain the functional importance of a job, as specialisation and inter-dependence make every position unique and imperative in the overall operation of an organisation. For example; Footballers earn more than doctors. Are footballers more important than doctors?. Secondly, the social stratification by the functionalist does not work like the functionalist claimed because some are born into the top of the pyramid (children of company owner, the wealthy) and just remain at the top of the pyramid not having to worry about climbing the ladder up.

Empirical Review

Ajibola, Loto and Enilolobo (2019) examined poverty and inequality in Nigeria from 1980 to 2013. The study adopted the OLS, Johansen co-integration and pair-wise granger causality tests. The result of the study showed a uni-directional causality from Poverty (POV) to Growth Rate of Gross Domestic Product (GGDP); Government Expenditure on Health (GEXPH) to Inequality (measured by PCI); Government Expenditure on Education (GEXPED) to PCI. The study recommended that policies and strategies aimed at improving access to quality health facilities and educational opportunities with increased job creating opportunities should be pursued.

Ewubare and Okpani (2018) examined the relationship between poverty and income inequality in Nigeria within the period 1980-2017. The study adopted the OLS, co-integration, ECM and Granger causality test. The result of the study showed that national poverty index was positively related to inequality but statistically not significant. The ECM result showed that poverty and unemployment have positive significant relationship with inequality. It was established that as poverty and unemployment rate increased, inequality increased correspondingly, inferring close links among the variables. The study recommended that deliberate effort should be made by government to creating employment opportunities as a major tool in order to combat poverty and inequality in Nigeria.

Lucky and Achebelema (2018) examined poverty and income inequality in Nigeria. The study adopted the Nigerian Bureau of Statistics survey to examine poverty and income inequality in Nigeria. The findings of the study showed that there is wide gap

between the rich and the poor and significant proportions of Nigerian population are living below the poverty line adopted in this study. The study also found. The study recommend implementable polices to reduce poverty and reduce income inequality in Nigeria.

Sharimakin, Oseni and Adegboye (2015) examined the role of education and labour productivity on income inequality in Nigeria for the period 1981 to 2013. The study adopted the co-integration and error correction methodology in the empirical analysis. The result of the study showed that productivity has a stronger impact on inequality reduction than education. The study recommended that any policy that promotes education without the productive capacity of labour would not lead to reduction in inequality and that policies of reducing income inequality in Nigeria should invariably incorporate productivity growth measures for such policies to be sustainable.

Research Methodology

This study examined the impact of human capital development on inequality in Nigeria and it relied on time series data from 1985 to 2020. The time frame was due to the availability of data from the central bank of Nigeria statistical bulletin, World Bank database and SWID database.

The study adopted the empirical model used by Ajibola, Loto and Enilolobo (2019) on poverty and inequality in Nigeria which is presented in equation 1 as:

$$POV_t = f(PCI_t,\ E_t,\ H_t,\ UNEMP_t) \quad 1$$

Where:

PCI = Per capita income

POV = Poverty

H = Government expenditure on Health

E = Government expenditure on Education

UNEMP = Unemployment

In order to suitably examine the effect of human capital on inequality, the study modified the model in equation 1 by dropping poverty rate and unemployment rate and replaces them with life expectancy, mortality rate and average years of schooling. The justification for the choice of these variables is based on role they play in human capital development of a nation, thereby leading to economic development. The study further replaces per capital income with inequality data. The justification for this is to directly measure inequality without proxy or manipulation on data. By so doing, the study included life expectancy, mortality rate and average years of schooling, inequality in addendum with the already government expenditure on health and education variables. Thus, the modified model proposed for this study is specified as in equation 11 as follows:

$$INQ_t = f(H_t, E_t, L_t, M_t, A_t) \quad 2$$

Where:

INQ = Inequality

H = Government expenditure on health

E = Government expenditure on Education

L = Life expectancy

M = Mortality rate

A = Average rate of schooling

Expressing equation 11 in linear form:

$$INQ_t = H_t + E_t + L_t + M_t + A_t \quad 3$$

Expressing equation 3 in stochastic form:

$$INQ_t = \alpha_0 + \alpha_1 H_t + \alpha_2 E_t + \alpha_3 L_t + \alpha_4 M_t + \alpha_5 A_t + \mu_t \quad 4$$

Where α_0 is the constant and $\alpha_1 \alpha_2\ \alpha_3 \alpha_4 \alpha_5$ are the coefficients of the variables. From equation (4), INQ_t is Inequality, H_t is the Government Expenditure on Health, E_t is the Government Expenditure on Education, L_t is the Life Expectancy, M_t is the Mortality Rate,

A_t is the Average Years of Schooling, μ_t is the error term.

