Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Socioeconomic Determinants of Corruption in Nigeria: 1981 - 2016

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Abstract

Most empirical studies on the determinants of corruption are cross country studies. Furthermore, studies related to corruption are on corruption and economic growth while those on the determinants of corruption in Nigeria were not empirical hence; this paper adopted the error correction mechanism and data from 1981 - 2016 to examine the socio-economic determinants of corruption in Nigeria. The findings revealed that all the variables were difference stationary and there exists long run relationship among the variables. It was found that inflation rate and income inequality affect corruption positively in Nigeria while per capita income was found to have significant negative impact on corruption. Unemployment rate and population density were found to have insignificant impact on corruption. The study then recommends that government should ensure that inflation is brought under check through various policy formulations as this would reduce corrupt tendencies among the citizens. Policy makers should enhance per capita income as well as ensure equitable income distribution among the citizens as this may reduce corruption to its barest minimum in Nigeria.

Keywords: Corruption, inequality, per capita income and socioeconomic determinants
JEL Codes: D7, D73.

1. Introduction

Generally, corruption is the use of public office for private gain (Gray and Kaufmann, 1998). Ijewereme (2015) identified electoral corruption, nepotism, favouritism, budgeting corruption, ghost–workers phenomenon, procurement scam among others as the various forms of corruption in the Nigerian public sector. Corruption has been the bane of Nigeria's development since independence. Obasanjo (2014) noted that corruption remains a major bane of the Nigeria society and despite the fact that it is present in every society; attempts should be made not to condone it as it carries with it the threat to annihilate a country that is ingrained with corruption. Similarly, Aluko (2002) posited that societies ridden with corruption will not survive or develop in an orderly fashion.

The perception people have about corruption can also be a determining factor for getting involved in corrupt practices. In this vein, Travits (2010) found that for citizens and public officials, the decision whether to engage in corruption is mostly affected by individuals' definitions of corruption and personal perceptions of how widespread corruption is. Thus, Ghulam and Abdul (2014) asserted that it is essential to consider corruption as a social deviation instead of defining it as an individualistic action and that human behaviour is influenced by the sophisticated relations among social, political, economic and cultural structures of the society.

There has been an increasing interest in the alarming rate of corruption in Nigeria, hence, the need to reduce or eliminate it completely. For example, Gbadamosi (2006) opined that Nigeria has been consistently rated as one of the most corrupt nations in the world since 2001 by the Transparency International Corruption Perception Index. Out of 174 surveyed countries in 2014, Nigerian ranked 136 while in 2015, out of the 168 countries surveyed, Nigeria was ranked 136 (Transparency International, 2016). In 2017, Nigeria was ranked 148th out of 180 countries surveyed by the corruption perception index (Transparency International, 2018).

In Nigeria, most empirical studies like Nageri, Gunu and Abdul (2013), Odubunmi and Agbelade (2014), Chiam (2015), Enofe, Oriaifoh, Akolo and Oriaifoh (2016), Ighodaro and Mogbolu (2017) are on the impact of corruption on economic growth. On the other hand, Moyosore (2015), Ezenagu (2018), Nigeria Finder (Undated) identified some causes/determinants of corruption in Nigeria as poverty, acceptance of poverty by the populace, weak government institutions, greed, and poor education and illiteracy. These may be the root causes of corruption in Nigeria; however, these were not empirically tested by the authors. Furthermore, most empirical studies on determinants of corruption are not country specific studies but cross country studies. As a result, the objective of this study is to examine the socio-economic determinants of corruption in Nigeria. Following this, section 2 presents literature review and theoretical framework while section 3 is methodology and model specification. Section 4 is analysis and interpretation of results while section 5 provides the conclusion and recommendations.

2.0 Literature review and theoretical Framework

Social Disorganization Theory

Social disorganization theory originated as part of the Chicago School, a body of work focusing on urban sociology in the 1920s and 30s (Bernard, Snipes, and Gerould, 2010). The theory is based on the assumption that behaviour is influenced primarily by one's environment, and that corruption and other deviant and criminal behavior are a result of weakened mechanisms of social control (Steenbeek and Hipp, 2011). The theory has been applied to how antisocial attitudes develop in individuals, families, and communities, and how those attitudes conflict with larger social norms (Johnson, 1998).

The theory posits that dysfunctional behavior has cultural, political, and economic causes (Akers & Sellers, 2009). Established communities experience increases in deviance and crime when their way of life and the established order change. Disorganized communities such as the case of Nigeria experience crime because informal social controls break down, resulting in the emergence of deviance and criminal cultures. Such communities lack the collective efficacy to fight crime and disorder (Hochstetler & Copes, 2008; Vito, Maahs & Homes, 2007). The theory predicts that more crime will occur in neighborhoods with fraying social structures, such as failing schools, vacant or vandalized buildings, changing ethnicity, and high unemployment (Steenbeek & Hipp, 2011).

The sociological perspective of behaviour does not consider specific behavior as a problem of an individual but instead considers individual behavior as reflecting the social order in which an individual lives. This assumption agrees with Durkheim's notion that all behavior is socially generated. In this view, a particular social problem such as corruption must be addressed by focusing on a society, not a particular individual's behavior (Steenbeek & Hipp, 2011). Johnson (1998) used social disorganization theory to argue that in many nations corruption is embedded in the overall society. In these countries, economic and political processes perpetuate corruption rather than resist it. Consistent with the assumptions of social disorganization theory, corruption can be reduced by developing enhanced criminal justice, political, social, and economic

institutions, which will bring about social empowerment (Colombatto, 2003)

Social Learning Theory

The theory of social learning is based on the assumption that a similar learning process can produce both deviance and conformity. The theory identified four variables as determinants of social behavior. They include: definitions, differential association, modeling, and reinforcement. The interaction of these variables predisposes one to either conforming or deviant behaviour (Singer and Hensley, 2004).

According to social learning theory, behavior is influenced by standards of legal and illegal behavior, peers, and positive or negative reinforcement. A key variable is differential association, or peer influence. Definitions of deviance are developed in interactions with peers and are reinforced, positively or negatively, by rewards and punishments. Those definitions affect attitudes and behavior in many areas such as: sexual behavior, substance use and white-collar crime (Akers and Sellers, 2009).

Bernard, Snipes, and Gerould (2010) characterized social learning theory as acknowledgement that learning involves interplay of environmental, behavioral, and cognitive influences. Criminal or deviant behavior, then, results in part from the observation of consequences that particular behaviors have for other people (Akers & Sellers, 2009). Although social learning theory addresses potential influences on criminal behavior, it does not address the particular environments that create such behavior. Bernard et al. (2010) suggested that social structure affects crime because it affects one's exposure to norms and the consequences of violating norms. Social leaning theorists argue that behavior is influenced by one's self-concept, one's social role, and how one perceives a social situation (Sandholtz and Taagepera, 2005). Each of this in turn is the product of the socialization that occurs at the institutional level (Meng and Friday, 2010). A social problem such as corruption, then, is affected not only by material incentives but also by cultural orientations, which are the result of socialization (Sandholtz & Taagepera, 2005; Travits, 2010).

In empirical review, the prevalence of corruption in the society has been attributed to socio-economic factors amongst others factors. Empirical findings of studies such as Ali and Isse, (2003); Brunetti and Weder (2003) reported a negative relationship between human capital and corruption. Saha and Gounder, (2013) found that higher level of educational attainment intensively discourage the corrupt activities through increasing employment opportunities and equal income distribution. They also investigated this relation in non-linear framework using Gini coefficient as a measure of income inequality and concluded that higher income inequality contributes positively to the level of corruption. Treisman (2000) showed that exposure to democracy for a long period reduces perceived levels of corruption. Chowdhury (2004), Brunetti and Weder (2003) and Lederman *et al*. (2005) found that press freedom reduces corruption.

Most studies on corruption in Nigeria are with respect to corruption and economic growth as noted earlier with little or no emphasis on the determinants of corruption, though; most of these papers are not country specific papers. There are a large number of published papers that examine the socio-economic determinants of corruption. For example, Serra (2004) examined the determinants of corruption using sensitivity analysis for sixty two countries developing and developed countries. The author examined four economic variables, five socio-cultural variables and seven political variables. The findings revealed that five variables are robustly related to corruption. Corruption is lower in richer countries, where democratic institutions have been preserved for a long continuous period, and the population is mainly Protestant. Corruption is instead higher where political instability is a major problem. Finally, a country's colonial heritage appears to be a significant determinant of corruption.

Seldadyo and De Haan (2006) analyzed the determinants of corruption with the use of seventy economic and non-economic determinants. They used factor analysis technique and found that regulatory capacity can be concluded as the most robust determinant of corruption. The authors found that population density had positive relationship with corruption, ethnic tension, government wage, portion of population with no religion have positive relationship while and portion of female in labor force has negative link with corruption. In a similar study, Serra (2006) conducted a sensitivity analysis on the determinants of corruption. The result showed that out of twenty eight variables used, only five variables (country's level of development, the age of democratic institutions to exert corruption, political stability, and prevalent protestant countries) were found to be negatively significant in the determination of perceived corruption.

Shabbir and Anwar (2007) examined the determinants of corruption in forty one developing countries. They found that almost all of the economic determinants were significant in determining corruption in developing countries except for income distribution. Economic freedom, globalization, and economic development all have negative relationship towards corruption. It signifies that as the three variables increase, there will be a decline in corruption. On the other side, the education level variable has a positive relationship towards corruption. It denotes that the rise in education level in a country will also increase the perceived level of corruption. In the non-economic determinants model, they found out that degree of democracy, press freedom and religion in share of total population did not have significant impact towards the perceived level of corruption. Thus, they concluded that the social-political and religious norms are meager and unable to affect the level of corruption in developing countries.

Ghulam and Abdul (2014) empirically investigated socioeconomic determinants of corruption using panel data set of developing eight countries and GMM estimation method. The results suggested that economic development, government size, income inequality, urbanization and education have statistically significant impact on corruption. An increase in economic development, government size and education level lowers the corruption, whereas, skewed income distribution and urbanization enhance its level. However, inflation, economic competition and female labor force participation were found statistically insignificant. The study recommended that economic managers should focus on the policies that promote education, economic development, less skewed income distribution and government size to control the corruption in the country.

Nafi and Fithra (2017) analyzed various political, social and economic determinants, measured through development indicators and various indexes, upon the perceived level of corruption indicated by corruption perception index in nine two observed countries for the year of 2014. The results showed that level of development, degree of democracy, economic freedom, level of education, political stability and religion have significant impact on the perceived level of corruption. Yet, there are differences in significant variables between the developing and developed countries groups.

3. Methodology

The paper adopts the co-integration analysis and Error Correction Modelling approach. The scope of the study covered the period 1981to 2016. The Error Correction Model (ECM) is used to establish the short-run dynamics between corruption perception index and its socioeconomic determinants in Nigeria. Hence, following the works of Shabbir and Anwar, 2007; Ghulam and Abdul, 2014; as well as Nafi and Fithra, 2017, the functional model specification used in this paper is:

$$CPI = f(INFL, PCI, UNEMP, POPD, GINIC). \quad 3.1$$

Where:
CPI = Corruption perception index
INFL = Inflation rate
PCI = Per capita income

UNEMP = Unemployment rate
POPD = Population density
GINIC = Income inequality

Accordingly, from a priori considerations, inflation rate, unemployment rate, population density and income inequality are expected to be positively related to corruption while per capita income is expected to be negatively related to corruption. Equation (1) can be expressed in log-linear form as:

$$CPI_t = \beta_0 + \beta_1 LNGINIC_t + \beta_2 LNINFL_t + \beta_3 LNPCI_t + \beta_4 LNPODP_t + \beta_5 LNUNEMP_t + \beta_6 LNCPI(-1) + \mu_t \quad \text{..... 3.2}$$

Where LN before a variable is the log of that variable; β_i are parameters and β_i, $(for\ i = 1, 2, \dots, 5)$ are the long run parameters to be estimated and μ_t is the stochastic error term. Equation (2) is estimated using the Ordinary Least Squares (OLS) technique. Since the variables are co-integrated, the next step is to obtain the short run dynamic parameters by estimating an Error Correction Model (ECM) associated with the long run estimates. This is specified as:

$$CPI_t = \beta_0 + \beta_1 LNGINIC_t + \beta_2 \Delta LNINFL_t + \beta_3 \Delta LNPCI_t + \beta_4 \Delta LNPODP_t + \beta_5 \Delta LNUNEMP_t + ECM(-1) + \mu_t \quad \text{..... 3.3}$$

The order of integration of the variables that were used in the estimation was first tested to ascertain the time series property using the (Dickey and Fuller, 1979, 1981) Augmented Dickey Fuller (ADF) test based on the estimation of the following equations (with only intercept as well as with intercept and trend).

$$\Delta LNY_t = \gamma_0 + \gamma_1 LNY_{t-1} + \sum_{i}^{k} \gamma_2 \Delta LNY_{t-i} + \varepsilon_t \dots\dots\dots 3.4$$

$$\Delta LNY_t = \gamma_0 + \lambda_t + LN\gamma_1 Y_{t-1} + \sum_{i}^{k} \gamma_2 \Delta LNY_{t-i} + \omega_t \dots\dots\dots 3.5$$

Where:

γ_0, γ_1 and γ_2 are coefficients to be estimated while LNY is the variable whose time series properties are considered while ε_t and ω_t are the white –noise error terms of both models with intercept only as well as intercept and trend. $\gamma_1 = 0$ implies the series is non – stationary (the null hypothesis). $\gamma_1 \prec 0$ implies the series is stationary (the alternative hypothesis). Lag length is automatic and it is based on Schwarz Information Criterion.

The Engle and Granger (1987) suggest a co integration test which consists of estimating the co integration regression equation by ordinary least squares, obtaining the residual $\hat{\mu}_t$ and applying unit root test for $\hat{\mu}_t$ using the equation below:

$$\mu_t = y_t - \hat{\phi} x_t \quad \text{.....3.6}$$

where $\hat{\mu}_t$ follows an autoregressive process;

$$\mu_t = \hat{\rho}\, \mu_{t-1} + \hat{\omega}_t, \text{ with } \hat{\omega}_t \sim iid(0, \sigma^2). \quad \text{.....3.7}$$

4. Analysis and Interpretation of Results

In this section of the paper, the results are presented in the order of unit root results, Co-integration results and Estimated Error Correction model.

Unit Root Result

The results of the ADF tests are presented in Table 1 below:

Table 4.1: Augmented Dickey-Fuller Unit Root Test at Levels and First Difference – Intercept only and Intercept and Trend

	Intercept Only			Intercept and Trend		
Variable	ADF Test Statistic	Test Critical Value	Remark	ADF Test Statistic	Test Critical Value	Remark
LNCPI	-2.8326	-4.2000	NS	-7.1431	-5.5218	I(0)
D(LNCPI)	-4.4661	-3.3209	I(1)	-	-	
LNGINIC	-2.2291	-3.7529	NS	-3.7964	-4.4163	NS
D(LNGINIC)	-7.5608	-3.7695	I(1)	-7.6292	-4.4407	I(1)
LNINFL	-3.3348	-3.6329	NS	-3.2957	-4.2436	NS
D(LNINFL)	-5.4411	-3.6394	I(1)	-5.3294	-4.2528	I(1)
LNPCI	-0.1747	-3. 6329	NS	-2.2326	-4.2435	NS
D(LINPCI)	-5.4134	-3.6394	I(1)	-5.3098	-4.2528	I(1)
LNUNEMP	-1.9975	-3.7529	NS	-0.3991	-4.4407	NS
D(LNUNEMP)	-7.0985	-3.7695	I(1)	-8.1849	-4.4407	I(1)
LNPOPD	-2.4043	-2.9810	NS	-3.0729	-3.5875	NS
D(LNPOPD)	-3.4464	-2.9810	I(1)	-3.8605	-4.3560	I(1)

Notes: Eviews, 7.0 ; i. The test critical values of all the variables at 1% level of significance except population density at 5% level of significance; ii. D denotes first difference of the variable; iii. The null hypothesis is that there is a unit root.

From the results, as revealed in Table 1, all the variables are non-stationary at levels except corruption perception index (CPI) which has mixed results. It was I(1) when only trend was used in the model but I(0) when both trend and intercept were used.

Co integration Test

Having established the time series properties of the data, the paper proceeded to conduct the Engel Granger residual based co integration test. The results of the test are reported in Table 2 below.

Table 4.2: The Engle and Granger Two Steps Procedure

Variable	ADF Test Statistic	Test Critical Value	Remark
Residual	-3.680584	-2.847250	I(0)

The null hypothesis is that the residual has a unit root and the lag length is automatic based on Schwartz Information Criterion (SIC).

Based on the ADF unit root test, since the residual is stationary at level, the Engle and Granger two steps procedure reveals that there is long run relationship among the variables in the model.

Results of the Estimated Model

The results of the models (2) and (3) estimated are shown in Table 3 below:

pTable 4.3: Estimated Coefficients of the Long Run and Short Run Models

Depended Variable (LNCPI) Long Run Model		Depended Variable D(LNCPI) Short Run Model	
Constant	-0.507684	*Constant*	*4.375461*
	(-0.091142)		*(2.648556)*
LNGINIC	-0.502689	*D(LNGINIC)*	*0.185254*
	(-4.776506)		*(2.166810)*
LNINFL	0.228786	*D(LNINFL)*	*0.140672*
	(8.586423)		*(5.211158)*
LNPCI	-0.228786	*D(LNPCI)*	*-0.104105*
	(-4.920609)		*(-2.014133)*
LNPOPD	2.077277	*D(LNPOPD)*	*-161.4817*
	(4.057802)		*(-2.599361)*
LNUNEMP	-1.718994	*D(LNUNEMP)*	*-1.708740*
	(-0.857906)		*(-0.553506)*
LNCPI(-1)	-0.531426	*ECM(-1)*	*-0.903058*
	(-4.846459)		*(-5.252621)*
R-squared	0.988558	*0.977122*	
Adjusted R-squared	0.954231	*0.908489*	
F-statistic	28.79845	*14.23685*	

Figures in the parentheses are the t-statistics
Source: Author's computation using E views 9.0

For the long run model, the coefficient of determination (R^2) whose value is 0.99 indicates that about 99% of the variations in corruption perception index are explained by the explanatory variables. The adjusted R-squared (0.95) shows that about 95% of the systematic variations in corruption perception index are accounted for by the independent variables in the long run model. The F-statistic (28.798) indicates that the whole model is significant at the 5% level. The regression results revealed that income inequality coefficient is negative and significant at the 5% level. The relationship between corruption and income inequality is interesting because this suggests that low income inequality breeds corruption in the long run in Nigeria. A positive and statistically significant relationship was found between inflation rate and corruption perception index in the long run. Inflation rate coefficient is 0.23 with a t-statistic of 8.59. It is significant at the 5% level. Hence, inflation rate has a positive significant effect on corruption in the long run in Nigeria. Also, the estimated coefficient of per capita income is negative and significant at the 5% level of significance. Thus, per capita income has a significant negative impact on corruption in the long run in Nigeria. The estimated coefficient of population density is positive and significant at the 5% level of significance. It means that population density has a significant positive impact on corruption in the long run in Nigeria. However, the coefficient of unemployment turned out negative but insignificant at the 5% level. This indicates that unemployment has an insignificant effect on corruption in the long run.

For the short run model, the R^2 is 0.98 showing that about 98% of the systematic variations in corruption perception index are accounted for by the explanatory variables. Similarly, the adjusted R^2 whose value is 0.91 which denotes that about 91% of the variations in corruption perception index are determined by the independent variables in the short run model. The F-statistic indicates that the overall short run model is significant at the 5% level. Also, the error correction coefficient is statistically significant and negative. This suggests that it will rightly act to correct any deviation of the dependent variable from its long-run equilibrium value.

In the short run, the results revealed that income inequality has a significant positive

impact on corruption. This shows that high income inequality breeds corruption in the short run in Nigeria. Also, a significant positive relationship was found between inflation rate and corruption perception index. This implies that inflation rate has a significant positive effect on corruption in the short run in Nigeria. Again, the estimated coefficient of per capita income is negative and significant at the 5% level of significance. Thus, per capita income has a significant negative impact on corruption in the short run in Nigeria. In this same vein, the estimated coefficient of population density was found to have a significant negative relationship with corruption perception index. This reveals that high population density will reduce corruption in the short run in Nigeria. However, the coefficient of unemployment turned out negative but insignificant at the 5% level. This signifies that unemployment has an insignificant influence on corruption in the short run.

5. Conclusion and Recommendations

This paper used the Error Correction Model technique to capture the short run dynamics between corruption perception index and the socioeconomic determinants of corruption. The Augmented Dickey-Fuller test revealed that all the variables are difference stationary. Also, there exists a long run relationship among the variables. It was discovered that inflation rate has a significant positive effect on corruption both in the short run and long run in Nigeria. Therefore, inflation rate is a determining factor of corruption in Nigeria.

The implication is that high inflation can induce individuals to get involved in corrupt practices. As a result, individuals may be induced to get involved in corrupt practices so as to augment the fall in the value of money arising from inflationary pressure. Thus, government should ensure that inflation is brought under check which will in turn help reduce corrupt tendencies among the citizens.

Also, per capita income was found to have a negative significant effect on corruption both in the short run and long run. Hence, high per capita income will discourage corruption in Nigeria. To this end, there is a need for government to enhance per capita income as this will discourage corruption in Nigeria.

In addition, population density was found to have a significant negative effect on corruption in the short run whereas in the long run, population density has a significant positive impact on corruption in Nigeria. This can be interpreted to mean that there may be high pressure on available resources resulting to corrupt practices in the long run as a result of fear of not having a grab of it.

Furthermore, in the short run, income inequality was found to have a positive significant impact on corruption in Nigeria. This shows that high income inequality fuels corruption in Nigeria in the short run. But surprisingly, income inequality was found to have a negative significant impact on corruption in the long run. This result is somewhat counterintuitive in that low income inequality breeds corruption in the long run in Nigeria. A possible explanation for this finding might be that if corruption is not reduced to its barest minimum it will become so endemic and entrenched in the system that even when the income gap between the rich and the poor is low, people won't consider the need to refrain from engaging in corrupt practices. Thus, there is the need for government to ensure equitable income distribution among the citizens as well as reduce corruption to its barest minimum in Nigeria.

Last, rate of unemployment was discovered not to be a contributing factor to corruption in Nigeria both in the short run and long run. As a result, government should make efforts to reduce unemployment either through provision of incentives to go into farming or basic infrastructure that may aid self employment in Nigeria.