The estimation techniques used for this study, is Auto Regressive Distribution Lag test to test for the presence of long run relationship among the variables, Error Correction model to show the rate at which short-run inconsistencies are being corrected and incorporated into the long-run equilibrium relationship was employed which was determined after conducting the preliminary tests like the unit root test, co-integration, lag selection test.

To derive a well reliable result, the data for Inequality were sourced from the SWIID Database while the data for Mortality rate, Life Expectancy and Inequality were gotten from World Development Indicators, also human capital was represented with government expenditure on health and education which were gotten from the Central Bank Nigeria (CBN) statistical bulletin was used to source for annual time series data while the E-view was used to analyze the data sourced.

Results

Table (i): Unit Root Test

Variables	Test statistics	Critical value			Order of Integration
		1%	5%	10%	
INQ	-3.077574	-3.632900	-2.948404	-2.612874	I(0)**
AYS	-3.815736	-3.632900	-2.948404	-2.612874	I(0)***
GHEA	-2.984452	-3.711457	-2.981038	-2.629906	I(1)**
LE	-2.937667	-3.639407	-2.951125	-2.614300	I(0)**
GEDU	-3.995774	-3.724070	-2.986225	-2.632604	I(1)**
MR	-7.113841	-3.639407	-2.951125	-2.614300	I(1)*

Note: * (**) (***) denotes null hypothesis at 10%, 5% and 1% level of significant respectively
Source: Author's Computation, (2021) from E-view 9, Statistical Package

Table (i) showed the result of the Augmented Dickey-Fuller unit root test. From the result, it is shown that inequality, average years of schooling and life expectancy attained stationarity at level and at 1%, 5% and 10% level of significance while government expenditure on health, government expenditure on education and mortality rate attained stationarity after differencing i.e. at first difference and at 5% level of significance. The economic implication of this is that any shock or disturbance (e.g. government policy) to the variables will not be sustained for a long period of time meaning such shock will die off in a short while.

According to the rule of thumb which says that when there is mixture of 1(0) and 1(1) ARDL approach to co-integration should be applied and otherwise Johansen co-integration. Since there are mixtures of I (0) and I(1) variables. Autoregressive Distributed Lag model (ADRL) was adopted and bound test was used to capture the presence of co-integration as against Johansen co-integration.

ARDL Bound Co-integration on Human capital development and Inequality

Table (ii): ARDL Bound test

Null Hypothesis	F - Statistic	Critical Values Bounds		
		Significance	**Lower bound**	**Upper bound**
No long-run relationships exist	5.091188	10%	2.26	3.35
		5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

Source: Author's Computation, (2021) from E-view 9, Statistical Package

The table (ii) revealed that the computed F-stat of 5.091188 is greater than the Upper Bound table value at any % level of significance. The study rejects the null hypothesis. This is interpreted as there is long-run relationship among the variables, that is, the variables co-move on the long run. This implies that study may proceed further to the long run analysis and the short-run dynamic and error correction analysis.

Long and Short Run Estimation Coefficients

Having confirmed the existence of long-run relationship among the variables, the study will estimate long run and short run parameters by general to specific procedure ARDL model.

Table (iii): Long Run Co-Integrating Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C (INQ)	275.507503	104.740699	2.630377	0.0141
GEXEDU	3.623982	1.199420	3.021445	0.0077
GEXHEA	2.264555	1.023284	2.213027	0.0409
LE	-2.578103	1.495507	-1.723900	0.0966
AYS	13.769637	9.479756	1.452531	0.1583
MR	-0.314533	0.120518	-2.609851	0.0148

Source: Author's Computation, (2021) from E-view 9, Statistical Package

The result of table (iii) indicated that the coefficient of inequality is positive and statistically significant at 5% level of significance. This implies that if all the variables are held constant, inequality will be significantly increased by 275.50%. The coefficient of government expenditure on education and health are positive and statistically significant at 5% level of significance which implies that 1 percent change in expenditure toward educational and health sectors will significantly affect inequality positively by 36.23% and 22.64% respectively. On the other hand, life expectancy portrayed a negative and insignificant relationship with inequality which connotes that 1 percent increase in life expectancy will reduce inequality by 25.78%. Furthermore, average years of schooling indicated a positive and an insignificant relationship with inequality, implying that 1% increase in average year of schooling will result to about 13.78% increase in inequality though not significant. On the final note, mortality rate has negative and significant relationship with inequality which implies that 1% change in the effort of the government on

mortality rate will result to about 3.14% change in inequality.

The Short-run Dynamic and the Error Correction Model

Table (iv) The Short-run Dynamics and Error Correction Model

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(GEXEDU)	0.603477	0.198556	3.039320	0.0074
D(GEXHEA)	0.683367	0.305594	2.236191	0.0390
D(LE)	5.321118	3.281819	1.621393	0.1170
D(AYS)	15.092418	11.400500	1.323838	0.1971
D(MR)	0.164173	0.298951	0.549165	0.5876
ECM (-1)	-1.096065	0.213615	-5.131020	0.0000

Source: Author's Computation, (2021) fromE-view 9, Statistical Package

The result in the table (iv) indicated that the coefficient of the error correction term ECM(-1) has the correct sign and significant at 5% level. The value of the coefficient is -1.096065. The result shows that about 10.96% of the short-run inconsistencies are being corrected and incorporated into the long-run equilibrium relationship in each period. In other word, it can be said that the level at which human capital development adjust to equilibrium was about 10.96%. This therefore implied that an approximate 11% of the discrepancy between long and short run level of human capital development in Nigeria was corrected and incorporated on yearly basis.

The short run result revealed that government expenditure on education as well as on health sectors has positive and significant relationship with inequality. Therefore, it can be concluded that the government expenditure on education and health has the coefficient of 0.603477 and 0.683367 implying that government expenditure on education and health decreased inequality by 6.03% and 6.83% respectively in the short run. In further relationship between life expectancy and inequality, the analysis disclosed that though a positive relationship exists but it is insignificant in nature which implies that the standing relationship between life expectancy and inequality is positive and insignificant at 5%, hence, life expectancy will positively contribute to inequality by 53.21%. More so, the result of average years of schooling and inequality posited a positive and an insignificant relationship. Therefore, when the level of average years of schooling increases by 1 unit, it will result to 15.0924 increases on inequality. Lastly, mortality rate has a positive and an insignificant relationship with inequality to the tune of 1.64%.

Discussions and Recommendations

Discussions:

The central objective of the study is to investigate the human capital formation as a driver for solving inequality problem in Nigeria covering period of 1985 to 2020.

Human capital development was proxied by government expenditure on education and health, life expectancy, average years of schooling and mortality rate; whereas inequality was directly captured. Secondary data were exacted from Central Bank of Nigeria (CBN) Statistical Bulletin and World Development Indicators.

Recommendations:

Some policy options that could strengthen human capital development and inequality in Nigeria include:

i. Effort of the government should be at increasing government expenditure on education and health in order to reduce inequality in the short run and long run respectively.

ii. Effort of the government should be at creating employment opportunities as a major tool in order to reduce income inequality and combat poverty in Nigeria;

Contributions to Knowledge

The study made some important contributions to knowledge by:

i. Establishing the influence of human capital development on inequality;

ii. Building on recent data for the purpose of analysis.

iii. Providing information on the significant effect of government expenditure on education and health as parameters of human capital development on inequality.

Suggestion for Further Studies

This study opens new opportunities for future researchers in the following ways;

1. Future research could extend by covering more countries by doing cross country research in order to strengthen results.
2. Secondly, a comparative study may be carried out on industries.
3. Thirdly, application of quarterly data is suggested.
4. Comparative study on regions of the country could be researched

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