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Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

The Impact of Rail Freight and Passengers Volume on Economic Growth in Nigeria: 1970 -2017

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Abstract

The study investigated the impact of rail freight and passengers volume on economic growth in Nigeria (1970 – 2017). Annual time series data were sourced from Nigerian Railway Corporation, Federal Ministry of Transport, Central Bank of Nigeria and National Bureau of Statistics. The data were tested for stationarity using Augmented Dickey Fuller (ADF) test while the co-integration was conducted using Johansen's test. The estimation technique employed for the time series data was Error Correction Model (ECM). The results show that, there is long-run equilibrium relationship between the key variables, Gross Domestic Product (GDP), Volume of Freight (VOF) and Volume of Passengers (VOP). ECM also has the expected negative sign and is between the accepted region of less than unity. The result showed VOP has a positive relationship with GDP but does not have significant impact on GDP. VOF has a negative relationship but has significant impact on GDP. The negative impact of VOF on economic growth can be attributed to total neglect of railway sub-sector in Nigeria by successive government. The study therefore recommends that government should continue to increase capital expenditure in the rail sub-sector in order to rehabilitate old and provide modern rail tracks, purchase modern coaches and locomotives will aid movement of passengers and goods across cities and the hinterland which will boost economic activities, increase output, facilitate trade and generate employment across the country.

Keywords: Freight, Passages, Rail Transportation, Economic Growth
JEL Codes: O18, R41, O47.

1. Introduction

Transportation is a derived demand. The demand from a given location depends on the existence of demand of passengers and goods in the distant location. Transportation plays an important role in helping to bridge the demand and supply gap inherent in production approach between the geo-political zones of the economy. Transportation affects every individual directly or indirectly. The place we go to, the goods we consume and the entertainment are impacted by transportation. The growth of the Nigerian economy is attributable in part to the transportation system of the economy (Siyan, 2017).

Transportation infrastructure investment is critical to the economic well-being of Nigeria. These investments enhance mobility and provide our people with increased business and work opportunities. Advancing integrated, multi-modal networks provide travel options that improve connectivity, affect the health and well-being of urban and rural communities, and contribute to creating "smart" cities through the 21st century. Also, continuous re-investment is important to sustaining and advancing the Nigerian's competitive advantage in the worldwide

marketplace. It allows companies to establish lean supply chains and deliver competitively priced products and services, while at the same time achieving healthy profit margins.

The role of public infrastructure in the process of economic growth has received a wide attention since the contributions of Aschauer (1989) and the theoretical model of Barro (1990). These works showed that public capital generates spillover effects for the private sector. This view has been questioned in subsequent studies. It has been argued that while public investment may be considered as a factor input that contributes to economic growth, the way it is financed may crowd out private investment (Mittnik & Neumann, 2001). The main criticism of government intervention is that it is not as effective as market forces in allocating resources.

In many countries, rail transportation has and continues to play a catalytic role in bringing about socioeconomic development. It contributes substantially to the movement of passengers and freight. Indeed, railways can provide the most cost-effective, affordable, energy saving and environmentally friendly form of transport, when traffic densities are high. When properly integrated with other modes of transport, economic levels of traffic can be consolidated to enable the railway provide efficient services for high density flows of homogenous traffic carried over relatively long distances, including high volumes of containerized cargo or bulk freight such as oil, coal, steel or agricultural produce. Rail transport could be energy flexible and energy efficient, when electric traction is used.

The Nigerian railway network consists of 3,505 kilometers of single track route of 1,067mm (narrow) gauge and 479 km of the standard gauge construction of 1,435mm (Ajaokuta - Warri line). It traverses from the South-West (Lagos) to the North-East (Maiduguri) and from the South-South (Port Harcourt) to the North-West (Kaura - Namoda). Equally, new railway lines are being constructed in standard guage (1,435mm). These include: Ajaokuta - Warri of 277km; Kaduna - Abuja line of 186km while the scope of work for Lagos – Ibadan segment is under review together with its cost implications. The primary reason for constructing the railways was partly administrative: to provide a link between the northern and southern parts of Nigeria and partly economic: to enhance the evacuation of mineral resources and agricultural products from the hinterland to the seaports, for onward shipment to overseas markets in Europe (Nigerian Railway Corporation, 2017).

Several years after independence, Nigerian rail transport infrastructures investment still remains primary in Nigeria's transport system. While the maritime sector has been developed in terms of capacity and fair country-wide spread, the rail sector continues to be bogged down by systemic neglect (Akwara, Udaw & Ezirim, 2014).

The railway well suited for the movement by large numbers of inter-city passengers and high volumes of containerized cargo or bulk freight such as oil, coal, steel or agricultural produce. Since the fall in the price of oil in the international market, it has been difficult for the nation to finance her rail transport infrastructures because Nigerian economy is mono-economy that depends only on one source of foreign exchange earnings. The railway is well suited for the movement by large numbers of inter-city passengers and high volumes of containerized cargo or bulk freight such as oil, coal, steel or agricultural produce. The effects of the poor performance of the Nigerian railway subsector is already being felt seriously in the form of the undue pressure being mounted on the road transport across the country and the attendant huge damage to roads and loss of lives among other things. Many rail and road projects have been stopped due to the fall in oil revenue. This has led to low economic activities, decrease in productivity, increase in unemployment, low income, and high price level among others.

At the moment, the NRC operates just one freight service from Lagos to Kano each week. Years of neglect of both the rolling stock and the right-of-way have seriously reduced the capacity and utility of the system. Couplings of the chopper kind, vacuum brakes and non-roller bearing plain axles are also obsolete. By early 2013, the only operational segment of Nigeria's rail network was between Lagos and Kano. Passenger trains took 31 hours to complete the journey at an average speed of 45 km/h. With Nigeria's increasing population rate and the majority of the population involved in intra and interstate trade, Nigerian rail transport can no longer provide effective and efficient means of transporting passengers and goods **(**Ataguba, 2014).

From the foregoing, this study seeks plausible answers to the following research questions:

i. Is there any significant impact of volume of freight from rail transportation on economic growth in Nigeria?
ii. Does volume of passengers from rail transportation have positive impact on economic growth in Nigeria?

2. Literature Review and Theoretical Framework

The relationship between transport and economic development is a matter of much theoretical interest and practical importance and one that has received considerable attention over many years in both the developed and less developed countries. It is also an extremely topical and controversial area of study. Economists seek to explain how transportation infrastructure development can improve economic growth and also standard of living of the citizens. On the other hand, Geographers are more concerned with the spatial implications of transportation infrastructure development which would help in the general allocation of government expenditure in the economy (Ojekunle, 1999).

Yoshino and Abidhadjaev (2015) examined the nature and magnitude of the impact of railway infrastructure provision on regional economic performance in Uzbekistan. They employed difference-in-difference methodology linking the changes in the growth rate of regional-level economic outcomes in affected regions to the newly built railway connection in the southern part of Uzbekistan. The empirical results suggest that the Tashguzar–Boysun–Kumkurgon railway line in Uzbekistan encouraged an increase of around 2% in growth rate of the region due to connectivity effects by increasing the industry value added and services to approximately 5% and 7%, respectively. Positive and significant changes in the industrial output of the directly affected and neighboring regions mostly took place during the design and construction period in anticipation of the railway connection. The impact on agricultural output has been moderate in comparison to the other sectors, constituting around 1%. They suggested that the nature of effects of the infrastructure provision might be mirrored throughout the transition economies of Central Asia, as well as in other developing countries of Asia that might share a commonality of processes accompanying emerging markets.

Ojekunle (2015) assessed the commercial viability of rail transport operations in Nigeria. The data collected were analyzed using both descriptive statistics and regression analysis (SPSS Version 20). The results of data analysis showed that rail transport operations presently are not commercially viable. The variables used were volume of passenger, freight carried, Operating cost, Number of trips, Number of locomotives/wagons and coaches available. The result of the regression analysis shows that operating cost, number of trips made the capacity of train service and volume of freight carried were major determinants of estimating revenue generated from passenger operation. The variables account for 90.2% of the factors that determine the amount of revenue generated from freight operations of rail transportation in Nigeria. The NRC ran its operation at an average annual loss of 58.3% for passenger operation and 32.8% for

freight operation. However, it is revealed that increase in the operational capacity of NRC will enhance the commercial viability of rail services in the country. It is therefore suggested that rail operational capacity should be increased by providing more locomotives, wagons, coaches and improving its operational efficiency.

Mitwallyova and Jankovic (2015) examined the influence of railway infrastructure on the lives in selected European countries. Descriptive statistics were used to analyze the data. It was discovered that in the freight transportation area that all states are predominantly surpassed by Estonia who successfully exploits its position on the Baltic Sea coast. Germany and the Czech Republic reach mean values, while Serbia exceeds Italy as well as Switzerland and Great Britain. The differences are not very significant though. Comparing the indicators of transported gross-ton-kilometres per 1 employee, a huge dispersion is striking which shows in analysis outcomes in many European countries. The average value is 1.52 million gtkm per 1 employee, the most efficient Estonia having the indicator of 14 million gtkm per 1 employee, while the lowest being held by Great Britain with a mere 29.8 gtkm/1 employee. The study noted that EU states are capable of far more efficient utilization of their workforce than post-communist states with the exception of Estonia in the area of freight transportation.

Lingaitisa and Sinkevičiusb (2014) studied the relations between the passenger transport by railway and macroeconomic processes of a country (region), the correlation and regression statistical analysis of people's income, consumption, motorization, change in population, unemployment and passenger circulation were used. The 2001–2012 statistical research indicators for Lithuania were used. The result shown that, due to the increased motorization as a result of the growing standard of living, the amount of railway passengers is decreasing, negative – reverse correlation coefficients between the passenger transport and the indicators of GDP, average wage, final consumption expenditures were found. Also close correlation of the passenger transport and the change in population were recorded.

Apanisile and Akinlo (2013) examined the link between rail transport and economic growth in Nigeria over the period 1970-2011 using Error Correction modeling approach. The economic variables used were; GDP, capital, government expenditure on rail, rail and pipeline output and inflation. The results show that there is long-run relationship among the variables. In addition, the EC models show that the error correction term is correctly signed and significant while there is inverse relationship between rail transport and economic growth in Nigeria. There is negative relationship between inflation and economic growth in Nigeria over the period under review. This explains the decadence in the sector due to the neglect of the sector by the government. The study therefore concluded that government should embark on development policies that will aim at strengthening the sub-sector of the economy so that it can operate in its full capacity and neutralize the decadence that is evident in the sector.

Furthermore, Herranz-Loncán (2011) examined the role of railways in export-led growth of Uruguayan economy between 1970 and 2010 using OLS estimation. The results showed that Uruguayan railways did produce some positive effects. They helped to integrate the national market while also promoting the political and administrative unification of the country. However, their economic impact was much lower than in other countries of the region that experienced export-led growth. This indeed has affected the growth prospects of the Uruguayan economy. The results, therefore, provide reason for relative poor performance of the economy during the period under study. The study concluded that Uruguayan case provides a clear-cut example in which geography limited the potential of railway technology to generate significant levels of economic growth.

Robinson and Mortimer (2004) studied the state of the art in urban rail freight distribution on the basis of some relevant European examples. They discovered that rail has, in many areas, been displaced in whole, or in part, from a dominant position as road transport services have grown and developed in capability and levels of sophistication that have not, regrettably, been matched by rail service providers. Rail's generic weaknesses, particularly in door-to-door capability, cost - compared to road transport alternatives, which largely exclude consideration of external costs - and service availability have been the principal causes of the decline in rail's share of the urban freight market. The development of city planning, zoning and rebuilding practice has also created problems by effectively sterilizing operational and commercial options that were formerly open to rail. They therefore, concluded that there is no doubt that rail no longer commands a prominent place in urban freight activities. There are some grounds for believing that rail can rebuild market presence, but this will need to be done with a much greater recognition of the market's needs and requirements and how these continue to evolve. Shippers are now accustomed to slick; sophisticated, road-based logistics services and are very unlikely to be prepared to sacrifice these for a less capable and costlier alternative.

In addition, Ramirez (2001) studied the impact of rail transport on the Colombia's economic development using panel data set for the period 1914-1980. The study adopted fixed effect model and found out that railroads did not play an overwhelming role in the Colombian economy, in contrast to other Latin American countries with similar rail transportation system such as Brazil and Mexico. In addition, the study found out that railroads caused expansions in coffee exports, but the magnitude of these effects were lower than those suggested in the literature.

3. Methodology

This section presents macroeconomic models that permit the simulation of influence of macroeconomic variables on the Nigerian economic growth. The models consist of one behavioural equation and four explanatory variables. The methodology to be employed in estimation of the time series data is Error Correction Model (ECM). Following the link between rail transportation infrastructure and economic growth reviewed earlier, as well as the work of Pooloo (2009), hence we adapt the model of Ojekule (2015) with the functional relationship specified as follows:

$$GDP_t = f(VOF_t, VOP_t, INF_t, INT_t) \quad ...3.1$$

In order to capture the responsiveness of the dependent variable (GDP) to the explanatory variables (VOF, VOP, INF, INT), we take the log of equation (3.1)

$$\ln GDP_t = \beta_0 + \beta_1 \ln VOF_t + \beta_2 \ln VOP_t + \beta_3 INF_t + \beta_4 INT_t + \mu_t \quad ...3.2$$

In the model represented by equation (3.2), GDP is the Gross Domestic Product. Other variables in the model are defined as follows: VOF represents Volume of Freight in rail transport while VOP is the Volume of Passengers in rail transport. INF and INT are inflation rate and interest rate. $\beta_1 - \beta_4$ represent the coefficients of the explanatory variables, while μ is the error term. The a priori expectation posed that β_1 & $\beta_2 > 0$ while β_3 & $\beta_4 < 0$.

4. Estimation and Interpretation of Result

Unit Root / Stationarity Test

Stationarity is defined as a quality in which the statistical parameters (mean and standard deviation) of the process do not change with time (Challis & Kitney, 1991). The assumption of the classical regression model necessitates that both the dependent and independent variables be stationary and the errors have a zero mean and finite variance. According to Granger and Newbold (1974), the effects of non-stationarity include spurious regression, high R^2 and low Durbin-Watson (DW) statistic. The Augmented

Dickey Fuller test modifies the work done by (Dickey & Fuller, 1979) was used to test the Stationarity of the data.

Table 4.1: Unit Root Test for Stationarity Result

Variable	ADF Statistics	Critical Value	Stationary Status
GDP	-7.610362	-4.26274(1%) -3.55297(5%) -3.20964(10%)	I(1)
VOP	-8.625674	-4.26274(1%) -3.55297 (5%) -3.20964(10%)	I(1)
VOF	-5.166726	-4.26274(1%) -3.55297 (5%) -3.20964(10%)	I(1)
INF	-4.484296	-4.26274(1%) -3.55297 (5%) -3.20964(10%)	I(0)
INT	-5.860210	-4.5743 (1%) -3.6920 (5%) -3.2856 (10%)	I(1)

The critical values for rejection of hypothesis of unit root were from MacKinnon (1990) as reported in e-views 9.0.; Source: E-Views Output, Version 9.0

The table above shows the result of the unit root test for stationarity. The five variables (GDP, VOP, VOF, INF and INT) underwent unit root test using the Augmented Dickey-Fuller (ADF) test. As is the case most times, only INF was stationary at levels I(0) while other variables (GDP, VOP, VOF and INT) were found to be stationary after first difference I(1).

Table 4.2: Johansen Co-integration Test
Series: GDP VOP VOF INF INT

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.825231	236.9292	150.5585	0.0000
At most 2 *	0.573807	113.3767	88.80380	0.0003
At most 3 *	0.524298	76.70361	63.87610	0.0029
At most 4 *	0.402146	44.75621	42.91525	0.0323
At most 5	0.205504	9.892040	12.51798	0.1321
At most 6	0.256499	22.63661	25.87211	0.1200

*Trace test indicates 4 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: E-Views Output, Version 9.0*

The table 4.2 above shows there is long run relationship among three keys variables which are GDP, VOF and VOP. The result shows the three variables (GDP, VOF and VOP) converge in the long run thereby depicting the existence of long run relationship among them. The long run relationship exists at 5% level of significance according to the trace test statistics. However INF and INT were not co-integrated with the rest of the variables, this implies there exists

three (3) co-integrating relationships among the variables.

Table 4.3: Error Correction Mechanism
Dependent Variable: ΔGDP_t

Independent Variables	Coefficient	Standard Error	t-Statistic	Pr Value
Constant Intercept	-51672.43	17761.16	-3.44554	0.0456
ΔVOF_t	11824.59	895.6475	10.04561	0.0000
ΔVOP_t	0.002521	0.001290	1.954225	0.0639
ΔINF_t	-13552.67	547.4567	-1.221881	0.0531
ΔINT_t	1.024911	0.012171	3.104332	0.0021
ECM (μ_{t-1})	-0.246324	0.035809	-3.125736	0.0000
R^2	0.503576	F Statistic	33.46217	(00000)
Adjusted R^2	0.541721	D-W Statistic	1.947939	

Source: E-Views Output, Version 9.0

Since the key variables were found to be co-integrated implying that they have long run equilibrium relationship, it is necessary to test for short run relationship. From table 4.3, the ECM parameter is negative (-) and significant which is -0.246324, this shows that 25 per cent disequilibrium in the previous period is being corrected to restore equilibrium in the current period. It has been established the variables are co-integrated and also have short run relationship established from the ECM. Hence, the OLS technique will be used to derive the long-run impact of the independent variables (VOP, VOF, INF and INT) on the dependent variables (GDP).

Table 4.4: Least Square Regression Result
Dependent Variable: GDP

Independent Variables	Coefficient	Standard Error	t-Statistic	P-Values
C	6.945064	2.181561	3.183530	0.0028
VOP	0.003153	0.102328	0.030817	0.9756
VOF	-0.283406	0.102705	-2.759409	0.0087
INF	0.020343	0.008187	2.484810	0.0172
INF	0.020343	0.008187	2.484810	0.0172
R^2	0.583594	F Statistic	74.98254	0.00000
Adjusted R^2	0.541543	D-W Statistic	1.947939	

Source: E-Views Output, Version 9.0

Table 4.4 is the result of the least square estimate for the model. Volume of Passengers (VOP) has a positive impact on Gross Domestic Product. This result fulfils a priori expectation and consistent with previous literature including the study of Dowden (2013); Mitwallyova and Jankovic (2015); and the study of Ojekunle (2015). Volume of Freight (VOF) has a negative impact on Gross Domestic Product. This result does not fulfil a priori expectation. This result supports the study of Robinson and Mortimer (2004) on the impact of urban rail freight in some European countries but not consistent with empirical study of Dowden (2013); and Mitwallyova and Jankovic (2015). Interest Rate (INT) has a positive impact on Gross Domestic Product. This result also fails a priori expectation and is not in line with the study of Maiga (2015) and Obamuyi (2009). The result from Inflation Rate (INF) shows that INF has a positive impact on Gross Domestic Product. This result does not fulfil a priori expectation and is not consistent with the study of Apanisile and Akinlo (2013) and Marbuah (2010). But the study of Umaru and Zubairu (2012) show that there is positive relationship between inflation and economic growth which is in line with our result.

5. Conclusion and Recommendations

Transportation plays a pivotal role in the economic, political and social development of every nation. No two locations will interact effectively without a viable means of movement. Rail transportation can therefore provide substantially to the movement of passengers and freight (goods). Indeed, railways can provide the most cost-effective, affordable, energy saving and environmentally friendly form of transport in Nigeria if adequate attention can be given to it by the government. Rail transportation has capacity to link producers and consumers together, making it easy to move raw materials, commodities and other finished products. An efficient and effective rail transportation system in Nigeria is essential in supporting economic growth and in fact serves as a corner stone to economic development.

Also, increase in volume of freight and passengers have the capacity and potential to increase economic growth and employment in Nigeria if government can continue to increase its investment in the rail transportation sub-sector. Increase in the number of locomotives, coaches and cargoes will improve movement of passengers and goods will boost trade and business activities, increase output, generate employment either directly or indirectly and generate more revenue for the government.

Rail transportation infrastructure investment in Nigeria has only been in the exclusive list of the government. This has hampered the development of rail transportation sub-sector. As a matter of fact, the Nigerian Railway Corporation has operated as a monopoly since its establishment. Deregulation of the activities of NRC like what obtains in the telecommunication sector will improve the rail infrastructural provision and services delivery of the corporation. Involvement of the private sector in the provision of rail transportation facilities and services will indeed improve the sub-sector and overall economic performance in Nigeria.

Based on the findings, of this study, the following recommendations are proffered in order to improve the quality and quantity of rail transportation infrastructure in Nigeria:

The government remains the major financier of infrastructure in every economy. Nigerian government must continue to increase capital expenditure in the rail sub-sector in order to rehabilitate abandoned rail tracks and construct new rail tracks across the country. This will improve the contribution of rail transportation in contributing to economic growth and employment generation in Nigeria. In order to improve economic activities, the government should provide modern rail tracks, purchase modern coaches and locomotives, which will aid the movement of passengers and goods across cities and the hinterland. This will improve trading and mobility in the country. The Nigerian Railway Corporation functions as a monopoly. There is need for government to decentralize the sub-sector in order to allow other levels of governments (states and local governments) participate in the establishment and provision of rail transportation infrastructure which has been in the exclusive list of the federal government.

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Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Entrepreneurship in Nigeria: Periscoping the Obstacles, Challenges and Way Forward

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Abstract

Growing Entrepreneurship is the engine room that is critical to the development of societies. Entrepreneurs however, cannot work in isolation; they need the right environment to thrive.the paper adopted the interview method of the primary methodology in data sourcing, The findings of this paper is for the judicial system, the educational system, the financial system and general government policies should be such that encourage and promote entrepreneurship. Thus the paper recommends the that Basic infrastructures such as power, water, and transport systems are necessary to boost entrepreneurship thus creating a better entrepreneurial society via creating an enabling environment and support for entrepreneur, creation of a curriculum of entrepreneurship and rebasing of the private sector.

Keywords: Entrepreneurship, Nigeria Economy, Institutional Framework, Infrastructure, Intellectual Property Protection

JEL Codes: I26

1. Introduction

A person, working within an existing organization or independently, who identifies a business opportunity within a given market and sets up an enterprise or subsidiary to take advantage of the opportunity is known as an Entrepreneur (Gartner, 1988). He assumes the risks involved in pursuing the opportunity and also takes credit for the reward that may accrue from taking such risk. He however, ensures that the risk is well calculated before venturing (Timmons, 1978; Lynskey, 2002). Entrepreneurs by nature are innovative, creating new ideas and developing new business processes (Schumpeter, 1934), Entrepreneurs identify new markets; alter existing processes and ways of doing business in other to create something new, with improved value to the community within which the entrepreneur carries out his business (Hitt, Ireland, Camp & Seton, 2001). The entrepreneur is quick to identify opportunities within a given market (Sull, 2004), having identified these opportunities he devices ways of curbing all potential and existing obstacles within the market environment (Kouriloff, 2000). Even though entrepreneurs derive pleasure in identifying opportunities to satisfy personal aspirations, they also seek to get commensurate financial reward for their efforts (Hisrich & Peters, 1992; Boyd & Gumpert, 1983). Entrepreneurs believe in taking calculated risks towards achieving their goals (Das & Teng, 1997). Davids (1963) and Drahem (1972) both described entrepreneurs as founders of new businesses. Broekhaus (1980) opines that the individual or group of individuals should be the major owner of the business and not employed in another organization.

In essence entrepreneurs are characterized by the need to break new grounds and attain new heights (Komives, 1972; McClelland & Winter, 1969). They possess strong value and personal discipline (Decarlo & Lyons, 1979; Komives, 1972). They have strong self believe that they can control events around them (Broekhaus, 1980a; Broekhaus & Nord, 1979; Liles, 1974). Individuals with these sorts of qualities can therefore contribute immensely to the growth of the economy if they are given the necessary platform to thrive. The onus is on the government to establish the right policy framework that can effectively spur the development of sustainable entrepreneurship. Entrepreneurs have the potential to transform the **economic** standing of a developing country. Landes (1998) put it that entrepreneurship can indeed promote poverty alleviation, encourage innovation, promote healthy competition and in the overall boost economic growth.

The rest of this study will be organized as follows: Section two is a literature review of related topics; Section three is brief description of the methodology adopted for this research; Section four is on data description and analysis; This is followed by section five which is a recommendation of possible ways the government working closely with the private sector can create a better entrepreneurial society; and finally the paper reaches a conclusion in section six.

2. Literature Review and Theoretical Framework

Many literature in the past have focused on defining who an entrepreneur is, the characteristics and traits of a typical entrepreneur. Not much work has been done in the area of understanding and differentiating the concept, characteristics and challenges of entrepreneurship in a developed world compared to a developing economy such as Nigeria (Lingelbach,Vina, &Asel, 2005). It is only recently that some authors delved into understanding the concept of entrepreneurship in developing countries. Schimtz(1992) focused more on the constraints faced by small scale manufacturing firms in developing countries. Robinson (2002) considered entrepreneurship in developing countries with respect to microfinance banks. And the few literatures that delved into entrepreneurship in developing countries concentrated on describing the attributes of entrepreneurship in developing countries rather than researching and proffering ideas on the best framework within which entrepreneurs and policy makers can successfully thrive (Lingelbach, Vina & Asel, 2005).

Naude, Szirmai & Goedhuys (2011) pointed out that there is reasonable relationship between motivation, entrepreneurship and development. They further observed that the problem with developing countries is not the shortage of entrepreneurs but rather inadequate policy and institutional environment. They also opined that for innovation and invariably entrepreneurship to thrive government in developing countries should come to terms with the relevance of innovation in the development of their economies. Governments should implement innovation friendly reforms. This could include providing policies that will encourage the development of micro-finance banks, venture capital funds and other financial institutions designed to support small and medium size enterprises (SMEs).

Lingelbach, Vina & Asel (2005) in their work noted that there is distinction between entrepreneurship in an emerging market and that of a developed economy. They observed that the degree of market efficiency influences the practice of entrepreneurship. They further observed that entrepreneurs situated in inefficient markets have to some extent be able to live above some of these inefficiencies. They basically identified three key factors that distinguish entrepreneurs situated in developing countries. They recognized that the opportunities for entrepreneurs in developing countries are much broader, giving entrepreneurs the chance to diversify their portfolio.

Entrepreneurs can therefore, use some of their investments as hedge against risk that may be encountered in other industries. They argued that in as much as the opportunity in the developing market is broader the inherent risk in doing business in this sort of environment is much higher compared to developed economies. The last factor they recognized was human resources. They aligned with the views of Porter (1998) and Kantis& Ishida (2002) that for a firm or an individual to be competitive the firm or the individual must acquire skills from trainings that are specific to the industry within which they operate. These firms can also acquire these requisite skills by collaborating and learning from other firms within the industry. One way of achieving this is by forming clusters (Porter, 1998). Clustering was identified as a powerful tool that can help in the development of entrepreneurs. The software cluster in India, the animation cluster in Philippines, and the wireless market cluster in China were all cited as cases in point.

Existing framework by Bhide (2000) on uncertainty, investment and profit was based mainly on the research conducted on entrepreneurship in the United States and other developed economies. It failed to substantially take into consideration the challenges of entrepreneurship in developing countries. Before now the general assumption was that entrepreneurship is the same the world over irrespective of whether it is in a developing or developed country. However, recent empirical research notably the World Business Environment Survey (WBES) and the Global Entrepreneurship Monitor (GEM) projects have revealed in more clear ways the challenges facing the formation of new businesses in developing countries. The GEM data is a compilation of responses from individuals from across the world on their perception of the concept of entrepreneurship and their involvement in entrepreneurial activities if at all (Reynolds et al., 2005).

Fasehun&Bewayo (n.d) in their work recognized inadequate financial system as the main cause of very poor entrepreneurial performance in Nigeria. They argued that the country needs more micro-finance banks and that the existing micro-finance banks should be more efficiently managed. However, Bankole (2007) recognized that there are quite a number of factors that are responsible for the poor state of entrepreneurial growth in Nigeria.

These include, access to market, poor infrastructure, lack of support from the relevant government agencies, lack of adequate finance, poor information dissemination and lack of access to the right technology. Oviawe (2010) argues that Nigerian youths can be better positioned for economic development and entrepreneurship through proper and focused education. He suggests that schools should integrate entrepreneurship as part of its curriculum and should teach entrepreneurship at early age. She also suggests that entrepreneurs should be used as instructors and mentors in the school.

This paper aims to examine the challenges facing entrepreneurs in Nigeria and the opportunities that are present in the market space despite these challenges. The paper will further recommend steps that can be taken to remedy the identified challenges. The paper recognizes that for entrepreneurs in Nigeria to become successful there is the need to first of all understand the challenges militating against entrepreneurship. It is after these challenges are identified that measures can be recommended to help take entrepreneurship to a higher level.

3. Methodology

This paper will adopts the qualitative research methodology. This will be a combination of observation, telephone and face-to-face interviews. Qualitative research approach is usually adopted when there are no existing theories or when existing theories fail to adequately explain a given occurrence, as is the case in this research.

In carrying out the research interviews this paper takes into cognizance the fact that individuals ascribe varying meanings and interpretation to specific issues depending on their current understanding and perception of that very issue. In other words individuals, in this case entrepreneurs may see issues that affect them based mainly on their social interaction within the environment they have found themselves (Merriam, 2002). This further implies that there may not necessarily be generally approved and permanent reality; rather there may be numerous understanding and interpretation of actuality based on individual perception.

So one of the major reasons behind qualitative research is to understand how entrepreneurs (this does not have to be only through interviews but could include group discussion, observations and so on) understand and interpret their social reality especially as it affects their businesses (Bryman, 1988). The interest of this research is therefore to basically ascertain what individual entrepreneur interpretations are at a given point in time and in a given context. The data collection technique used in this research is such that entails close interaction between the researcher and the research participants, thereby making the data collection very detailed, extensive and informative (Ritchie & Lewis, 2003). Even though the researcher in qualitative research is the primary instrument for data collection and data analysis and is subject to bias this research strives to ensure that such biases are minimized as much as possible. This is achieved by trying as much as possible not to influence the opinion of the respondents but rather allowing each respondent to freely express his opinion in detail.

The interviews will be conducted in a semi-structured manner using the following methods; face-to-face interviews, telephone interviews and electronic-email interviews. This paper chose the electronic interview as one of the methods as it is not only gaining popularity but it is also quite convenient (Meho, 2006) especially when the respondents are very busy and situated in locations that are far apart.

4. Data Presentation and Analysis

The respondents to the interview are entrepreneurs and owners of businesses in various business sectors across different cities in Nigeria particularly Abuja and Lagos. They were notified of the interview either via email or Skype. For some of the respondents the interview was started and completed within a day, while for others it took several days due to their busy schedule. Some of the interviews were carried out via multiple email exchanges, while for some it was one or two emails and an in-depth telephone conversation, for a few it was an email followed by a face-to-face meeting. Skype was used with two of the respondents, as they were not in the country as at the time of the interview.

A total of 15 entrepreneurs were contacted but only 10 of them were available for the actual interview. The 4 potential participants that did not take part in the exercise did not actually decline the interview but mainly could not reach convenient time with the researcher due largely to their busy schedule. The research participants selected for this exercise have an average of over 10 years' experience as entrepreneurs and come from very diverse business sectors. The sectors range from fashion to software design and development. Below shows the responses and remarks from the respondents when asked to express in their view the major challenges facing entrepreneurship in Nigeria.

Partner in a law firm contacted via Email

When this respondent was asked to share his views on the challenges facing entrepreneurship in Nigeria, he listed the following:

a. The poor state of power and other key infrastructures.

b. Skilled labor: From experience finding capable hands is always very challenging in some cases you still end up wasting valuable

time doing tasks that could be easily delegated if your staff were capable.

c.Multiple Taxation: Most entrepreneurs are not very informed as to what their tax obligations are or should be.

d. Access to Capital: The requirements for accessing funds from financial institutions and the exorbitant interest rates are a big challenges for most entrepreneurs particularly the SME'S.

e. Understanding & Appreciation of Corporate Governance: Most Entrepreneurs don't understand or appreciate the concept of corporate governance. As a result most run their businesses as an extension of themselves thereby limiting their growth potentials.

f. Lack of continuity in Government policies: With every change in government (and at times even in the same government) come radical changes in policies. This has led many entrepreneurs to adopt short-term business models.

The respondent is of the view that to fix the problems the failing education systems has to be sorted out. Banks and lending houses should cut their interest rates but even accessing such funds is very difficult as the banks demand for unreasonable collateral. The government should provide special funding alternatives for small and medium scale enterprises. To fix the issue of frequent changes in government policies, the government should put in place long-term developmental plans that should not be subject to changes in government regimes.

Owner of a farm. Also director and shareholder in other businesses contacted via Skype

This respondent is of the opinion that the following are the major issues confronting entrepreneurship in Nigeria:

Lack of credit rating system, hence no risk management infrastructure, therefore no serious fund lender. He asserts that without proper financing entrepreneurship cannot thrive. Also infrastructural challenges, including regulatory infrastructure in his view is negating the growth of entrepreneurship. He thinks there are too many frequent changes in regulatory framework in Nigeria. And this in his view really hampers entrepreneurship as entrepreneurship thrives under controlled risk factors. When the goal posts keep on changing, serious entrepreneurship is a mirage.

In summary he believes that these challenges can be classified as lack of systems including strategy system, regulatory system, financial system, and physical infrastructure system.

These problems in his opinion can be solved by doing the following:

Build and develop the system pattern exactly the way they are arranged above. Starting from strategy: what do we really want to achieve in entrepreneur ship? How far do we want to go? The strategy will determine all other things. Once we get the strategy, we must institute regulatory framework. Entrepreneurship thrives under free market enterprise and one of the fundamentals of free market enterprise is right of ownership and limits and terms of engagement. He asserts that an entrepreneur is a like a criminal, only that he stretches the law to its limit without breaking it. Once the law becomes very elastic, there is no difference between a criminal and an entrepreneur anymore. These wrong activities may help a few individuals, but in the long run it kills genuine entrepreneurial spirit and destroys creativity. It is therefore imperative to have a robust and well-structured entrepreneurial system in place.

Owner of a food retail chain responded via face to face interview

This respondent sees the following as the key factors militating against entrepreneurship in Nigeria:

The lack of a moral compass with very little role models in the society. People don't believe in hard work anymore they just want to make money but don't want to do the work. The lack of infrastructure across board to support young businesses and startups.

The lack of qualified human resources due to the heavily decayed educational infrastructure in the country.

This respondent does not think that access to finance is a critical challenge.

In his view to solve the problems mentioned above, the following has to be done:

Creating a proper value system that has to start from the top. There has to be incentives for doing the right things As concerning infrastructure, this can be changed by having the right and focused leadership. This will help improve education and other infrastructural deficits.

Founder/CEO Telecoms company contacted via Email

This respondent summarized the problems facing entrepreneurship in Nigeria as follows:

Finding staff with the right skill set and abilities is the number one issue. This is because you may have some good initiatives but not enough people to implement. Those that are capable are typically their own bosses or working for large corporations.

There is no good access to seed and project funding. Banks always want unrealistic amount of collateral and private equity or startup funding is limited.

Unreliable power/electricity is another factor he sees as working against real entrepreneurship in Nigeria. And the last factor he identified is the low purchasing power of the majority of the market.

In his view to fix these problems government should endeavor to fix education and infrastructure. And also making investment funds available.

Serial entrepreneur. Owns and manages multiple businesses and responded via Email.

This respondent in his view summarized the problems confronting entrepreneurship in Nigeria as follows:

Start up Finance - The banks aren't supportive of start - ups because they always want a collateral unlike in the west where you can walk into a bank with a good business plan and get financing.

Human Capital – he thinks this one is unique to Nigerians (especially the ones living in Nigeria) because of their proud nature. Loyal employees are hard to find as per, everyone kind of wants to be their own boss (Not entirely a bad thing) but they don't want to put in the work and learn. I think this is one of the reasons behind so many failed small businesses.

Non Existent Regulatory Body or Structure to protect Intellectual Property - People tend to play their cards too close to their chest because of the fear that their ideas might be stolen by money bags who are preying on vulnerable entrepreneurs with little or no capital to bring their ideas to life and possibly enjoy First Mover Advantage while doing that.

High Cost of Business - Power and Public/mass transportation are not readily available. Using generator increases production costs/overheads generally. For someone in the import trade business, transportation costs are quite high here. It costs roughly two-thirds of the freight from China to Lagos to get the goods to Abuja from Lagos. This could have been minimized if we had cargo railways.

Economic Inequality - The disparity between the rich and poor in Nigeria is too much. The rich are extremely rich and the poor extremely poor. The middle class is very small in population and this has a negative effect on the purchasing power of the economy, which in turn discourages entrepreneurs.

Unhealthy Competition - This is mostly as a result of a lack of competent bodies to regulate quality and price. Some businesses sell inferior products at ridiculously low prices and there is little or nothing you can do to make them stop or prove to customers that products are inferior until after use. Some corrupt individuals recycle/round trip their ill-gotten wealth by importing products

to sell at whatever price just to recoup the "cleansed wealth".

Too much reliance on imported goods and services - The local manufacturers cannot compete because of high costs as explained above. The extremely rich would rather give proven institutions contracts for services rather than encourage local entrepreneurs.

Fashion designer and Owner of a popular clothing line in Nigeria and responded via Skype

When asked about the challenges facing entrepreneurship in Nigeria this respondent mentioned the following: irregular power supply (high cost of running generator), cost of rent/property; nonchalant attitude of staff and lack of funding. And even when you intend to hire very competent staff they are usually too expensive to afford.

Furthermore, he identified that loans are not easily accessible as the cost of borrowing is too prohibitive. With such loans it becomes difficult to pay back the loan and sustain the business.

He is of the view that these challenges can be solved by having well-tailored government policies. Government policies should be such that support businesses. This could include tax breaks and reduction in the cost of borrowing.

Founder/CEO of Software Company responded via Skype and Email

In summary the challenges facing entrepreneurship in Nigeria in this respondent's view include the following:

Manpower issues - inadequate skill levels, wrong orientation and attitudes to work No access to affordable credit facilities - bank interest rates are detrimental to small businesses especially those that don't trade in quick moving commodities Unclear and conflicting government policies and general bureaucratic bottlenecks - multiple taxation, slow response time for government services, difficulties in accessing relevant and current information And lastly he identified ubiquitous corruption and criminal levels of incompetence as also factors preventing the growth of entrepreneurship in Nigeria.

This respondent believes these problems can be fixed if there will be improvement in the leadership of the country. He further suggests that entrepreneurs should learn to be more innovative and focused.

Co-owner/CEO of a Location based Services Company responded via telephone interview

When this respondent was asked about his view concerning the challenges facing Nigeria, he mentioned the following as the key challenges:

Government policy: The policies of government are anti-private sector. For a country that is striving with unemployment, it is expect that Government should relax its policies especially as regards tax and regulatory charges. This in his view will encourage the companies to hire more people. Government policies do not support the patronage on made in Nigerian goods. Government should put in place policies to support local content patronage.

Access to Capital: The high rate for acquiring capital to do business in Nigeria is very discouraging. In a country where lots of attention is on security and infrastructure development, it is expect that Government should have created a special incentive for specific sectors that need urgent intervention especially as it regards to capital to expand business.

Security: This is critical for every entrepreneur because without adequate security, the incentive to start or expand an existing business will fail.

Non-employable workforce: With the continuous decline in the standard of education in Nigeria, most employers are finding it difficult to hire qualified people to work for them.

One of the ways in his view that entrepreneurship can be promoted in Nigeria is by giving then incentives. Such incentives should not be generalized but should be industry specific. One of such incentives could be tax-breaks for startups; rebate for

organizations that employ more than a certain number of staff.

Founder/CEO of an indigenous technology consulting firm in Nigeria responded via Email

This respondent when asked about the challenges facing entrepreneurship in Nigeria identified the following:

The first challenge in his view is the lack of enabling infrastructure; The next is the lack of access to risk capital to launch new venture; And lastly he identified negative perception of made in Nigeria products and services by Nigerian clients as a major setback for entrepreneurs.

The respondents is of the view that the above challenges can be fixed through the establishment of programs that will encourage public and private sector led infrastructure investment. There should be aggressive measures by the government to improve human capital development.

Also in his view the government needs to provide financial intervention to venture capital companies and private equity firms. And lastly there should be more awareness to encourage Nigerians to patronize made in Nigeria goods. And in turn Nigerian entrepreneurs should endeavor to produce more quality goods and services.

Owner/CEO of a photography and Arts start-up responded via Telephone Interview

This respondent identified the following as the key challenges facing entrepreneurship in Nigeria:

First of all, most businesses are dependent on revenue from government, and due to corruption, bureaucracy and many other factors, it is tough to get anything done. Secondly, Nigeria is simply a tough place to get anything done. You need a lot of money to properly setup any business as everything is paid for upfront, for example rent, furniture, vehicles, company registration, equipment etc. If you walk into a bank, the bank will 98% of the time never finance a startup even if you invest 70% of the cash required and you are merely looking for 30%. Financiers especially banks lack clear understanding of entrepreneurs' requirements. Banks in Nigeria are not designed to take risks or finance small or medium businesses especially startups. They focus more on trade financing and invoice discounting.

Nigerian environment does not truly encourage startups and entrepreneurship as there are no incubators, functional institutes of research, access to relevant data / information etc. No real tax holidays for businesses and indirect taxes from Local Government to Value Added Tax to Income taxes are not waived. Infrastructure remains a huge challenge especially electricity, the cost of diesel is quite high and contributes heavily to the cost of running a business.

Access to skilled workforce is also another factor. Although gifted with a large population, the Nigerian workforce lacks exposure, experience and education to clearly hit the ground running for a business. This means that a business starting will need to invest in the training of their staff, which is another thing that is lacking in Nigeria (no access to good training programmes), which in turn increases business overhead costs significantly.

And lastly general efficiency of the system is a major militating factor. The Nigerian environment lacks serious efficiency from Government to the private sector. From policy flip-flops to the lack of implementation of policies; from so many loopholes in the system, this causes an un-even playing field to competitors. Also, the judicial system is gravely lagging behind in the disposition of trails and settling of disputes as it takes years to adjudicate on ligation matters.

This respondent is of the view that these challenges can be fixed through the reformation of government to become more effective and efficient. Also investment in education especially teaching entrepreneurship in schools will also go a long way in alleviating the challenges. Furthermore, providing incentives for

venture capitals and banks will also help, as they will be better positioned to finance entrepreneurs. He also suggests that entrepreneurs also have a part to play, they should be more innovative and be willing to take more risks and they should also learn to be more patient.

A look at the responses from the research participants shows that there are some common factors affecting entrepreneurship in Nigeria. These include poor infrastructure including unreliable power supply, poor transport system, and weak judicial system. Almost all the respondents see the current state of infrastructure in the country as having a strong negative impact on entrepreneurship. Another common factor is poor education system, which in turn churns out people that are largely unemployable. In fact more than 50 percent of the respondents believe that lack of qualified and competent manpower is a major problem hampering entrepreneurship in Nigeria.

Government policies and endemic corruption are another factor that most entrepreneurs see as negatively impacting entrepreneurial activities in Nigeria. They generally think that the policies formulated by the government are such that does not promote the growth of small and medium enterprises. This include the tax system, which some of them think is prohibitive and they cite instances of double taxation. Some argue that startups and small businesses should get some level of tax breaks and other incentives that will at least help their businesses especially in the early stages.

Even though only a few of the entrepreneurs see access to finance as a challenge others are of the view that finance would be easier if the entrepreneurs know how to come up with bankable business plans. Most entrepreneurs lack mentorship and guidance, they are mostly eager to setup their businesses without willing to learn from experienced entrepreneurs and businesses. This in their view is among the reasons some entrepreneurs fail in the early stages of their businesses as they do not carry out proper study of the business environment before venturing. However, the respondents still agree that even when you come up with a robust business plan the conditions for which one can obtain loan from the banks are too stringent. So, in their view while lack of easy access to finance may not be the number one issue it is also a problem.

Bankole (2007) basically corroborates some of the points highlighted during the interview process by identifying six major factors militating against entrepreneurship in Nigeria. He categorized these factors into a framework he referred to as 'MISFIT'. The M stands for access to market which he believes is lacking as most entrepreneurs in Nigeria lack basic knowledge about the market they intend to enter. The 'I' represents infrastructures, which he identifies as critical to the success of business. By infrastructure he refers to issues such as power supply, transport system etcetera. The 'S' is for support agencies. He recognized that organizations that provide mentorship and guidance to entrepreneurs are too few and some of the ones that exit lack adequate knowledge on how to effectively mentor an entrepreneur. The 'F' stands for finance. This he sees as a major factor militating against entrepreneurship. The issue bothering on finance is not only about unavailability of finance or access to finance but also the mindset of some entrepreneurs. He recognized that even when the bankers committee in Nigeria some years ago came together and agreed to keep 10 percent of their profit aside to finance SMEs it was not effective. This was mainly due to the unwillingness of some entrepreneurs to let go of some equity in return for capital injection into their businesses. The businesses will rather go with debt financing as against equity financing. And meeting the conditions for debt financing is often too difficult for these businesses. Businesses are expected to provide collateral and other conditions, which they often cannot meet. The second 'I' is quite close to the 'M'. He identified the relevance of information in the ability and willingness of an entrepreneur to

want to venture. Access to information is vital for the entrepreneur to be able to research about the industry dynamics including opportunities and risks. Without such information it becomes more difficult for entrepreneurs to fine-tune their strategies. And lastly the 'T' stands for technology. He argues that entrepreneurs in Nigeria lack access to the right technology that can ordinarily help make them more efficient, productive and invariably more competitive and profitable.

The findings in this research largely agree with Bankole's position but will add that there are two other critical areas that were not mentioned in his work and these include inadequate intellectual property right (IPR) protection and lack of robust entrepreneurial education. Issues bothering on ineffective protection of IPRs and lack of enforcement of contracts hamper the growth of entrepreneurs in any society. Nigeria has well-articulated intellectual property (IP) laws and is signatory to key intellectual property related treaties and conventions such as World Intellectual Property Organization (WIPO) Copyright Treaty, WIPO Performances and Phonograms Treaty, Patent Cooperation Treaty, Patent Law Treaty, Convention Establishing the World Intellectual Property Organization, and Paris Convention for the Protection of Industrial Property (WIPO, 2011). However, the major problem in Nigeria is the enforcement of its intellectual property laws (Oyesina, 2010). Furthermore, capacity building is yet another factor militating against the prosperity of entrepreneurs in Nigeria. The country lacks qualified skilled labor. This is not unconnected with the failing educational system and almost non-existent vocational and technical schools where individuals can acquire skills in selected fields. All these have contributed adversely to the business concerns in Nigeria.

Having a robust intellectual property rights regime is important for the advancement of entrepreneurship in any society. There are mainly two major reasons why the protection of intellectual property right is important. The first is for the encouragement and promotion of innovation by granting the intellectual property right holders exclusive rights to use and sell their newly developed technologies, goods and services. The second is to ensure that relevant knowledge is continuously made available for public consumption and interest. It is important that the government balances these two main reasons by ensuring that there is neither over protection of IPR as this could limit the social benefits of innovation nor under protection, as this will discourage innovation. Contract enforcement should also be taken seriously as lack of it erases business confidence which is detrimental to entrepreneurial development.

The Nigerian public in recent years resort more to the court system to seek redress to contract issues. However, they often get disappointed as they do not get fair and impartial judgments. The World Bank's publication on "Doing Business 2014" surveyed 189 countries across the world. Out of this number Nigeria ranked 136 on the enforcement of contracts. The country moved up by 2 positions as it was ranked 138 under the same category in a similar survey conducted in 2013. The report further stated that contract enforcement required 40 procedures and an average of 477 days. The average legal cost of pursuing the contract cases averaged 92 percent of the total value of the contact. On the other hand contract enforcement in Organization for The Economic Co-operation and Development (OECD) countries required an average of 31 procedures, and spans an average of 529 days at an average cost of 21 percent of the total cost of the contract. Nigeria is worse than the sub-Sahara African average which requires an average of 39 procedures over an average of 652 days, and 51.1 percent of total contract sum (World Bank, 2014).

Different scholars such as North (1981) and Machlup (1958) believe that there is reasonable correlation between intellectual

property system and the economic development of a nation. They argue that having a robust intellectual property protection system is necessary for sustainable economic development. They suggest that such a system will promote innovation as IPR owners will be encouraged to research more and those who do not have any IPRs will be encouraged to work harder and come up with new innovations knowing that their efforts will be adequately rewarded and protected. Since ideas and information are necessary for the development of any society the creators of these ideas have to be given the right incentives to continue to produce ideas that are relevant for the benefit of the entire community (Asia-Pacific Economic Cooperation, 2006).

In other to continue to encourage creativity and innovation governments establish IP laws and enforcement policies; granting IP rights such as patents and copyrights. Patents and copyrights and indeed any other intellectual property right permit the owner limited time to enjoy monopoly over the property. The owner of the right may also decide to license his IPR to others for a consideration or he may decide to sell it to a third party outright. As mentioned earlier the Nigeria judicial system must begin to adequately enforce intellectual property rights protection and indeed other contracts if the country intends to boost internal and external investors' confidence. Enforcing laws will encourage entrepreneurs to invest their time and resources in Nigeria and it will also encourage foreigners to want to invest in Nigeria. Adams (2010) suggests that strong IPR protection has positive effect on foreign direct investment (FDI), which invariably has positive effect on the economic growth of a nation.

Some entrepreneurs may be able to take advantage and benefit from FDI as some foreigners may feel more comfortable investing in start-ups if they know the company has IPR and that these IPRs are well protected through adequate and robust government policies. So in essence having a robust IP system will not only encourage people to innovate and start up new businesses but will help these start ups to raise capital. This has a similar effect as the enforcement of contracts agreements between two or more parties. Present reports show that contract enforcement in Nigeria is still very poor. Banks and other financial institutions shy away from lending money to startups, as it is very difficult to enforce the contracts. The United States Department of States reported that, "In at least three prominent cases between 2008 and 2010, local companies or government officials manipulated the judicial system or law enforcement agencies to exert undue pressure on international companies for commercial or personal advantage" (US Department of State, March 2011).

5. Conclusion

To have a truly entrepreneurial system in Nigeria the private sector/business owners will need to work with the government to define what is suitable. Entrepreneurs in Nigeria should not only see the challenges, which by no means should not be discounted, but should also learn to take advantage of the opportunities. Like the India example cited above, Nigerian entrepreneurs can find smart ways of surviving within the present economic structure of the country while still collaborating with the government to improve the system. They can indeed help to build the desired strong and conducive business environment. Furthermore, entrepreneurs should see the importance of learning under established entrepreneurs and businesses. They should ensure they have a firm understanding of the business environment before venturing. They should desire and embrace sound mentoring.

They should be more innovative and understand that they have to nurture their ideas until it becomes profitable and this may take some time.

The government on the other hand should come to terms with the fact that one of the ways of growing the economy is to promote

entrepreneurship. To achieve this it should build a society that promotes and encourages entrepreneurship. The private sector cannot realize and solely build a truly entrepreneurial society without recourse to the government. The government should build the right institutional environment such as reforming the educational system and the judicial system. The educational system should incorporate entrepreneurial teaching and nurturing while the judicial system should be such that is responsive to IPR protection. Furthermore the financial institutions should adequately incorporate and set aside adequate funding for sponsoring of new innovative enterprises. It is also important that key infrastructures including power, transport and water are fixed and made readily available.

6. Recommendations

In the current financial structure in Nigeria it is much easier for established businesses to get funding from banks to finance new ventures than it is for new entrepreneurs to raise capital. It is therefore, imperative that the micro-finance policy. One of the key objectives of the policy is to "enhance service delivery (provision of financial support) by micro-finance institutions to micro, small and medium entrepreneurs" (Central Bank of Nigeria, 2005). It is intended that the micro-finance banks will "provide diversified, affordable and dependable financial services to active poor, in a timely and competitive manner that would enable them to undertake and deliver long-term, sustainable entrepreneurial activities" (Central bank of Nigeria, 2005). The government should therefore ensure that these micro-finance banks have reasonable capital base and that they provide the services they are setup to render. The government can also setup special bodies or work with the Small and Medium Enterprise Development Agency of Nigeria (SMEDAN) to provide special funds for start-ups. The government can ensure that organizations/individuals that receive these special funds are able to pay back by adopting the services of organizations such as the Enterprise Development Centre (EDC). The EDC has adopted psychometric testing to predict credit risk. EDC recognized that it is difficult for most start-ups to present all the securities and collateral required to obtain a loan from a bank. To get around this, the EDC adopted Harvard University's Entrepreneurial Finance Lab initiative of using psychometric testing to predict credit risk (Wylie, 2011).

Nigeria universities churn out huge amount of graduates yearly but only a small percentage of these students get employed after leaving school. It is in fact estimated that the unemployment rate of university graduates in Nigeria is around 25 percent (Dabalen, Oni, & Adekola, 2000). To curb this problem, engage the graduates and promote economic growth the country has to imbibe entrepreneurship in its academic system. Schools should incorporate entrepreneurship into their curriculum. This should be made as a policy by the government and the policy should be such that encourage existing entrepreneurs to help the schools define, deliver and evaluate their training programs. Professional associations such as computer society of Nigeria, Nigeria society of engineers, institute of chartered accountants of Nigeria should be involved in the program and other non-for-profit organizations should also play a role. The government working in collaboration with the organized private sector should from time to time evaluate the sectors that have added more significant value to the country's GDP through entrepreneurship and educate and nurture students to step up businesses in those sectors.

In order for Nigeria to encourage entrepreneurship it should have a solid IPR strategy. In setting out this strategy it must do so by balancing the interest of the public and the interest of the IPR owner. Joseph Story in [Folsom V Marsh, 9F. (as 342 (1841)] ruled "we must often, in deciding questions of this sort, look to the nature and objects of the selections made, the quantity and value of the materials used, and the

degree in which the use may prejudice the sale, or diminish the profits, or supersede the object of the original work." The strategy should be such that while encouraging innovation and promoting entrepreneurship does not work against the social interest and benefit of the rest of the society (Khan, 2002). Nigeria already has the necessary laws concerning intellectual property protection what is lacking as pointed out earlier is the proper implementation of these laws. The government should instruct the relevant law enforcement agencies to ensure strict enforcement of the IPR laws.

The government should perhaps reconsider harmonizing the different agencies responsible for carrying out different aspects of intellectual property related activities. These agencies include National Office for technology Acquisition and Promotion (NOTAP) an agency under the Federal Ministry of Science and Technology: responsible for registering technology transfer agreements, promotion of intellectual property rights, commercialization of research outcomes and inventions and the provision of patent information and documentation. Nigeria Copyright Commission (NCC) an agency under the Federal Ministry of Justice has the mandate to establish the appropriate enabling environment for the protection of copyright and also to ensure the proper enforcement of all copyright works protected under the laws of the Federal Republic of Nigeria. The Industrial Property Office (IPO) an agency under the Federal Ministry of Commerce and Industry is responsible for the registration of Trademarks, Patents and Designs (www.wipo.int). The government should as a matter of urgency revisit the subject of the Nigerian Intellectual Property Commission (NIPCOM), which it had established in 2009 to administer intellectual property matters in the country (Ebhuomhan, 2009). This will ensure that all intellectual property matters are handled within a single organization. It will help for easy administration of intellectual property matters and make it easier for the public to make enquiries and register their intellectual properties. Having such an efficient and effective intellectual property office will greatly encourage innovation and invariably entrepreneurship. The public should be enlightened on the benefits of registering their intellectual property. And the process of carrying out such registration should be made simpler and easier. It should also be made available online for those who will prefer to register their trademarks, patents and so on online. And lastly the Corporate Affairs Commission (agency responsible for registering new businesses) should reduce the number of days it takes to register a new company by reducing the number of steps and taking the entire process online. The online platform should also allow companies to be able to do their annual return fillings and general enquiries.

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Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Impact Public Debt on Economic Development in Nigeria: 1986 - 2017

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Abstract

The study examined the impact of public debt on economic development in Nigeria for the period of 1986 to 2017. Three research questions and objectives guided the study. Vector Error Correction Model (VECM) technique and Johansen Co-integration test were employed for testing the hypotheses of the study. The VECM analysis results shows that Domestic debt had a positive impact on economic development in the short run, while in the long-run, domestic debt impacted negatively on economic development in Nigeria. The analysis shows that external debt impacted positively on GDP per capita income, indicating that it tends to contribute largely to economic development than domestic debt in Nigeria. The co-integration test results show that there exist a long-run relationship between public debt and economic development in Nigeria. Hence, the study recommends that policy makers like the Debt Management Office (DMO) should be seen to support the government in financing infrastructural development in production sectors and other priority areas of the economy, in order to promote increase in the volume of commodities exported from the country so as to boost earnings from foreign exchange, improve the living standard of people and eradicate poverty. Also, new debt management strategy should be created to contain guidelines to encourage export promotion and import substitution, as this would lead to increase in productivity level and promoting foreign exchange earnings, among others.

Keywords: Domestic Debt, External Debt, GDP per capita income, Interest Rate, Development, Nigeria.
JEL Codes: H63

1. Introduction

Debt in itself refers to the resources of money in use in an organization which is not contributed by its owners and does not in any other way belong to them. It is a liability represented by a financial instrument of other formal equivalent (Cohen, 2001). When a government borrows, the debts is a public debt, debt are incurred by government through borrowing in the domestic and international markets to finance domestic investment. Therefore, the public debt is seen as all claims against the government held by the private sector of the economy, or by foreigners, whether interest-bearing or not (and including bank held debt and government currency, if any); less any claims held by the government against the private sector and foreigners (Rogoff, 2010).

In the same vein, Muley (2016) submitted that public debt burden refers to the economic hardship which the public debt imposes. The hardship may take the form of waste of productive efficiency (misdirection of production) for the economy as a whole or undesirable economic burdens imposed upon particular classes. The problem of public debt in Nigeria has resulted in various distortions in the macro-economy. Essentially, these distortions are structural in nature and thus affect the level of per capita incomes and are instrumental to the rising

poverty in the country. The latter has attributed the attention of various authors and Nigerian economic planners. The various points of view are all agreed that the condition of Africa in general and that of Nigeria in particular have now characterized to an economic and political catastrophe (Nzotta, 2004).

Basically, Nigeria began to experience public debt problem from the early 1980s when foreign exchange earnings plummeted as a result of the collapse of prices in the international oil market and external loans began to be acquired indiscriminately (Udoka & Ogege, 2012). The debt crisis, which is the combination of accumulated debt stock and difficulty servicing, has imposed several problems on the Nigerian economy. This is reflected in the fall in real Gross Domestic Product (GDP), investment rate and export earning since 1980 (Cohen, 2001). The problem of public debt has clearly been a constraining factor on rapid economic recovery growth and development with the public debt increasing at an alarming rate.

However, funds which should have been used for economic development are channeled towards servicing the public debt. The constraining effect of the public debt services is more pronounced as the economy has failed to grow sufficiently to reduce the problem to a sustainable level.

In recent times, Nigerian economy has been characterized by highly levels of public debt along with persistent low economic growth and development. As such, an understanding of the dynamics between public debt and development is critical in addressing the obstacles to economic growth and development, and to improve debt sustainability in Nigeria (Omet, Akthan & Fadwa, 2002). Traditionally, the main drivers of economic development are the level and quality of a country's physical and human capital, technological advancement and the quality of the labour force as well as the country's level of openness to international trade (Omet et al, 2002). However, it is now universally accepted that a country's ability to grow also depends critically on its level of indebtedness.

Nigeria has relied much on public debt to finance its development projects in the past two decades with public debts which put its debt profile so high. Thus, before the debt write-off by the Paris-Club and London Club actually reduced Nigeria's external debt, whereas the domestic debt and the effect created by the huge debt before the debt write-off still have lag effect on the economy (Yusuf, 2017).

The Nigerian economy in the 1980s and 1990s has been filled with trepidation as the level of growth and development was weak and volatile, unemployment soared, and rise in poverty level. In addition, the economy was buffeted with a new economic slogan "debt overhang" in the 1990s. this was as a result of debt incurred in the decade and the debt incurred in the 1970s. The year 1972 saw dramatic increases in the price of oil, favourable for an oil-producing nation to begin development. Nigeria borrowed more from the international market, but by the end of the decade, oil prices has collapsed, and debt soared on the back of the inability of the government to service the debts (Business Post, 2018).

However, various approaches have been adopted towards making public debt sustainable for economic development in Nigeria. For instance, under the Structural Adjustment Programme (SAP), the economy adopted several strategies to make improvement on domestic debt which include the acquisition of domestic debt, restructuring of domestic debt, and servicing of domestic debt. On the external debt, the strategies employed included embargo on new loans, limit on debt servicing payments (i.e. maximum of 30% of export earnings), debt restructuring through refinancing, rescheduling, issuance of collateralized bonds, and debt conversion schemes. In addition, international debt reduction strategies were adopted which included the Paris Club Plan (1987), the Africa

Development Bank Plan, the Baker Plan (1985), the IMF Facilities Plan, and the World Bank Facilities Plan (Udoka & Ogege, 2012). Despite all these measures and strategies created and adopted for reducing the level of domestic and external debt, yet the picture has not changed from what it is known to be as the Nigeria's public debt still continues to rise to a very devastating rate. This in turn, stands as an epidemic for development of the Nigerian economy.

From the SAP period of 1986, the level of development in Nigeria by its GDP per capita was N0.0015 billion and increased to N0.0021 billion in 1987 (CBN, 2017). On the other hand, external debt at that period grew from N41.4 billion in 1986 to N100 billion in 1987. While, domestic debt increased from N28.4 billion to N36.7 billion. In the 1990s, as the GDP per capita increased to N0.013 billion in 1994 and N0.026 billion in 1995; the external debt increased to N716 billion while, domestic debt increased to N477 billion. However, from 1996 to 1997, external debt stock reduced drastically to N595 billion while, domestic debt stock further increased to N501 billion. On the other hand, the value of GDP per capita from 1996 to 1997 kept rising to N0.36 billion (DMO, 2005). At this period, there was obviously a reduction in the external debt which showed that the available resources at that time were judiciously managed by the government and which focused more on domestic borrowings.

Moreover, from 1997 to 1997, the GDP per capita reduced to N0.039 billion leaving the external debt stock to rise at N2577 billion, and the domestic debt stock to rise at N709 billion. From 1999 to 2004, as the GDP per capita increased to N0.083 billion, the external debt stock rose further to N4890 billion while, domestic debt rose to N1370 billion (DMO, 2005). At this point, as the GDP per capita in the economy kept increasing, the external debt also increased at a higher rate than the domesticp debt. This made debt servicing difficult for the government due to its high service obligations, hence managing and controlling external debt was unsustainable. According to Matthew and Mordecai (2016), this resulted the government to cancel debt negotiations with the Paris Club Creditor nation. As a result, the government was able to procure debt relief of $18 billion in 2005, which brought the country's external debt stock level to N431 billion in 2007 (DMO, 2006).

However, according to CBN (2017) in 2007, the GDP per capita had an increase in its value of N0.14 billion. And as a result of the reduction in external debt, the government focused more domestic borrowing leading the domestic debt level to peak at N2169 billion at the end of 2007. While, from 2008 to 2015, the external debt stock increased from N523 billion to N1631 billion, while domestic debt stock increased from N3228 billion to N7904 billion. As a result, the GDP per capita increased from N0.16 billion in 2008 to N0.498 billion in 2015. From 2015 to 2017, Nigeria's external debt rose to N5.78 trillion while, domestic debt rose to N15.93 trillion bringing the total debt stock of the country to N21.72 trillion (DMO, 2017).

Fundamentally, the high debt profile of the Nigerian economy came as a result of the mono-cultural nature of the economy and the volatile nature of international oil market prices, which led the economy to unfavourable balance of payments, low per capita income, persistent fiscal deficits, unemployment, vast poverty, and low productivity (Igberi, Odo, Anoke & Nwachukwu, 2016). It is on this note that; this study therefore examines the impact of public debt on economic development in Nigeria with particular interest on determining whether or not the external debt stock or domestic debt stock is necessary for the development of the Nigerian economy.

2. Literature Review

Theoretical Framework

This study was anchored on the Keynesian Theory of Public Debt. The Keynesian theory of public debt as postulated by John M. Keynes (1936) stated that a large amount of public debt is a national asset rather than a liability and that continuous deficit spending is essential to national economic development.

Keynes (1936) held the views that increase in public debt through the multiple effects would raise the national income of a country. He linked public borrowing with deficit financing and authorized government to borrow for all purposes so that effective demand in the economy is increased resulting in increased employment and output. Keynes borrowing for consumption was as desirable as borrowing for investment in productive goods because consumption expenditure induced investment to rise.

For the purpose of this study, the Keynesian national income model was modified as depicted in Equation [1]:

$Y = C + I + G + (X - M)$----------2.1

Where *Y* represents national income (proxied with GDP per capita income);

C = represents private consumption;
I = represent private investment;
G = represents government expenditure;
(X – M) represents net exports.

Empirical Review

In this section, various empirical works were reviewed on the analysis carried out between public debt and economic growth, as well as its level of development in Nigeria. It consists of economies outside Nigeria, various methodologies, period of study, and the outcomes.

Egbetunde (2012) examined the causal nexus between public debt and economic growth in Nigeria between 1970 and 2010 using a Vector Autoregressive (VAR) estimation technique. The time series data conducted for the study were obtained from Central Bank of Nigeria Statistical Bulletin (2010). The findings of the study revealed that there is a bi-conditional causality between public debt and economic growth in Nigeria.

Ekperiware and Oladeji (2012) examined the effect of external debt relief on economic growth in Nigeria using regression technique on quarterly time series of external debt, external debt service and real gross domestic product. The quarterly time series data were sourced from CBN statistical bulletin (2006) which was analyzed for the period between 1975 to 2005. Applying Chow-test to the regression analysis, the result revealed that there was a structural break in the relationship between economic growth and external debt in Nigeria.

Jadoon, Batool and Mehmood (2014) conducted to discover the impact of foreign debt servicing on per capita income growth rate of Pakistan for the period 1981 to 2010, by applying the autoregressive distributed lag (ARDL) estimation technique. The time series data for the study were generated from World Development Indicators (2010). The results confirmed that foreign debt servicing had adverse and significant impact on per capita income growth rate in Pakistan in both short-run and long-run period.

Bassey, Oparah and Ndiyo (2014) empirically analyze the relationship between public debt and inclusive economic growth in Cross River State, Nigeria. The study adopted the primary type of data analysis which was descriptive in nature using tabular and graphical methods. Secondary data were sourced from the Cross River State statistical bulletin and National Bureau of Statistics (NBS). The study revealed that the Cross River State government has undertaken lots of people oriented projects from money raised by borrowing indicating that public debt has enabled government to undertake programmes that were beneficial to the poor thereby influencing inclusive economic growth.

Hassan, Sule and Abu (2015) employed the ordinary least square (OLS) estimation technique to examine the effect of government debt on economic growth in Nigeria from 1986 to 2013. The annual time series data for analysis were sourced from CBN statistical bulletin (2015). Their study

showed that there was no significant positive impact of government debt on economic growth in Nigeria.

Essien, Agboegbulem, Mba and Onumonu (2016) employed the vector autoregressive (VAR) and granger causality test estimation techniques to examine the impact of public sector borrowings on prices, interest rates, and output in Nigeria. The time series data for the study were sourced from CBN statistical bulletin (2015) which was analyzed for the period between 1970 and 2014. The findings of the study revealed that shock to external debt increases prime lending rate, but with a lag. Hence, the study concluded that external and domestic debt had no significant impact on the general price level and output in Nigeria.

Saifuddin (2016) employed the two-stage least square (TSLS) to examine how public debt can influence economic growth in Bangladesh within a period of 1974 to 2014. The time series data of the study were sourced from World Development Indicators database, Economic Relation Division of Bangladesh, Bangladesh Economic Review, and Economic Trend of Bangladesh Bank. The result of the study revealed public debt is positively related to both investment and economic growth. It also revealed that public debt had an indirect positive effect on growth through its positive influence on investment.

Bakare, Ogunlana, Adeleye and Mudasiru (2016) employed the ordinary least square (OLS) regression technique to establish the extent to which domestic debt empirically impact on economic growth in Nigeria between 1981 to 2012. The data used for its estimated were sourced from CBN statistical bulletins (2012), Debt Management Office (DMO), and National Bureau of Statistics (NBS). As a result, the study discovered a positive relationship between domestic debt and economic growth. This implies that increasing domestic debt (up to a certain level) would increase economic growth, provided proceeds from domestic debts are channeled into productive sectors of the economy.

Oloruntoba, Olusegun and Olusola (2016) employed the ordinary least square (OLS) and co-integration techniques to examine the effect of public debt on economic growth in Nigeria between 1970 and 2011. The time series data were sourced from CBN statistical bulletin (2011) and World Development Indicator (WDI). The results of the study revealed that there exist no long-run relationship between public debt and economic growth in Nigeria. It further revealed a positive but non-significant relationship between per capita domestic public debt and economic growth, while a negative and non-significant relationship was found to exist between per capita external public debt and economic growth.

Senibi, Oduntan, Uzoma, Senibi and Oluwaseun (2016) assessed the impact of public debt on external reserve in Nigeria between 1981 and 2013. The time series data were sourced from CBN statistical bulletin (2013) and analyzed using the Johansen co-integration estimation technique. The result of the study revealed that public debt had a positive and significant effect on external reserve stock in the long-run.

Okwu, Obiwuru, Obiakor and Oluwalaiye (2016) employed the multiple regression analysis technique to examine the effects of domestic debt on economic growth in Nigeria during the 1980-2015 periods. The time series data were sourced from CBN statistical bulletin (2015) and National Bureau of Statistics (NBS). The findings of the study revealed that domestic debt stock had a significant short and long-run positive effect on economic growth, while domestic debt servicing expenditure had a negative effect on economic growth in Nigeria.

Jibir, Abdullahi, Abdu and Ibrahim (2017) employed the autoregressive distributive lag (ARDL) econometric technique to analyze the external debt-growth nexus in Nigeria. The time series data for the study were sourced from CBN statistical bulletin (2016) and World Bank (2016) which spanned between 1981 and 2016. The results of the study revealed that external debt was

negatively related with economic growth in both short and long-runs.

From the empirical review, studies like Saifuddin (2016) and Jadoon *et al* (2014) were not focused on the Nigerian economy. It was also discovered from the research work conducted by Egbetunde (2012), Bakare *et al* (2016), Oloruntoba *et al* (2016), Senibi *et al* (2016), Okwu *et al* (2016), Bassey *et al* (2014), Jibir *et al* (2017), Essien *et al* (2016), Ekperiware & Oladeji (2012), and Hassan *et al* (2015) that there was more emphasis made on the relationship between domestic debt, external debt and economic growth, without capturing its impact analysis on the development of the Nigerian economy. In addition, the period of previous studies did not cover the SAP period of 1986 and was not extended to the year 2017.

To overcome the aforementioned limitations on the empirical analysis of public debt, the study therefore adopts the Vector Error Correction Model (VECM) estimation technique and annual time series data to examine the impact, long-run relationship, and direction of causation between the components of public debt and economic development in Nigeria. Other explanatory variables include government investment, GDP per capita income and interest rate. The annual time series data were analyzed spanning for 31 years, from the SAP period of 1986 to 2017.

3. Methodology

The data utilized for the study consists of annual observations sourced from CBN statistical bulletin (2017) and World Bank Indicators, which adopts the Vector Error Correction Model (VECM) to examine the impact of public debt (domestic and external debt) on economic development in Nigeria. In the course of examining the impact of public debt on economic development in Nigeria, secondary data adopted for the analysis covered the period of 31 years (1986-2017). In achieving the analysis of the study, the E-views econometric software version 10.0 was adopted.

Model Specification

In order to examine the impact of public debt on the economic development in Nigeria, the Keynesian national income model in Equation [3.1] was adopted which was modified by Favour, Idenyi, Oge and Charity (2017). For the purpose of this study, Equation [1] is transformed to obtain Equation [2] where public debt is disaggregated into domestic debt and external debt. The implicit form of the model is presented in Equation [2] as thus:

$GDPPC = f(DDS, EDS, GDI, INT)$----3.1

Where *GDPPC* is Gross Domestic Product Per Capita Income (proxied for economic development); *DDS* is Domestic Debt Stock; *EDS* is External Domestic Stock; *GDI* is Government Investment; and *INT* is Interest Rate.

The implicit function in Equation [2] can be reduced to a linear functional form as in Equation [3.1]:

$GDPPC = a_0 + a_1DDS + a_2EDS + a_3GDI + a_4INT + u$----------3.2

Where a_0 is the intercept; a_1a_2, a_3 and a_4 are the coefficients of all the explanatory variables; and u is the error term. The a priori expectation are, :a_1a_2, $a_3 > 0$; $a_4 < 0$.

Estimation Procedure

To ensure that the outcome of the regression is not spurious, the annual time series data was subjected to stationary test using the Augmented Dickey-Fuller test. The Lag Order Selection test is carried out to determine the optimal lag order in constructing the VECM estimates. In addition, the Johansen Co-integration test was used to ascertain the long-run relationship between the variables in the model of the study. Lastly, to ensure there is no presence of autocorrelation in the VECM model, the study employed the Breusch-Godfrey serial correlation LM test.

4. Discussion of Results

Unit Root Test Result

The Augmented Dickey-Fuller unit root test result presented on Appendix 2, shows that all time series data except Domestic Debt

Stock (DDS) were stationary at first difference. While, DDS became stationary at level with a 5% critical level.

VECM Lag Length Result

The lag length selection criterion to determine the optimal lag structure to employ in carrying out the VECM analysis is presented on Appendix 3. The result shows that the study uses the Lag Length Criterion based on the Schwarz Information Criterion (SC) to select 2 lags for estimating the VECM and Johansen co-integration test.

Co-Integration Test Result

The Johansen Co-integration test result is presented on Appendix 4 which is used to determine the existence of long-run relationship in the model as speculated in the third objective of this study. The result on Appendix 4 reveals that trace test statistics has 5 co-integrating equation(s) at 5% level, while the max-eigen value statistics reveals 4 co-integrating equation(s) at 5% level. This result indicates the presence of long-run relationship among the variables. Thus, we reject the null hypothesis and accept the alternative that there exist a long-run relationship between public debt and economic development in Nigeria.

Vector Error Correction Model (VECM) Result

The result of the VECM estimate is presented on Appendix 5. From Appendix 5, the coefficient of error correction estimate (ECM) was -0.417108 and has a negative sign. This indicates that the variables are significant at 5% level. The result which shows the speed of adjustment revealed that deviation from equilibrium is corrected 41% annually in economic development in Nigeria. The negative and significance of the ECM coefficient confirms the existence of a long-run stable equilibrium relationship in the model.

The result of the analysis on Appendix 5 shows that the VECM coefficient of the past value of Domestic Debt Stock in period one (DDS (-1)) positively impacted on economic development in Nigeria. This conforms to apriori expectation. In period two, the VECM coefficient of the past value of Domestic Debt Stock (DDS (-2)) negatively impacted on economic development in Nigeria. However, this did not conform to apriori expectation. Therefore, from the result, a unit change in past value of Domestic Debt Stock in period one (DDS (-1)) will result in 0.981units change in current value of economic development (GDPPC). While, a unit change in past value of Domestic Debt Stock in period two (DDS (-2)) will result in 1.530units reduction in current value of economic development (GDPPC). The result also shows that the impact in period one (DDS (-1)) was statistically significant at 5% level given the probability value of 0.0000. While in period two (DDS (-2)), the impact was statistically significant at 5% level given the probability value of 0.0002.

The VECM coefficients of External Debt Stock in period one (EDS (-1)) and period two (EDS (-2)) positively impacted on economic development in Nigeria. This conforms to apriori expectation. Therefore, a unit change in past values of External Debt Stock (EDS (-1)) and (EDS(-2)) will result in 0.0204units and 0.089units change in current value of economic development (GDPPC) respectively. The result shows that the impact in period one (EDS (-1)) and period two (EDS(-2)) were statistically significant at 10% level given the probability values of 0.6797 and 0.0858 respectively.

The VECM coefficients of Government Investment in period one (GDI (-1)) and period two (GDI (-2)) positively impacted on economic development in Nigeria. This conforms to apriori expectation. Therefore, a unit change in past values of Government Investment (GDI (-1)) and (GDI(-2)) will result in 0.104units and 0.154units change in current value of economic development (GDPPC) respectively. The result shows that the impact in period one (GDI (-1)) and period two (GDI (-2)) were statistically significant at 5% level given the probability values of 0.0045 and 0.0000 respectively.

The VECM coefficients of Interest Rate in period one (INT (-1)) and period two (INT(-2)) negatively impacted on economic development in Nigeria. This conforms to apriori expectation. Therefore, a unit change in past values of Interest Rate (INT (-1)) and (INT (-2)) will result in 12.43units and 7.830units reduction in current value of economic development (GDPPC) respectively. The result shows that the impact in period one (INT (-1)) was statistically significant at 10% level given the probability value of 0.0839. While, the impact in period two (INT(-2)) was statistically significant at 5% level given the probability value of 0.2090.

The overall goodness of fit of the VECM model is indicated by the R-squared coefficient of determination. The value of the R-squared statistics for the VECM model on Appendix 5 is 0.854. this indicate that about 86% of the variation experienced in GDPPC (economic development) in Nigeria for the period of 1986 to 2017 in explained by the explanatory variables included in the model.

Since the critical value of the F-statistic is 9.07 and is greater that its tabulated value of 0.000041; it then indicates that the explanatory variables have a significant impact on economic development (GDPPC) in Nigeria. The Durbin-Watson statistic value of 2.80 indicates the absence of serial correlation in the VECM model.

Policy Implications

The study sought out to examine the impact of public debt on economic development in Nigeria, and its long-run relationship from 1986 to 2017. In achieving this, the study adopted the Vector Error Correction Model (VECM) estimation technique and the Johansen Co-integration test to determine the impact of the variables on economic development and its long-run relationship respectively.

Based on the objectives of the study, the VECM results showed that in the short-run, Domestic Debt Stock (DDS) had a positive impact on economic development in Nigeria. While in the long-run, Domestic Debt Stock had a negative impact on economic development in Nigeria. This is implicative of the fact that increasing domestic debt would lead to a decrease in the level of GDP per capita income (economic development), provided the benefits of domestic debts are not skewed towards the productive sectors of the economy, which will create great consequence on the living standard and welfare of the people in Nigeria.

The findings of the study also revealed that external debt impacted positively on economic development in Nigeria. As a result, an increase in the amount of external debt stock would increase the level of GDP per capita income (economic development). This implies that external debt stock compared to domestic debt contributes largely to economic development in Nigeria.

5. Conclusion and Recommendations

The study examined the impact of Public debt on economic development in Nigeria from 1986 to 2017. The Vector Error Correction Model (VECM) estimation technique and Johansen Co-integration test were employed to achieve the objectives of the study. The results of the analysis showed that Domestic Debt had a positive impact on economic development in the short-run, while in the long-run, domestic debt impacted negatively on economic development in Nigeria. The results also revealed that external debt tend to contribute largely to economic development compared to domestic debt in Nigeria. Therefore, it was revealed that most of the benefits of domestic debts are not invested or skewed to the productive sectors of the economy, as domestic debt had a negative impact on the economy. However, it is believed that if these implications and challenges are checkmated and tackled accordingly, the public debt would be adequately managed to promote economic development in Nigeria.

Based on the findings and policy implications of the study, the following recommendations are proffered;

In order to correct the fact that proceeds from domestic debts are not skewed to the

productive sectors of the economy, policy makers like the Debt Management Office (DMO) should be seen to support the government in financing infrastructural development in production sectors and other priority areas of the economy, thereby promoting increase in the volume of commodities export which will boost earnings from foreign exchange, and help reduce fiscal deficit in the Nigerian economy.

In order to create a sustainable economic development, employment, reducing poverty, and increasing the standard of living of Nigerians, the government should carve out new initiatives aimed at developing debt management strategy that would ensure that in the face of macroeconomic and other financial constraints, the cost and risk profile of the public debt portfolio remains within acceptable limits over time.

In addition, the Debt Management Office (DMO) should carve out better and sustainable debt management strategy other than the SAP-induced strategies of 1986 which has contributed to the persistent absolute poverty and low standard of living in the country. Hence, new debt management strategy should contain guidelines and policies that will encourage export promotion and import substitution, as this would lead to increase in productivity level and promoting foreign exchange earnings. This would aid in reducing the debt burden in the Nigerian economy.

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APPENDICES

Appendix 2:*ADF Unit Root Test Result*

Variables	ADF Statistics	Critical value at 5% level	Order of Integration	Remark
GDPPC	-4.793456	-3.603202	1(1)	Stationary
DDS	8.208658	-3.603202	1(0)	Stationary
EDS	-3.717349	-3.568379	1(1)	Stationary
GDI	7.079503	-3.612199	1(1)	Stationary
INF	-4.120411	-3.562882	1(1)	Stationary

Source: Researcher's computation (2018) using Eviews 10.0

Appendix 3: *Lag Length Selection Test*

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1110.604	NA	1.37e+26	74.37361	74.60715	74.44832
1	-985.7952	199.6944	1.82e+23	67.71968	69.12088	68.16793
2	-928.4150	72.68153*	2.44e+22*	65.56100*	68.12986*	66.38280*

** indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion*

Appendix 4: *The Johansen Co-Integration Test Result*

Hypothesized No. of CE(s)	Trace Statistic	5 Percent Critical Value	Hypothesized No. of CE(s)	Max-Eigen Statistic	5 Percent Critical Value
None *	202.0658	69.81889	None *	107.8990	33.87687
At most 1 *	94.16677	47.85613	At most 1 *	51.30483	27.58434
At most 2 *	42.86193	29.79707	At most 2	20.25452	21.13162
At most 3 *	22.60742	15.49471	At most 3 *	17.83129	14.26460
At most 4 *	4.776122	3.841466	At most 4 *	4.776122	3.841466

**(**) denotes rejection of the hypothesis at the 5%(1%) level*
Source: Researcher's computation (2018) using Eviews 10.0.

Appendix 5: *Vector Error Correction Model (VECM)Result*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	175.4583	77.34328	2.268566	0.0366
D(GDPPC(-1))	-0.138136	0.172904	-0.798917	0.4354
D(GDPPC(-2))	0.499756	0.198140	2.522230	0.0219
D(DDS(-1))	0.981130	0.132386	7.411117	0.0000*
D(DDS(-2))	-1.530290	0.324373	-4.717688	0.0002*
D(EDS(-1))	0.020469	0.048723	0.420103	0.6797**
D(EDS(-2))	0.086095	0.047205	1.823850	0.0858**
D(GDI(-1))	0.104322	0.031851	3.275338	0.0045*
D(GDI(-2))	0.154345	0.028688	5.380123	0.0000*
D(INT(-1))	-12.43328	6.771007	-1.836253	0.0839**
D(INT(-2))	-7.830699	5.996577	-1.305861	0.2090*
ECM(-1)	-0.417108	0.173145	-2.409008	0.0276*

Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Is Inflation Always and Everywhere a Monetary Phenomenon? Evidence from Nigeria: 1980 - 2016

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Abstract

Money supply is thought as capable of increasing inflation and the output level in an economy. In Nigeria however, monetary growth is seen to have been accompanied with increases in the price level over the years. This study is aimed at evaluating the existing relationship between Money Supply and Inflation in Nigeria between 1980-2016. To achieve this, the study employed the use of the ARDL bound testing approach to co-integration on the annual series of broad Money supply, CPI and the exchange rate. After correcting for the apparent structural breaks in the series, the long run result established that both money supply and the exchange rate were found to have positive impact of 0.31% and 0.96% on the inflation rate. This finding lends empirical support to the monetarist view of inflation. The study therefore recommends as thus: the monetary authority should consider an alternative framework for monetary policy that will better anchor prices- say Nominal-GDP targeting as the current monetary targeting regime appears to be inefficient in anchoring price.

Keywords: Monetarist, Structural breaks, ARDL, exchange rate, inflation
JEL Codes: E31, E50

1. Introduction

One of the fundamental goals of a modern economic system is to keep prices of goods and services stable at rates that would not be detrimental to the economic system (Asekunowo,2016). Whereas 3% to 6% rate of inflation will spur economic activity through increased investment, production and wages, a high inflation rate in the range of double digit may produce a negative economic effect (Abraham, Helen & Gosele, 2015). Changes in the size of money supply have a number of implications on the macroeconomics variables especially inflation (Bakare, 2015). According to Nyong (2001), inflation varies ceteris paribus positively in relation to the growth in money supply. This is the contention of the monetarists as profess a one-to-one relationship between money supply and the general price level (MacCandless & Weber, 2005).

The two giant schools of taught in economics (Classicals and Keynesians) explained the role of money supply on the inflation rate of any economy through the Aggregate demand-Aggregate supply framework. While, the Classicals view the aggregate supply (AS) curve as vertical as any increase in money supply leads to increase in prices through increased demand. The Keynesians contend that it is an inverted L-shape. This is because, as long as there is idle resources in the economy an increase in the money supply leads to an increase in aggregate

demand, output and employment the short-run but translates into higher prices in the long run (Hussain, et.al. 2010).

Akinbobola (2012) offered three major explanations of inflation which include fiscal, monetary and balance of payments aspects. While in the monetary aspect, inflation is considered to be due to an increase in money supply, in the fiscal aspect, budget deficits are the fundamental cause of inflation in countries with prolonged high inflation. However, the fiscal aspect is closely linked to monetary explanations of inflation since government deficits are often financed by money creation in developing countries. In the balance of payments aspect, emphasis is placed on the exchange rate. Simply, the collapse of exchange rate brings about inflation either through higher import prices and increase in inflationary expectations, which are often accommodated, or through an accelerated wage indexation mechanism.

Many economists that favour traditional adjustment strategies contend that monetary growth, arising particularly from the domestic bank financing of large budget deficits, is the major source of inflationary pressures (UNECA, 1989 cited in Akinbobola, 2012). The negative consequences of inflation cannot be overemphasized. Inflation creates uncertainty which discourages savings and investment it erodes the gains from growth and leaves the poor worse off thereby increase the divide between the rich and poor in the society (Abraham, et. al. 2015).

A careful survey of the literature shows that myriads of empirical literature exist on the relationship between money supply and inflation in Nigeria and other countries alike (see: MacCandless & Weber 2005; Abraham et. al (2015); Akinbobola (2012); Asekunowo(2016) Bakare (2012); Chuba (2015); Ezekiel et. al (2014); Inam (2014); Mbutor 2014). However, it was noted from the literature that, previous studies so far reviewed ignored the structural breaks that are very apparent in the series. This portends great negative consequences on the results gotten. The breaks seen are sturdy enough to generate divergence and wrong inferences. This study aims at complementing these earlier efforts by taking care of the noticeable breaks in the series in its estimation.

The paper follows the following sequence: section one gives the introduction and motivation for the work. Section two presents some stylized facts on money supply and inflation in Nigeria as well as highlights the findings of some important related literature. Section three contains the econometrics method as well as the data sets used while section four present and discusses the result. The study is concluded in section five.

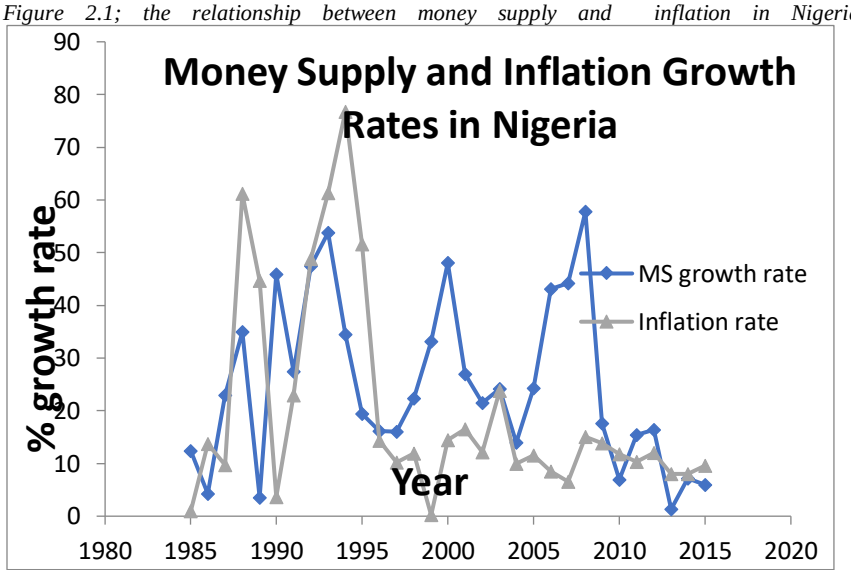
2. Literature Review and Thoretical Framework

Stylized Facts about Money Supply and Inflation in Nigeria

Nigeria had the economic impetus to reach its dream land in less than two decades from independence and still is; given its vast abundance of both human and natural resources, coupled with favorable climatic conditions that support all kinds of agricultural and manufacturing endeavors. This expectation was further strengthened by the oil boom in the 1970s. As a result massive oil money has being constantly injected into the economy with the view of expanding the productive base of the economy. However, the accompanying effect of this is the surging levels of prices overtime.

As a result of the over dependence on oil, the Nigerian mono economy is therefore exposed to the volatility of the world oil price. Consequently, the macroeconomic variables of money supply and the inflation rate among others have being characterized with several cyclical upswings and downswings. This can be seen in figure 2.1 below;

Figure 2.1; the relationship between money supply and inflation in Nigeria.



Data source: World Development Indicator, (2017)

Looking at figure 2.1, it could be seen vividly that there are four episodes of cyclical ups and downs in the behavior of the two macroeconomic variables of money and inflation in Nigeria. During the 1980s, the high rate of inflation of 61.2 per cent in 1986 was attributable to the increase in the level of money supply and the foreign exchange crises of the 1980s. The spillover effects of the windfall gains of the oil money flow of the 1970s further aggravated the situation. In the second period, money supply growth rate is seen to have increased to 53.76 per cent in 1991 and consequently inflation inched up to 76.8 per cent in 1993. Devaluation, Credit expansion, wage adjustments in addition to the increased liquidity may have influenced the rate of inflation. Consequent upon this, the indirect monetary control was adopted at the beginning of this period (1993-date) to control the growth of monetary aggregates in the belief that inflation is caused primarily by the persistent expansion in money supply (Ojo, 2013). As a reaction to the surging prices the average output level shrunk. This is not surprising as Babatunde & Shuaibu (2011) labeled inflation as a retardant to growth.

The third split shows improvement as money supply remains at averagely 27 per cent. Here, the inflation rate dropped to 12.7%. Also in the last episode, both variables reduced moderately with decrease in money supply being the highest. This is not unconnected with the government's renewed efforts in strengthening its stabilization measures in the economy through several reforms policies, fiscal discipline and good monetary and exchange rate policy etc. the CBN independence granted in 2005 further strengthened it as well as its ability to control the level of prices.

Empirical Review

Several works have been conducted on the impact of money supply on the inflation rate both in Nigeria and other countries alike. For example, Akinbobola (2012) reports a negative relationship between money supply and exchange rate on the inflation rate of Nigeria. He opined that, the inverse effect of

money supply on price level is that inflation may not be due to aggregate demand pressure but rather due to hiccups in the supply chain of goods both from the domestic and foreign supply outlets. On the contrary, the usual argument of the Monetarist school of thought that says money matters was given credence in Bakare (2012) as the results of the Error Correction Mechanism employed reveals 1% to 5.6% positive relationship between money supply growth and inflation in Nigeria from 1981 to 2006. This positive relationship between money supply and inflation is not only reported in Nigeria rather in Romania, Păun & Topan (2013) established Inflation has a monetary cause, as the basic VAR model performed on endogenous variables shows a unidirectional causality between M2 dynamics and CPI dynamics. However, from the results obtained reveals no statistical relevance for M1 on the inflation rate of Romania.

Odiba, et al (2013) examined the effects of both money supply and aggregate demand on the price level between the years 1986-2009. Through the use of OLS technique, a multiple regression model was estimated and the result suggested that there exist a strong positive relationship between money growth rate and the level of prices. The work of Dayo and Kemi (2013) also supports the positive relationship as they found money supply exerts considerable influence on the rate of inflation. But Inam (2014) has a contrasting result. His study refutes the monetarist explication of inflation. Having employed a multivariate co-integration regression technique, the study reveals that: there exists a long run relationship between money supply and inflation in Nigeria; but no causality between money supply and inflation in Nigeria from 1970 to 2011. The study recommends that monetary policies instruments and institutions should be improved and strengthened to effectively manage the money stock and maintain it at acceptable and non-inflationary levels.

Mbutor (2014) employed the use of impulse response analysis in his study of money and inflation dynamics in Nigeria from 1970 to 2012. The results showed that money supply is the most crucial variable for determining inflation in Nigeria other than the contribution of inflation to variations of inflation. Money supply plays an important role in explaining inflation as it accounts for up to 34.5% of aggregate price changes until the tenth period. In similar vein, Chuba (2015) affirm the supposition of the monetarist as the results of the recursive (VAR) model established the transmission mechanism from money supply to inflation in Nigeria from 2000Q1-2013Q4.

Asekunowo (2016) identified exchange rate pass-through of import prices to domestic prices as well as persistence of inflation itself as the causal factors of inflationary pressure in Nigeria from 1974 to 2013. In Moses et. al. (2016) all the three variants of OLS - ordinary least square, fully modify OLS, and dynamic OLS – techniques in order to ascertain the relationship between money supply and inflation in Nigeria from the period 1982q1 to 1996q4. Results from these estimates showed that the overall sample coefficients of money supply of 0.31% was positive and significant at 1, 5, and 10 per cent in the inflation equation for the full sample period, suggesting that money supply bears a long run positive relationship with inflation. The CBN is advised to continue to factor growth in monetary aggregates in its monetary policy considerations aimed at achieving price stability while keeping a keen eye on financial innovations and their impact on money supply. Also, Priscilla (2016) investigated the effect of monetary policy on inflation in Ghana using a modeling technique of the Autoregressive Distributed Lagged Model (ARDL) over a period of 1980 to 2014. The study finds a stable long-run relationship amongst the variables as the results show a statistically significant positive short-run and long-run relationship between money supply and inflation. The study recommends that immediate measures need to be adopted by

the Central Bank to reduce money supply through the sell of government securities.

In conclusion, all works aforementioned, with the exception of Akinbobola (2012) and Inam (2014) provide empirical support to the monetarist explanation of the money supply inflation relations. This is plausible and understandable as the historical series show that over the years the oil money inflows have translated into higher prices. The growth in monetary aggregates was due to factors such as: rapid monetization of oil inflows, minimum wage adjustments, and the financing of government's fiscal deficits through the banking system (Babatunde and Shuaibu, 2012).

Theoretical Framework

This study is hinged to the Fisher's equation of exchange for its theoretical backing. According to the monetary economists, money supply has an equi-proportional relationship with the price level in every economy, they therefore view inflation as nothing more than a monetary phenomenon. Totonchi (2011) posits that, they make use of the quantity theory of money represented by equation of exchange formulated by Irving Fisher (1876-1947) as thus;

$$MV = PT \qquad 2.1$$

Where, M= Money supply; V= the speed with which money changes hands; P = the price level and T= the total transaction during a period of time. MV is therefore, how much money is used to make transactions while PT is the number of money exchanged in a year (Howden, 2013). It is widely agreed to use the GDP (Y) as a proxy for (T) because it is practically impossible to know for certain the number of transactions that take place in a year. This makes the equation to become;

$$MV=PY \qquad 2.2$$

Where **PY** is the nominal GDP. Keeping the velocity constant, makes the equation to become a theory of the effects of money called the Quantity Theory of Money (QTM). Since the velocity is fixed, any change in money supply will eventually lead to changes in the nominal GDP. This means **(M)** determines the value of the economy's output. Inferentially, whenever **(M)** increases, the prices will rise which will eventually leads to a rise in nominal GDP **(PY).** The above rise in price will be termed as inflation; which is calculated as a percentage change in the general price level.

Summarily, when **(V)** and **(Y)** are held constant, due to their exogeneity, any increase in money supply will inevitably increase prices proportionately. A central implication of the QTM is that a given change in the rate of money growth induces an equal change in the inflation rate. Walsh (2003) argued that, any theoretical model not consistent with a roughly one-to-one long run relationship between money growth and inflation is questionable. The QTM is therefore a viable theory in explaining the economic relationship between Money, Inflation in any economy

3. Methodology

Data Source and Variables Description.

The data used in this study is gotten from the World Development Indicators courtesy of the World Bank. The data range from 1980-2016. The Consumer price index CPI is used as proxy for measuring inflation while broad money is used as the measure for the money supply. Also the exchange rate is equally used as an independent variable.

Estimation Techniques

Most time series data analyzed in applied econometrics are found to be non-stationary. Co-integration is a technique used in estimating relationship between non-stationary variables and reconciling the short run dynamics with long run equilibrium (Nkoro & Kelvin, 2016).Commenting further, Nkoro & Kelvin, (2016) assert that, Granger (1981), Engle and Granger (1987), Autoregressive Distributed Lag (ARDL) co-integration technique or bound test of co-integration (Pesaran and Shin 1999 and Pesaran et al. 2001) and, Johansen and Juselius (1990) are all co-integration techniques that have become the solution to determining the long run relationship

between series. The deviation of a variable from its long run equilibrium does affect its short run behavior; the Error Correction Mechanism (ECM) is employed to revert co-integrated variables or to re-parameterize the short-run dynamics and long run relationship of the underlying variables (Nkoro & Kelvin, 2016). Although there are a number of co-integration estimation techniques in the analysis of relationships in economics. This study employed the bound testing approach to co-integration that was developed by (Pesaran and Shin 1999 and Pesaran et al. 2001). This is because it is not only superior to the rest of the aforementioned, the unit root test conducted showed that the variables were not of the same order rather of orders *I*(0) and *I*(1).

According to Peasaran and Shin (1995) the ARDL has numerous advantages over all other methods of testing for co-integration including the two most notable other methods of Johansen's (1991) maximum likelihood approach and Phillips-Hansen's (1990) fully modified OLS procedure. The advantages of the ARDL approach to co-integration developed by Peasaran and Shin (1999) and Peasaran *et al*. (2001) over the other traditional co-integration methods include; flexible to analyze data of variables with different order of integration that is to say it can be applied when the underlying variables are *I*(0), *I*(1) or mutually co-integrated and also has the additional advantage of yielding consistent estimates of the long-run coefficients that are asymptotically normal irrespective of the order of the regressors (Peasaran and Shin, 1995). Theoretically, Peasaran et.al (2001) give the general model as thus;

$\Delta z_t = \boldsymbol{\alpha}_0 + \boldsymbol{\alpha}_1 t + \Pi z_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta z_{t-i} + \varepsilon_t$ ... 3.1

Where Δ is first difference operator, z_t is a vector of both x_t and y_t, y_t is k x1 vector of dependent variables, X_t is k x k matrix which represents a set of explanatory variables, is an intercept, $\boldsymbol{\alpha}_1$ is trend coefficient, t is time trend, Π is long run multiplier matrix, Γ is short-run coefficients matrix, and $\varepsilon_t$is k x 1 vector of error terms. However, before estimating the models, it is pertinent to start by testing the stationarity of the variables of the study because bound-testing approach cannot be applied to *I*(2) variables. More so, stationarity test is carried out to avoid the problem of spurious result since not all time series data are stationary at level (Granger & Newbold, 1974).

Model Specification

To achieve the objective of this study which is to analyze the impact of money supply on the inflationrate of Nigeria, the empirical model is adapted from the work of Ifeakachukwu & Olasunkanmi (2012) conducted in Nigeria with a minor modification on the right-hand side.

$LogCPI_t = \theta + \theta_1 LogMS_t + \theta_2 LogEXR_t + \varepsilon_t$ 3.2

Hence, the ARDL model is specified as thus;

$\Delta\ LogCPI_t = \alpha_{01} + \alpha_{11}t + \sum_{i=1}^{p} \alpha_{2i} \Delta\ LogCPI_{t-i} + \sum_{i=0}^{q} \alpha_{3i}\ \Delta\ LogMS_{t-1} + \sum_{i=1}^{p} \alpha_{4i} \Delta\ LogEXR_{t-i} + \lambda_{11} CPI_{t-1} + \lambda_{21} MS_{t-1} + \lambda_{31} EXR + \varepsilon t2$ ---------- 3.3

Where MS, CPI and EXR are proxies for money supply growth rate, inflation and exchange rate respectively. α_{01} is the intercept ,α_{11}, α_{2i}, α_{3i} and α_{4i} are the coefficients. The first part of equation 3.3 with the coefficients mentioned above represents the short run dynamics of the model whereas the second part with parameters λ_{11}, λ_{21} and λ_{31} represent the long run relationship.

4. Result Presentation and Discussion

Descriptive Statistics

Table 4.1 presents a clear description and a good summary of the data sets used in this study at a glance. Looking at the maximum and the minimum values of each of the variables, as well as their large standard deviations from the mean, one will expect nothing other than a large number of JB statistic which shows that the data sets are not normally distributed. However, this is

largely attributable to the large outliers seen in the data sets. For example, while the devaluation of the domestic currency as a result of SAP increased the inflation rate to a record high of 76.8% the oil inflow and fiscal deficit expanded the money supply to a tremendous level of 45.92% in 1990. As a result, the data sets could be non-stationary; parameters such as mean and variance being time-variant. Hence, a unit root test is conducted to ascertain the stationarity of the variables prior to estimation.

Table 4.1. Descriptive statistics of money supply, inflation and exchange rate in Nigeria.

	CPI	**MS**	**EXR**
Median	12.21701	18.82110	100.0000
Maximum	72.83550	64.92465	546.4059
Minimum	5.382224	1.953095	49.77731
Std. Dev.	17.51471	17.17742	125.5099
Skewness	1.707371	0.944975	1.636078
Kurtosis	4.680742	2.962539	4.816130
Jarque-Bera	22.33160	5.508860	21.59156
Probability	0.000014	0.063645	0.000020
Sum	715.6820	889.4041	5813.402
Sum Sq. Dev.	11043.54	10622.29	567098.1
Observations	37	37	37

Unit Root Test Result

Before estimating the model, it is pertinent to start by testing the stationarity of the variables of the study because. To this end, the study employed ADF test for stationarity in the presence of breaks under the null hypothesis that the variables are not stationary at 5% level of significance. All the variables have significant breaks points but at different times as seen in the table 4.2 below. The result also shows that CPI and EXR are stationary at level while MS is only stationary at first difference all at 5% level of significance. In other words, the variables of interest to this study are found to be integrated of orders I(0) and I(1). Hence, the adoption of the ARDL model.

Table 4.2. Unit root test results (with intercept and linear trend)

Variables	ADF Statistic	Significance level	Break dates
MS	-6.565000* *	At first difference	2009
CPI	-4.977391**	At level	1995
EXR	-9.538232**	At level	1998

Source: Authors computation from E-Views9
Note (**) denotes 5% level of significance.

The Impact of Money Supply on the Inflation Rate of Nigeria

According to Tobin (1965) the exogenous increase in money supply by the monetary authority is thought to be a source of inflation. The preoccupation of this study is to exqmine this relationship with the view of providing empirical support or otherwise to the above assertion. The first step is examining the long run relationship between the two variables. This is shown in the table 4.3. As seen from table 4.3, the F– statistic value of 10.06770 is above the lower and upper bounds of 4.87 and 5.85 respectively at 5% level of significance. This is an evidence of the existence of long run relationship between the variables under study.

Table 4.3: ARDL Bound Test for Co-integration

Test Statistic	Value	K
F-statistic	10.06770	2
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	4.19	5.06
5%	4.87	5.85
2.5%	5.79	6.59
1%	6.34	7.52

Source: Author's Computation from E-Views9

Having established co-integration between the variables, the next stage is to determine the co-integrating and long-run model. Table 4.5 shows the estimated result of equation 3.3. The result shows that in the short-run, there is a positive and significant relationship between (CPI) and its lag values (CPI_{-1}) A percentage increase in the first and second lags of (CPI) will cause an increase in the current level of inflation by 0.71. This is a reflection of the adaptive expectations or backward-looking nature of the average Nigerian business and other economic actors about future path of inflation. When expectations are adaptive, current inflation will be the rate it was last year (Sloman, Garratt and Wride, 2015). Hence, could cause future inflation. Also, in the short run, it is found that a percentage increase in MS and EXR will increase inflation by 0.32% and 0.71% at 10% level of significance. In the long run, money supply has positive and significant impact on the level of prices in Nigeria with an impact of 0.31% at 10% level of significance. The above result is the same with the monetary-inflation narrative in Nigeria. However, EXR has almost one-to-one relationship with inflation in Nigeria as it is reported to have a 0.96% impact. This reveals the exchange rate pass-through to the CPI as reported in Sanusi (2011). This is not surprising as Nigeria is an import dependent country, therefore, the exchange rate is expected to have a positive significant influence on the Nigeria's inflation rate.

Increase in monetary growth rate, arising due to oil revenue monetization, expansion of government deficit, currency and devaluation the implementation of the Udoji committee's recommendation have been identified among other things are identified as the key and principal orchestrators of surging level of prices. The historic time series of the two variables of monetary growth and inflation shown in figure 2.1 have clearly reflected that. The result is in line with the findings of McCandless & Weber (2005); Bakare (2012); Paun and Topan (2013); Asekonuwo (2016) and that of Moses *et. al.*(2015) as they both lend support to the theoretical proposition of the QTM and that of the Tobin (1965). This was expected a priori. Notwithstanding. The result is in contrast with that of Akinbobola (2012) and Inam (2014) all conducted in Nigeria.

The coefficient of error correction term (ECT) is negative and statistically significant at 5% level of significance. This implies that short-run dis-equilibrium disturbances will converge back to equilibrium in the long-run at a speed of 126 % each year.

Table 4.5: ARDL Short-Run and Long Run Result

LONG-RUN MODEL	Coefficient	Std. error	t-Statistic	Prob.
LOGMS	0.318095	0.161811	1.965843	0.0641
LOGEXR	0.962189	0.222431	4.325779	0.0004
DUM02	0.517023	0.244047	2.118539	0.0475
C	9.122017	1.566003	5.825030	0.0000
SHORT –RUN MODEL				

LONG-RUN MODEL	Coefficient	Std. error	t-Statistic	Prob.
D(LOGCPI(-1))	0.715581	0.171276	4.177943	0.0005
D(LOGMS)	-0.173078	0.129758	-1.333850	0.1980
D(LOGMS(-1))	0.326685	0.159935	2.042611	0.0552
D(LOGMS(-2))	-0.168494	0.145316	-1.159502	0.2606
D(LOGEXR)	0.409463	0.269031	1.521995	0.1445
D(LOGEXR(-1))	0.716695	0.354946	2.019166	0.0578
D(LOGEXR(-2))	-0.349006	0.430829	-0.810081	0.4279
D(LOGEXR(-3))	0.582637	0.267775	2.175842	0.0424
DUM02	-0.656076	0.355518	-1.845407	0.0806
ECT (-1)	-1.268950	0.244302	-5.194187	0.0001
DIAGNOSTICS				
R^2				83
F-Stat.				7.23
D.W. Stat.				2.00
Serial Correlation (LM test)				0.76
Heteroskedasticity test				0.64
Ramsey RESET test				0.36

Source: Author's Computation from E-Views9

Other diagnostic test shows that: The probability value of the observed R-squared (LM statistic) of 0.76 from the Breusch-Godfrey Serial Correlation (LM Test) affirms the absence of serial correlation (H_0) at 5% level of significance. Similarly, the result of specification error test (Ramsey RESET Test) and the Heteroskedasticity test show that we could not reject H_0 at 5% level of significance, meaning that the model is correctly specified and residuals of the model have constant variance. Lastly, the CUSUM of squares test reveals the parameters are stable as they all fall within the 5 % critical bounds.

5. Conclusion and Recommendation

Having established a positive and significant impact between money supply and the exchange rate on the inflation rate rate in Nigeria from 1980-2016, it is therefore concluded that inflation may not be entirely a monetary phenomenon. The paper studies the relationship that exists between monetary growth and the level of prices in Nigeria by examining the existence of a significant long run relationship between money supply, inflation as well as the exchange rate between 1980 and 2016. The study makes use of the bounds testing approach to co-integration within an autoregressive distributed lag framework. The empirical result gotten reveals that there is a positive relationship between money supply and the exchange rate on the price level.

This implies that if effort is not intensified towards effective inflation and exchange rate management, the Nigerian macroeconomic space will be negatively affected. This is because of the negative effects they portend on the output level, employment and the general standard of living of the people. Another implication of the quantitative result

is that, as a monetary policy instrument, money supply is used to boost output, however, raising the money supply as a way of boosting output portends the danger of increasing the level of prices in the long run. Whereas, decreasing the supply of money as a way of controlling inflation will consequently decrease the output level. Based on the above stated findings, the following recommendation is proposed: The monetary authority should consider an alternative framework for monetary policy that will better anchor prices- say Nominal-GDP targeting as the current monetary targeting regime appears to be inefficient in anchoring the price level.

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Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Economic Determinants of Maternal Mortality in Nigeria: 1980 - 2016

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Abstract

The study assessed the economic determinants of Maternal Mortality in Nigeria for the period between1980-2016. It relied on secondary data from the Central Bank of Nigeria and the Federal Bureau of Statistics and the World Bank. The data was subjected to two stage single equation co-integration procedure and the co-integration tests based on error correction model (ECM). The study found that an increase in real wage leads to decrease in maternal mortality rate. Inflation and unemployment rate have positive relationship with maternal mortality rate. But it was found that real wage and unemployment rate contribute significantly to maternal health status in Nigeria and therefore addressing the challenge of low income and high unemployment rate would pay off in terms of reducing maternal mortality rate in Nigeria.

Keywords: Real Wage, Unemployment, Inflation, Maternal Mortality Rate
JEL Codes: I12

1. Introduction

The state of maternal health in a society is one of the major indicators of its development. It is also an indicator of the performance of the health care delivery system. Reduction in maternal mortality is a major development priority of many governments and it has remained a serious intervention agenda of many global initiatives including the erstwhile Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs).

Maternal health is a common health challenge that affects both developed and underdeveloped countries almost everywhere. Despite the advancement in reproductive health and technology, high income countries still contend with the problem of maternal health because maternal health is such an important component of general health and a prerequisite for economic and human development. Maternal mortality is an important indicator of maternal health and a significant pointer of nation's welfare (Herfon, 2006).

Countries have evolved several strategies to reduce its rates to the barest minimum. At the turn of the Millennium, Nigeria signed onto the MDG along with other countries of the world. Given her circumstance, Nigeria's reduction of maternal mortality burden to 75% by 2015 was one of her health policy goals. By 2010 World Bank report showed that Nigeria was still among the countries with very high Maternal Mortality Rate (MMR) figures in the world. This shows that women's health still faces serious challenges in Nigeria. Nigeria accounts for 14% maternal death. Records also show that Nigeria is 1 of the 10 most dangerous countries to give birth. It is also estimated

that 630 of every 100,000 live birth in Nigeria result in maternal death. This means that as a nation we are not just losing vital human capital through avoidable deaths but equally decapitating the few remaining women and denying them of helping to build the economy.

During recession economic indicators such as real GDP, income, employment, manufacturing, and retail sales are low. These low levels of economic indicators affect the livelihoods of virtually everyone in one-way or the other. Reduced income during period of economic recession leads to reduced feeding and even lower attention to health care. Economic recessions are characterized by a dull in economics activities, reduction in the flow of money resulting to low earnings by the households. This ultimately reduces households' social and economic well-being especially the low income households.

Since high maternal mortality rate deteriorates the productivity of a nation, the economic determinants of maternal mortality are of considerable importance. Many possible causes of maternal mortality have been suggested in the literature and this paper critically fills the gap in literature by examining the economic determinants of maternal mortality. The rest of this paper is constructed as follows. In section 2 we review literature on the determinants of maternal mortality. In section 3 we present the theoretical background and methodology, while in section 4 we present our results and discussions of our results. The last section offers some concluding comments and recommendations

2. Literature Review and theoretical framework

Empirical Literature

Ujah (2005) made use of a seventeen-year review of factors contributing to maternal mortality in North-central Nigeria. The study found a bimodal pattern of maternal deaths occurring at both extremes of the reproductive age range. The study found that the greatest risk of maternal mortality was among early teenagers and older women. The study also found that the ethnic groups of women were also an important risk factor for maternal mortality.

Shiffman and Okonofua, (2007) examined ''the state of political priority for maternal mortality reduction in Nigeria''. Their study showed that the priority was in its infancy and that advocates the need to coalesce into a potent political force which will push the government to take appropriate action to reduce maternal mortality.

Abe and Omo-Aghoja, (2008) in a ten year retrospective study of maternal mortality at the Central hospital in Benin City, Nigeria identified leading causes of maternal deaths. The leading direct causes were sepsis, hemorrhage, obstructed labor and pre-eclampsia, while the major indirect causes were institutional difficulties and anemia. The study found that low literacy, high poverty rate, extremes of parity and non-utilization of maternity services were associated with maternal mortality. The overall maternal death ratio was 518/100,000. The maternal mortality ratio was accessed to be 30 times higher in un-booked as compared to the booked patients, while 60% of maternal deaths were discovered to occur within 24 hours of admission.

Mairiga (2008) carried out a population-based qualitative study in two rural and urban communities in Borno state, Nigeria. The aim of the study was to find out the community's knowledge and perceived implications of maternal mortality and morbidity as well as the community members' view on the ways to prevent the scourge. This study was carried out through focus group discussion. The study showed that maternal mortality and morbidity is common and well known in the communities studied and that the implications are well appreciated. The study also found that the communities had the perception that the causes of maternal deaths were medicinal, cultural and socio-economic.

Shah and Say (2007), produced a paper on Maternal Mortality and maternity care. The two authors showed that the gains in maternal mortality reduction between 1990 and 2005 have been modest and uneven. They also showed that countries with high maternal mortality rates shared problems of unplanned pregnancies and high fertility, low availability of health personnel and poor health infrastructure.

Harrison, (2009) showed that attempts to reduce the high maternal mortality ratio in Nigeria have failed. He argues that the uniqueness of Nigeria's situation calls for a fundamental remedy based on stamping out the chaos in the country. This could be done by the country getting its politics and governance structures right.

Benedict et'al, (2011) assessed the "Distribution of causes of maternal mortality among different socio-demographic groups in Ghana". The maternal mortality ratio of Ghana was assessed to be very high. The aim of the study was to analyze the causes of maternal mortality according to socio-demographic factors in Ghana. The causes of maternal deaths were assessed with respect to educational level, age, residence status, and marital status. The results of this study showed that the highest cause of maternal death was Hemorrhage (22.8%). The study shows evidence of variations in the causes of maternal death among different socio-demographic subgroups in Ghana that should not be overlooked.

Meghnaet'al, (2013) examined "An analysis of Pregnancy-Related Mortality in Health and Demographic Surveillance System in Western Kenya''. This group of scholars evaluated deaths that occurred between 2003 and 2008 among women of childbearing age using Health and Demographic Surveillance system data in rural western Kenya. Deaths were categorized as either obstetric or non-obstetric. Their study indicated low uptake of maternal health interventions in women dying during pregnancy and postpartum, suggesting improved access to obstetric care.

3. Methodology

Theoretical Framework

The theoretical framework for this study is based on Grossman, (1972) cited in Sede (2014) Health demand model. He specified the utility of time (t) given some choice set as:

$U_t = (_t, H_t, Z_t)$ **……..…..** 3.1

Where:

H_t= the total stock of health at t, $_t$= fraction of H_t consumed at time t and Z_t = these are bundles of goods consumed for utility at t. They are choice or control variables. It should be noted that Z_t can be any good, service or habit consumed any time from which the consumer derives utility, the moral judgment notwithstanding.

Thus equation (1) states that the amount of utility available to an individual at time t is a function of the total stock of health (H_t) and the total stock of other goods (Z_t) consumed. Implied in equation (1) is that $_t$ is a measure of service flow per unit of health stock. Thus total consumption of health services is given as:

$H_t = h_t$**……..…..** 3.2

(h_t) is also Grossman 'good health'. Another point to note is that the time path of life ranges from zero to death time (T).

Hence; t (0, T)**…….……** 3.3

From (3) above Grossman, (1972) derived the death function as $T = f(H_t)$ **……** (3.4)

Grossman 1972 also asserted that if the current total stock of health (H_t) available for an individual is less than the minimum stock of health required for survival then death will occur. Thus; H_tH_{min} = Death (T). Further to this assertion Grossman, (1972) postulated that every individual is born with some initial stock of health (H_0). Thus to him (H_0) is exogenously given and it depends on genetics and start up environment of the individual. He asserted that without good health, optimal amount cannot be produced according the level of education, even though education is crucial to the enhancement of a virile human capital because it relates directly to the productive

capacity of individuals and thus becomes a major determinant of earning. From (4) above, it follows that death is a direct function of H_t. This therefore necessitates the derivation of H_t function.

Grossman (1972) reasoned that health is not demanded to be consumed on its own. To him, 'good health' is the actual good that is consumed and cannot be directly observed. Thus demand for health is a derived demand. It is demanded for the purpose of obtaining 'good health'. It can also be seen as both inputs to the utility function and output from the endogenous production of human capital. Hence good health is an input to the process of producing human capital that will enable the individual produce healthy time that can then be spent on effective labor output which also helps in budget optimization. On the other hand, 'good health' as an output, is a product produced for utility maximization by the consumers. This study adopts the output orientation of "good health" since it focuses on maternal mortality rate as a dependent variable. Grossman, (1972) and Jaana-Maija, (1982) had a contemporaneous conceptualization of future health as a sum of current health and the investment on health minus depreciation. Thus:

$H_{t+1} = H_t + I_t - {}_tH_0$**.....** 3.5

Where:
H_0 = exogenous endowment of health. It is a function of genetics and environment, H_t= total stock of health at current time, H_{t+1} = future stock of health, I_t = Grossman investment on health, and $_t$ is the depreciation rate, it is a function of age and it declines to zero at death. From the foregoing the following holds: = f(age). That is, Lim_0.
Thus given Grossman (1972), Donald (1991) health investment function of
$I_t = f(Y, E)$ then,

$H_{t+1} = H_t + Y + E - H_t + Z_t$**.....**3.6

Equation 6 states that future health depends on current health stock (H), income (Y), Stock of education (E), the proportion of depreciated health (H_t) and other consumption stocks (Z_t). From (6) above H_t can be derived as:

$H_t = H_{t+1} - Y - E + H - Z$ **.....**3.7

Noting that at death $_t$ becomes zero and that at death and H_{t+1} ceases to function in the life model of the individual, they thus reduce to zero. From the foregoing it is deduced that:

Lim0 and $\lim H_{t-1}0$. Thus the value of H_t that will satisfy H_tH_{min} = Death (T) will be;

$H_t = -Y - E - Z$**.....** 3.8

Substituting for T, to get the death model then:

$T = -Y - E - Z$ **.....** 3.9

Equation 9 shows that income, education and other assets or good enter the death (mortality) model as negatives, showing that they are inversely related to mortality. Equation 9 above can be linearized to yield an econometric model of the sort:

$T = {}_0 - {}_1Y - {}_2E - {}_3Z +$ 3.10

Equation 10 states that mortality is a function of income (Y), education (E), amount of other utility creating goods consumed (Z).

Model Specification
Following the theoretical framework above, equation 10 can be modified and adapted for estimation. Therefore, we specify the economic determinants of maternal mortality as:

$MMR_t = f(RWGR_t, PHEXP_t, INF_t, UNEMPR_t)$ 3.11

Where: MMR = Maternal Mortality Rate, RWGR = Real wage rate, PHEXP = Private Health expenditure, INF = Inflation rate, and UNEMPR = Unemployment rate

Following from equation 11 stated above, an econometric form of the equation in log-linear form is specified in equation 12 as:

$LMMR_t = \beta_0 + \beta_1 LRWGR_t + \beta_2 LPHEXP_t + \beta_3 LINFR_t + \beta_4 LUNEMPR_t + \mu_t$ 3.12

μt is a random error term representing all other variables not specified in the model.

A-priori expectations are as follows: $\beta_1 < 0$ while $\beta_2, \beta_3, \beta_4 > 0$

Estimation Technique

The study employs cointegration and error correction modelling techniques to investigate the economic determinants of corruption in Nigeria, using data from 1980 to 2016. The choice of methodology draws from the need to identify the short run effects of the economic determinants of maternal mortality in Nigeria within the period covered by the study. The methodology involves three steps. The first step is the test for stationarity using the Augmented Dickey Fuller (ADF) to determine the order of integration of each variable series. This is followed by the test for cointegration using the Engle and Granger technique, which entails investigating the existence or otherwise of long run relationship(s) among the variables, and thirdly, if cointegration is detected, an error correction model is estimated to represent the short run relationship between the dependent variable and explanatory variables. Accordingly, Asteriou and Hall, (2007) noted that if variables are cointegrated, they move together over time so that any disturbances in the short-run are corrected. This indicates that if two or more variables are cointegrated, they may drift at random from each other in the short run, but will return simultaneously to equilibrium in the long run.

Sources of Data

This study employs annual time series data on Maternal Mortality Rate, Real wage rate, Private Health expenditure, Inflation rate, and Unemployment rate. The dataset were sourced from various issues of the Statistical Bulletin of the Central Bank of Nigeria and World development indicators.

4. Presentation of Result and Analysis

This section deals with the presentation and analysis of the empirical results obtained from the estimation. The study examined the economic determinants of maternal mortality in Nigeria.

The Unit Root Test

Stationarity test was conducted on the variables using the Augmented Dickey-Fuller test. The results of the unit root test are presented below in table 4.1.

Table 4.1: Unit Root Test Results.

Variables	ADF statistics at level	Critical value (5%)	Remark	ADF statistics at 1st difference	Critical value (5%)	Remark	Order of integration
LMMR	-3.794	-3.548	Stationary	-6.789	-3.564	Stationary	1(0)
LINF	-3.782	-3.544	Stationary	-6.574	-3.548	Stationary	1(0)
LPHEX	-2.605	-3.552	Not Stationary	-5.066	-3.562	Stationary	1(1)
LRWAGE	-1.542	-3.562	Not Stationary	-6.752	-3.562	Stationary	1(1)
LUNEMP	-2.041	-3.544	Not Stationary	-5.932	-3.548	Stationary	1(1)

Source: Author's Computation (2018)

From the unit root test presented in table 4.1 above, it is observed that the maternal mortality rate variable is stationary at level because its ADF statistic is greater than the critical value at 5% level in absolute values.

The Engle-Granger Co-integration Results

From the results below, it can be observed that there is one co-integrating equation as one of the variables is found to be statistically significant.

Table 4.2: The Engle-Granger Co-integration Results.

Variables	tau-statistics	Prob.*	z-statistic	Prob.*
LMMR	-2.098180	0.9266	-5.768832	0.9811
LINF	-4.902710	0.0495	-50.09544	0.0000
LPHEX	-3.178434	0.5371	-14.69290	0.5897
LRWAGE	-2.182298	0.9102	-7.995177	0.9379
LUNEMP	-3.113582	0.5674	-14.83518	0.5802

Source: Author's Computation (2018)

Inflation rate (inf) is co-integrated under the tau-statistics and the z-statistics with probability of 0.0495 and 0.0000. This leads us to state that the series are co-integrated since at least there is a co-integrating equation.

An examination of the econometric result shows that the overall goodness of fit is very satisfactory with the R-squared of 0.983929 and the adjusted coefficient of determination, R-bar-squared of 0.972449 which are the coefficient of determination.

Error Correction Representation for the model

Table4.3. Error Correction Representation for the model based on the Akaike and Schwarz information criterion

Explanatory variables	Coefficient	Standard error	t-statistic
D(LMMR(-1))	-3.747245	2.346892	-1.596684
LINF	-0.014605	0.011738	-1.244224
D(LINF(-1))	0.000457	0.008539	0.053556
LPHEX	0.023011	0.014652	1.570436
D(LPHEX(-1))	-0.020111	0.018853	-1.066763
LRWAGE	-0.055851	0.018678	-2.990130
D(LRWAGE(-1))	-0.000506	0.000278	1.820537
LUNEMP	-0.087079	0.031476	-2.766536
D(LUNEMP(-1))	0.001246	0.023411	0.053214
ECM(-1)	-0.738724	0.276143	-2.674514
R-Squared = 0.983929			
R-Bar-Squared = 0.972449			
F-Stat = 85.71121			
D.W = 2.014553			

Source: Author's Computation (2018)

The R-squared of 0.983929 indicates that about 98.39% variation in maternal mortality rate is explained by the variation in inflation rate, real wage rate, private health expenditure and unemployment rate. The F-Statistic of 85.71 is significant at 5 percent level of significance since it calculated f-value is greater than the tabulated f-value 2.60. The D.W statistic is 2.014 which is significantly close to 2. This means that the model is free from autocorrelation and the model is reliable in explaining the economic determinants of maternal mortality in Nigeria.

Using the Akaike and schwarz Information criterion based on parsimonious error correction model presented in the table 4.3 above, it is observed that the coefficient of real wage well behave since its coefficients have a sign of -0.055851 which conforms to theoretical expectation. An increase in real wage will lead to decrease in maternal mortality rate. This means that a 10 percent increase in real wage would lead to 0.559 percent decrease in maternal mortality rate.

It is also observed that the coefficient of private health expenditure well behave since its coefficients have a sign of 0.023011 which conforms to theoretical expectation. An increase in private health expenditure will lead to increase in maternal mortality rate. This means that a 10 percent increase in private health expenditure would lead to 0.230 percent increase in maternal mortality rate.

While inflation and unemployment rate of -0.014605 and -0.087079 have negative relationship with maternal mortality rate, these do not conform to apriori expectation. However, the lag one period of inflation and unemployment rate of 0.000457 and 0.001246 has positive sign respectively and the explanation will be done base on lag one period. This means that a 10 percent decrease in inflation and unemployment rate would lead to 0.00457 and 0.0125 percent decrease in maternal mortality rate. A closer look at the t-statistics of the independent variables, give their levels of significance respectively. From table 4.4 presented above, it can be seen that real wage and unemployment rate are statistically significant at 95 percent and 90 percent level. This is because the t-statistic of -2.990130 and -2.766536 are greater than the critical t-values of 2.060 at 95 percent level and 1.708 at 90 percent level in absolute terms. While inflation rate and private health expenditure are insignificant at 95 percent and 90 percent level, since their t-statistic of 1.596684 and 1.570436 are less than their critical t-values of 2.060 at 95 percent level and 1.708 at 90 percent level.

From the table 4.3 above, the ECM(-1) has a coefficient of -0.738724 and its t-value of -2.674514 is significant at 95 percent confidence level since it is greater than the tabulated t-value which is 2.060. It is also significant at 90 percent level. -0.738724 percent of the long run deviation has been corrected by the ECM(-1). Hence, the model is stable in the long run.

Policy Implications

Based on the results from the table 4.3, the following implications were deduced from the study;

Inflation has a positive relationship with maternal mortality rate. An increase in inflation rate would reduce the purchasing power of household; this would in turn reduce the amount spent on maternal health care, thus, increasing maternal mortality rate.

Real wage rate have a negative relationship with maternal mortality rate, hence an increase in real wage rate have implication of increasing maternal health care, thereby reducing maternal mortality rate in the country. If real wage increases, people will have more to spend, therefore aggregate demand for maternal care would continue to increase.

Private health expenditure have a positive relationship with maternal mortality rate, hence an increase in private health expenditure have implication of decreasing maternal health care, thereby increasing maternal mortality rate in the country. If private health expenditure increases, people will have to spend more, therefore aggregate demand for maternal care would continue to decrease.

Unemployment rate have positive relationship with maternal mortality rate. This can be seen from the point of view of a country with high unemployment rate. High unemployment rate in a country leads to social and economic problems in the country as a whole. Economic problems result in less production of goods and services, less distribution of income, loss of tax revenues, fall in GDP rate and little or no demand for health care etc. Social problems cause's social ills and shows effect on individuals financially and psychologically. Individuals cannot meet their financial obligations on time and getting high stress which leads to problems like ill-health, maternal mortality, premature death, suicides etc.

Moreover, the effects of unemployment are social too, not just economic. Frequently, crime rates rise as people are unable to meet their needs through work. Divorce rates often rise because people cannot solve their financial problems. The rate of homelessness rises, as do the rates for mental and physical illness. Homes are foreclosed upon or abandoned, and neighborhoods deteriorate as a result. When there is high unemployment, people pay less in income taxes and also pay less in sales taxes because they purchase fewer goods and services.

The policy implications above show that a proper implementation of government

policies would surely be beneficial to the country if government recognizes the relationship between real wage, private health expenditure inflation, and unemployment which serve as key economic determinants of maternal health care in the country.

5.Conclusion and Recommendations

Based on the empirical evidence of the study, it was found out that recession and inflation contributes significantly to maternal health status in Nigeria. This by implication means that if Nigeria is to achieve increase in maternal care demand (reduction in maternal mortality), it is of utmost importance that a sound macroeconomic policy mix which will ensure stable real wage and low inflation and low unemployment rate should be implemented. Thus, the study recommends that:

- Inflation should be control through fiscal and monetary measures so as to maintain a general stable prices.
- Maternal health status can be improved by reducing the unit cost of health services and thus, all things being equal, greater health coverage will be achieve.
- Government should pursue policies and programmes aimed at ensuring stability in real wage which in turn will increase maternal health care.
- It is not only the responsibility of the government to take initiation in reducing the unemployment problem, every individuals has to take step to overcome this problem. Lot of adjustments is to be done by the individuals to come out of unemployment situation. This can be done by cutting down unnecessary expenditures and also encourage other family members to find jobs so that they can compensate in income generation. Government policy gear towards unemployment reduction like unemployment compensation, creation of more job, increase of government expenditure on small and medium scale enterprise (SME) and provision of entrepreneurship centers should be implemented as this will boost the employment level and living standard in the country. This in turn will increase private health expenditure on maternal health care. These involve Formulation of effective unemployment policies that would absorb the unemployed citizens especially into informally sectors of the economy.

Based on the findings in this study, inflation rate and unemployment rate have positive relationship with maternal mortality rate. Hence government policy aimed at reducing inflation and unemployment rate such as a mix of tight monetary policy which keeps inflation rate in check and an expansionary fiscal policy which would reduce unemployment rate while raising the real wage rate and private health expenditure would definitely reduce maternal mortality rate to a barest minimum.

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Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Empirical Analysis of the Impact of Exchange Rate Fluctuation on the Nigeria Balance of Payments: 1981 – 2017

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Abstract

This study examined the impact of exchange rate fluctuation on the Nigeria balance of payment for the period of 1981– 2017. The study employed ARDL bound testing approach to cointegration to test the long run relationship among the variables after the unit root test was conducted, which revealed that some variables were stationary at first difference while one was stationary at level. The empirical results from the ARDL bounds testing procedure revealed that a long-run relationship exists between exchange rate and balance of payments in Nigeria. The elasticity of the exchange rate coefficient in the balance of payments model was negative and statistically insignificant at 5 percent level, thus balance of payment position in Nigeria responded negatively to exchange rate policies in Nigeria. Both in the long-run and short-run the estimated coefficient of exchange rate variable was not statistically significant. This implied that change in exchange rate do not influence the balance of payments position in Nigeria. Therefore, it was recommended that, Nigeria government should implement economic policies that could enhance the appreciation of the Naira-US$ exchange rate against the devaluation policy which most often results in high cost of importing raw materials and capital goods, raises the cost of production and reduces the profits of the importing firms as well as reduce the excessive balance of payments deficit by discouraging over-reliance on imported goods and the promotion of domestic export produce is very imperative.

Keywords: Exchange Rate Fluctuation, Balance of Payment, ARDL
JEL Codes: E31, F41, F43

1. Introduction

Exchange rate refers to the price of one currency (the domestic currency) in terms of another (the foreign currency). Exchange rate plays a key role in international economic transactions because no nation can remain in autarky due to varying factor endowment. Movements in the exchange rate have ripple effects on other economic variables such as interest rate, inflation rate, unemployment, money supply, etc (Oladipupo & Onotaniyohuwo, 2011). These facts underscore the importance of exchange rate to the economic well-being of every country that opens its doors to international trade in goods and services. The importance of exchange rate derives from the fact that it connects the price systems of two different countries making it possible for international trade to make direct comparison of traded goods. In other words, it links domestic prices with international prices. Through its effects on the volume of imports and exports, exchange rate exerts a powerful influence on a country's balance of payments position. Consequently, nations in the pursuit of the macroeconomic goals of healthy external balances as reflected in their balance of

payments (BOP) position, find it imperative to enunciate an exchange rate policy (Oladipupo&Onotaniyohuwo, 2011).

Exchange rate is a key determinant of the balance of payments (BOP) position of any country. If it is judiciously utilized, it can serve as nominal anchor for price stability. Changes in exchange rate have direct effect on demand and supply of goods, investment, employment as well as distribution of income and wealth. For several years, the Nigerian economy witnessed high level volatility in foreign exchange dynamics, which aggravated the nation's balance of payments. Basically, adequate foreign exchange is required in the economy for the servicing of external debts, importation of raw materials, machines and spares and upgrading of industrial infrastructure for sustainable development (Oladipupo & Onotaniyohuwo, 2011).

Against this backdrop, the concern of many scholars and economy watchers has to do with the dynamics of foreign exchange, being contingent on the market forces of demand and supply, as well as their critical linkages with balance of payments. Also of immense interest is the trend of balance of payments between trading nations, which underscore financial and real investments cooperation for economic cooperation and sustainable development. Some research works (Opaluwa, Umeh & Ameh, 2012; Owolabi & Adegbite, 2017; Oladipupo & Onotaniyohuwo, 2011) had examined changes in exchange rate over the years, with emphasis on short-run equilibrium tendency and also address the implications of foreign exchange dynamics on international finance and investment profiling (Loto, 2011; Lipsey& Chrystal, 2004). Considering Nigeria's macroeconomic context, this study examines foreign exchange dynamics in relation to balance of payments.

The implementation of Structural Adjustment Program (SAP) recommended by International Monetary Fund (IMF) for developing countries so that they could get loans with certain conditionality which lead to problems balance of payment problems due to expansionary financial policies, a deterioration in terms of trade, price distortions, high debt servicing or combination of these factors have often resorted to devaluing their currencies (Nashashibi, 1983). Therefore, Nigeria has undergone various policy and structural reforms both at micro-and macro level of the economy in the form of implementing Structural Adjustment Program (SAP), which began in 1986 and has led to high level of fluctuation in the exchange rate over the years. Therefore, the aim of this study is to investigate the impact of exchange rate fluctuation on Balance of Payment (BOP) in Nigeria. Hence, following the introduction is section II which deals with the review of empirical literature, section III involves the analytical methodology, section IV present data, analyze and interpret regression results, while section V summarizes and conclude the study.

2. Literature Review and Theoretical Framework

Empirical Review

A number of studies have been carried out on the relationship between exchange rate and balance of payment. Dutta and Ahmed (2006) using co-integration and error correction model approaches investigated the behavior of Indian aggregated import demand during the period 1971-1995. The results obtained indicated that import volume is co-integrated with relative import price and real GDP. The output of the import demand in India is largely explained by real GDP and generally less sensitive to import price changes. Rose (1990), examined the empirical relationship between the real effective exchange rate and aggregate real trade balance for major OECD countries in the post-Bretton Woods era. Using a variety of parametric and non-parametric techniques, the results suggest that there is little evidence that the exchange rate significantly affect the trade balance.

Oladipupo and Onotaniyohuwo (2011) investigated the impact of exchange rate on

the Nigerian external sector (the balance of payments position) using the ordinary least square (OLS) method for data covering the period between 1970 and 2008. The result revealed that exchange rate has a significant impact on the balance of payment position. Imoisi (2012) examined the trends in Nigerian's Balance of payments position from 1970-2010 using an econometric analysis. The study carried out a multiple regression analysis using the ordinary least square method for both linear and log linear form. The results showed that the independent variables appeared with the correct sign and thus, conform to economic theory, but the relationship between Balance of payments and inflation rate was not significant. However, the relationship between Balance of payments, Exchange rate and interest rate were significant.

Salasevicius and Vaicious (2003) used the VECM to test for Marshall-Lerner condition in the exchange rate-trade balance relationship in the Baltic States. The study found that Lithuania met the Marshall-Lerner condition, but Estonia did not, while the result of Latria was ambiguous.

Ogbonna (2011) examined the empirical relationship between the real exchange rate and aggregate trade balance in Nigeria. The study tested Marshall-Lerner conditions to see if it is satisfied for Nigeria. The result showed no co-integration for the trade balance model. The results further revealed that depreciation/devaluation improves balance of payment and Marshall-Lerner (ML) condition holds for Nigeria.

Rasaq (2013) analyzed the impact of exchange rate volatility on macroeconomic variables, using correlation matrix, ordinary least square (OLS) and Granger causality test, the findings of the study showed that exchange rate volatility has a positive influence on Gross Domestic Product, Foreign Direct Investment and Trade Openness, but with negative influence on the inflationary rate in the country.

Umoru and Odjegba (2013) analyzed the relationship between exchange rate misalignment and balance of payments (BOP) mal-adjustment in Nigeria over the sample period of 1973 to 2012 using the vector error correction econometric modeling technique and Granger Causality Tests. The study revealed that exchange rate misalignment exhibited a positive impact on the Nigeria's balance of payments position. The Granger pair-wise causality test result indicated a unidirectional causality running from exchange rate misalignment to balance of payments adjustment in Nigeria at the 1 percent level. The inconsistency in the research results of the various studies reviewed therefore motivated this study.

In recent time, a study was carried out by Okwuchukwu (2014) examined the impact of exchange rate on balance of payment in Nigeria, using annual data from 1971 to 2012. The empirical methodology employed autoregressive distributed lag (ARDL) co-integration estimation technique to detect possible long-run and short-run dynamic relationship between the variables used in the model. The study also tested the Marshall-Lerner (ML) condition to see if it is satisfied for Nigeria. The results provided evidence in favour of a positive and statistically significant relationship in the long-run and also a positive but statistically insignificant relationship in the short-run between balance of payment and exchange rate. The results further revealed that depreciation/devaluation improves balance of payment and that Marshall-Lerner (ML) condition subsists for Nigeria. The study recommends policies that will discourage excessive importation and promote incentive based export promotion programmes. It further recommends diversification of the economy and the promotion of entrepreneurial development in Nigeria.

Harley (2018) investigated the impact of exchange rate using of descriptive and ordinary least square methodology for the period of 2012 to 2016 on a panel data. The regression result shows thatthere is a positive relationship between Return on Investment and exchange rate of 145.4265. This implies

thata unit increases in exchange rate of 145.4265 will bring about a rise of 145.4265 in Return on Investment. Other variables used in the study have a positive relationship with return on investment. Hence, it can be deduced that, empirical research on the impact of exchange rate on balance of payment is still very scanty and few records available produced ambiguous result with techniques which are not only outdated but were not adopted following the rules governing the adoption of techniques of analysis of time series data. Therefore, this study will apply advance econometric technique to an updated time series data covering the period of 1981 to 2017 to fill the gap in the literature.

Theoretical Framework

This study employed as its theoretical framework the elasticity approach which focus on the trade balance and exchange rate. It studies the responsiveness of the variables in the trade and services account, constituting of imports and exports of merchandise and services relative price changes induced by devaluation. The elasticity approach to balance of payments is built on the Marshall Learner condition (Sodersten, 1980), which states that the sum of elasticity of demand for a country's export and its demand for imports has to be greater than unity for a devaluation to have a positive effect on a country's balance of payments. If the sum of these elasticities is smaller than unity, then the country can instead improves its balance of trade by devaluation. This condition can be expressed mathematically as follows:

$\Delta B = KXf(e_{1m} + e_{2m-1})$ …..…….…. 2.1

where:

ΔB= change in the trade balance

K = The devaluation in percentage

Xf = The value of exports expressed in foreign currency

e_{1m} = The first (devaluing) country's demand elasticity for imports.

e_{2m} = The second country's demand elasticity for exports from the devaluingcountry.

Thus, $e_{1m} + e_{2m} > 1$ for Marshall Learner condition to be fulfilled.

This approach essentially detects the condition under which changes in exchange rate would restore balance of payments (BOP) equilibrium. It focuses on the current account of the balance of payment and requires that the demand elasticity be calculated, specifying the conditions under which a devaluation would improve the balance of payments. Crockett (1977) sees the elasticity approach to balance of payments as the most efficient mechanism of balance of payments adjustments and suggests the computation of demand elasticity as the analytical tool by which policies in the exchange field can be chosen, so as to form the equilibrium. In contrast, Ogun (1985) is of the view that most less developed countries who are exporters of raw materials or primary products, and importers of necessities may not successfully apply devaluation as a means of correcting balance of payments disequilibrium, because of the low values for the elasticity of demand.

3. Methodology

Model Specification

This study focused on Balance of payment (BOP) as the dependent variable and exchange rate as the independent or explanatory variable. In order to test if Marshall – Lerner condition holds for Nigeria, total import and total export were included as explanatory variables. Based on the theoretical background and the model of Okwuchukwu (2014) this study will estimate the following functional relationship:

BOP =f(EXR , XM, IM) ……..3.1

Where ;

BOP is Balance of payment,

EXR is exchange rate,

XM is total export,

IM is total import.

The balance of payment model in this study draws from the same logic as the Marshall-Lerner condition, but differs only on the expression of the balance. While Marshall-

Lerner expressed balance of payment as net export (X – M), this study followed the methodology used by Boyd (2001) and salasevicius and vaicius, (2003) to take their ratio (X/M) since according to salasevicius and vaicius (2003), trade built in this way in a logarithmic model gives the Marshall-Lerner condition in an exact form rather than approximation. The Linear approximation of the functional form of the model expressed in natural logarithm is of the form.

$BOP = \alpha_0 + \alpha_1 InEXR + \alpha_2 InXm + \alpha_3 InIm + \mu_t$…..3.2

Where,
In is the natural logarithm,
BOP is the balance of payment,
EXR is the real exchange rate,
XM is total export,
IM, is total import,
μ is the stochastic error term,
α_o is the constant term and
$\alpha_1 \ldots \alpha_3$ represents the coefficients of the explanatory variables.

The coefficient of InEXR gives the Marshall-Lerner condition of NX + NM > 1. The decision rule here is that if the value of the coefficient of InEXR is positive, it implies high import/export demand elasticity, meaning that ML condition subsists and that depreciation of exchange rate improves balance of trade in Nigeria. But, if the value of the coefficient of InEXR is found to be negative, it indicates that the ML condition does not hold and thus depreciation of the domestic currency worsens the balance of trade in Nigeria.

Estimation Techniques

The model estimation technique chosen for the study is the autoregressive distributed lag (ARDL) bound testing approach to co-integration. The study first of all looked at the time series properties of the data used in the analysis since the ARDL stipulates that none of the variables should be more than I(1). This study therefore estimates the following regression equation.

Where;
ΔInBOP is the log difference of the balance of payment,
ΔIn EXR is the log difference of the exchange rate,
ΔInXM is the log difference of total export, and
ΔInIM is the log difference of total import.
α_1, α_2, α_3, α_4 represents the short-run coefficient and β_1, β_2, β_3, β_4, represents the long-run coefficient of balance of payment, exchange rate, export and import respectively.

Furthermore, Pesaran*et al*(2001), maintained that equation (3.3) can be replicate to ARDL version of the error correction model relating to the variables equation (3.3) as thus:

Where; ECM_{t-1} represents the error correction term lagged for one period, while γ is the coefficient for measuring speed of adjustment. It measures how fast errors generated in one period are corrected in the following period and μ_t is the stochastic error term.

This study basically relies on the use of secondary data. The data were sourced from the Central Bank of Nigeria (CBN, 2017) publications and World Development Indicators 2017 etc.

4. Analysis and Interpretation of Result

Unit Root Test

The results of the stationarity test conducted on each variable explained in the model using ADF and PP techniques in testing the hypothesis of unit root or no unit root as the case may be is presented in table 4.1;

Table 4.1: Unit Root Test Result

Variables	ADF TEST H_0: Variable is not Stationary	PP TEST H_0: Variable is not Stationary	Order of Integration
LBOP	-6.678550***	-9.169380***	I(0)

EXR	-0.112464	-0.112464	
D(EXR)	-5.305581***	-5.305581***	I(1)
LXM	-1.645958	-1.791143	
D(LXM)	-5.005961***	-5.013577***	I(1)
LIM	-0.527119	-1.138691	
D(LIM)	-4.631205***	-4.591967***	I(1)
Asymptotic Critical Values			
1%	-3.653730	-3.661661	
5%	-2.957110	-2.960411	
10%	-2.617434	-2.619160	

**** implies significant at 1% level, ** implies significant at 5% level and * implies significant at 10% level. Δ represents first difference*
Source: Authors' computation from E-views Output 10.0

From the results presented in table 4.1, the LBOP was stationary at level with both the ADF and PP unit root test respectively which means it is integrated of order (0), while the EXR, LXM and LIM were not stationary at level which necessitated there differencing. Hence, for these variables after the first difference, it was observed that the null hypothesis of non-stationarity were rejected at 10%, 5% and some at 1% critical value for ADF and PP respectively. This means that the variables were stationary at first difference and are integrated of order (1). Therefore, the appropriate techniques of analysis is that which can capture the characteristics of a mixture of I(0) and I(1) of the variables which according to Pesaran, *et al* (2001) is the ARDL model.

Estimation of Long Run Relationship

Equation 3.3 above is estimated to test the null hypothesis of no cointegration against the alternative hypothesis. The result obtain is presented in the table below.

Table 4.2: ARDL Long Run Relationship Result

Dependent Variable: D(LBOP)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1884.040	3741.959	0.503490	0.6196
D(LBOP(-1))	0.495016	0.203863	2.428180	0.0473
D(EXR(-1))	-5.074709	228.3677	-0.022222	0.9825
D(LIM(-1))	-10.64193	6.609146	-2.064100	0.0495
D(LXM(-1))	13.72817	4.566714	3.006138	0.0052
LBOP(-1)	-1.566183	0.317846	-4.927486	0.0001
EXR(-1)	-9.662516	89.83396	-0.107560	0.9153
LIM(-1)	-12.00640	5.359600	-2.240168	0.0124
LXM(-1)	26.24289	3.634952	2.323237	0.0496
R-squared	0.641026	Mean dependent var		-185.5194
Adjusted R-squared	0.510490	S.D. dependent var		19904.05
S.E. of regression	13925.86	Akaike info criterion		22.15858
Sum squared resid	4.27E+09	Schwarz criterion		22.57490
Log likelihood	-334.4580	Hannan-Quinn criter.		22.29429
F-statistic	14.90728	Durbin-Watson stat		2.001327
Prob(F-statistic)	0.001410			

Source: Authors' Computation from E-views Output 10.0

The result presented above shows the existence of long run relationship among the variable given a negative and significant coefficient of the lag value of the balance of payment (BOP) and its depicts that all the explanatory variables in their long and short run forms are in line with the apriori expectation and significant at 5% significance expect that of exchange rate variable. Also, the coefficient of determination (R^2) explains 64% of the variations in the dependent variable which is above 50% and even after taking into consideration the degree of freedom, the adjusted coefficient of determination (adjusted R^2) still explains 51% variation in the dependent variable. The F-statistic 14.90728(0.001410) confirmed the fitness of the coefficient of determination and shows an overall significant level of the explanatory variables jointly in explaining the balance of payment. Above all, the model is free from autocorrelation as shown by the Durbin-Watson value that is approximately equal to 2. In the same vein, the outcome of this result can be tested using some diagnostic tests such as serial correlation test and stability test. These are presented and explained below respectively:

Table 4.3: Breusch-Godfrey Serial Correlation LM Test:

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	2.237122	Prob. F(2,33)	0.0029
Obs*R-squared	14.53242	Prob. Chi-Square(2)	0.6513

Source: Authors' Computation from E-views Output 10.0

The result of the Breusch-Godfrey Serial Correlation LM test shows that, the Null hypothesis of no serial correlation cannot be rejected given the probability value of 0.6513 and that the alternative hypothesis that there exist serial correlation in the model can be rejected. Therefore, there is a plus to the reliability of the estimated model as it is free from serial correlation problem.

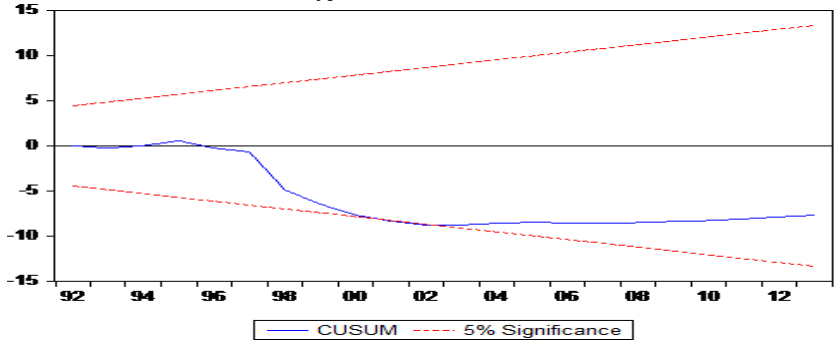

Fig. 4.1: Plot of Cumulative Sum of Recursive Residuals

For the stability test, CUSUM figure above shows that the CUSUM line is within the critical bounds of 5 percent which is an indication that the model is structurally stable.

Bound Test Approach to Cointegration

The long run relationship of the result presented above can be further affirmed by conducting a bound test. This is done by testing if the coefficients of β's are equal to zero in our estimated model or not. The F-Statistic value from the bound test as revealed by the Wald test presented in table 4.4 below will be compare with the critical value from the bound table (Pesaran et al., 2001).

Table 4.4: Wald Test

Test Statistic	Value	Df	Probability

F-statistic	6.072055	(4, 22)	0.0019
Chi-square	24.28822	4	0.0001

Source: Authors' Computation from E-views Output 10.0

Table 4.5: F-statistics for Testing the Existence of Co-integration

Test Statistic	Value	Lag	Significance Level	Bound Critical Value(Unrestricted intercept and no trend)	
F-statistic	6.072055	1	1%	I(0)	I(1)
			5%		
			10%		
				2.57	2.91
				2.86	3.22
				3.43	3.82

Source: Authors' Computation from E-views Output 10.0

We can observed from table 4.5 that estimated results of the F-statistics exceed the upper critical values at 1%, 5% and 10% significance level, and thus, inferring that there exists a co-integrating relationship among the time series in the level form, without considering whether they are I(0) or I(1).

Error Correction Representation of ARDL Model

Equation 3.4 in chapter three is estimated and the result is given in the below table.

Table 4.6: Error Correction Result of ARDL Model

Dependent Variable: D(LBOP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	269.8604	2894.304	0.093238	0.9265
D(LBOP(-1))	-0.468311	0.151422	-3.092760	0.0269
D(EXR(-1))	-40.21493	178.2546	-0.225604	0.8234
D(LIM(-1))	-18.35048	5.677854	-3.231940	0.0186
D(LXM(-1))	9.191937	3.933859	2.336621	0.0393
ECM(-1)	-0.326860	0.252711	-5.250501	0.0000
R-squared	0.648618	Mean dependent var		-155.1367
Adjusted R-squared	0.575413	S.D. dependent var		20243.59
S.E. of regression	13190.78	Akaike info criterion		21.98928
Sum squared resid	4.18E+09	Schwarz criterion		22.26952
Log likelihood	-323.8392	Hannan-Quinn criter.		22.07893
F-statistic	8.860349	Durbin-Watson stat		2.006892
Prob(F-statistic)	0.000071			

Source: Authors' Computation from E-views Output 10.0

From the above table, ECM (–1) is one period lag value of error terms that is obtained from the long-run relationship. The coefficient of ECM (–1) indicates how much of the disequilibrium in the short-run will be fixed (eliminated) in the long-run. As expected, the error correction variable ECM (–1) has been found negative and also statistically significant. Hence, the coefficient of the ECM term suggests that adjustment process is less than average as 32 percent of the previous year's disequilibrium in the explanatory variables from its equilibrium path will be corrected in the current year.

5. Conclusion and Recommendations

This study examined the impact of exchange rate fluctuation on balance of payments in Nigeria for the period of 1981 – 2017. A functional relationship was specified between the balance of payments and its explanatory variables such as exchange rate,

import and export. The study employed ARDL bound testing approach to cointegration in testing the long run relationship among the variables after the unit root test was conducted and it was revealed that some variables were stationary at first difference while one was stationary at level. The empirical results from the ARDL bounds testing procedure revealed that a long-run relationship exists between exchange rate and balance of payment in Nigeria with insignificant negative relationship between exchange rate and balance of payments at 5 percent level. This is an indication that, balance of payments in Nigeria for the period of study responded negatively to exchange rate fluctuation. The result of both short and long run revealed insignificant relationship which opposed the notion that, balance of payments position is influenced by exchange rate fluctuation. The dynamic error correction mechanism revealed that the speed of adjustment to the long run equilibrium position from the previous period to the current is moderate. The ECM coefficient was correctly signed with a negative sign. Hence, it is recommended that, Nigerian government should reduce the excessive balance of payment deficit, the need to discourage over-reliance on imported goods and the promotion of domestic export produce is very imperative. This can only be achieved if the Nigerian economy is diversified and entrepreneurial development promoted, in the presence of fiscal discipline.

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Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Analysis of the Impact of Exchange Rate Volatility on Manufacturing Output in Nigeria: 1986 – 2016

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Abstract

Since September 1986, adoption of structural adjustment programme (SAP) brought about flexible exchange rate regime which led to continuous depreciation and instability of naira. This instability and continue depreciation has resulted to downturn in manufacturing output in Nigeria. This study sought to examine the assessment of exchange rate volatility on manufacturing output using secondary quarterly data from 1986:1 to 2016:4. Autoregressive conditional heteroscedasticity (ARCH) and Generalized Autoregressive conditional heteroscedasticity (GARCH) model was used to find out whether there is stability in exchange rate in Nigeria. Traditional flow and Monetary approach was the theoretical framework on which this work was based; unit root test was conducted using Augmented Dickey fuller (ADF) and Philip Perron (PP) tests, Autoregressive distributed lag (ARDL) cointegrated test was used to test for the long-run relationship amongst the variables. Empirically, exchange rate volatilities are found to have a negative and insignificant impact on manufacturing output, this result demonstrates that exchange rate volatility create problem of shocks and consequently forces a number of manufacturers out of operation. Inflation and interest rates were found to be negative significant and insignificant respectively, all the variables were all in conformity with the theoretical expectations (appriori). However, this study recommended that, the gap between official and parallel exchange rate market should be breached, also that manufacturers should begin to look inward by sourcing their raw material locally.

Keywords: Exchange Rate, Volatility, Manufacturing, Output
JEL Codes: F31, L6

1. Introduction

Many economies of the world are basically interested in measures that can guarantee them viable and robust economic statues. This quest is more pronounced among the less developed countries (LDCs) than the developed countries (DCs) of the world. To achieve this noble objective, developing economies are constantly implementing policies that would not just increase their output but also, placed them in a very competitive position in the global economy. Among the English speaking countries in the ECOWAS sub-region in Africa, one of the policies embark upon is the management of their exchange rate level to encourage productivity. This step is in line with the understanding that exchange rate volatility (ERV) remain a source of concern as currency values partially determine the price paid or received for output and, consequently, this affects the profits and welfare of producers and consumers (Choudhri and Schembri, 2014). This implies that, exchange rate volatility (ERV) can influence the volume of output a country can produce since the cost of production is been determined by exchange rate. Therefore, there is no doubt, exchange rate, whether fixed or floating, affects macroeconomic

performance such as import, export, national price level, output, interest rate etc as well as economic agents such as individuals' purchasing power, firms' performance etc. Chong and Tan (2008) empirical analysis revealed that the exchange rate volatility is responsible for changes in macroeconomic fundamentals for the developing economies. The volatility of financial assets has been a growing area of research (Longmore and Robinson, 2004). The modeling and forecasting of exchange rates including volatility has important implications from any economic and financial issues.

Exchange rate is one of the economic indicators which directly affect investment as such its role in the overall economic objectives of a country cannot be underestimated. This gives confidence to why the public sectors, foreign investors and private individuals pay a lot of attention to the exchange rate variation. The exchange rate is among the most watched and analyzed, government manipulated macroeconomic indicators. In Nigeria, the naira exchange rate witnessed a continuous decline in all segment of the foreign exchange market (official, bureau de change and parallel markets). Exchange rate depreciates from N0.61 in 1981 to N2.02 in 1986 after which the floating exchange rate was adopted, in 1990 exchange rate depreciated from N7.91 per dollar to N81.20 in 1995 but the policy of guided or managed deregulation pegged the naira at N21.886 in 1994. Also, it was further depreciated concurrently to N93.95in 1999, N120.97 in 2002, N129.02 in 2003, and N135.50 in 2004. Thereafter, the exchange rate appreciated to N 132.15 in 2005 and latter N118.57 in 2008. Towards the end of the year 2008 when Global Financial Crises took its toll, the naira depreciated to N150.0124 at the end of 2009, in 2013 it reached N157.3per dollar and N158.5526 and N193.2792 in 2014 and 2015 respectively. Exchange rate rises to N197 in first quarter, N283 in second quarter, N305 in third quarter as well as N305 in fourth quarter in 2016 (CBN various issues).

In 1986, Nigeria adopted a floating exchange rate regime supported by exchange control regulations (ECR) that brought about significant distortions in the economy prior to the introduction of structural adjustment programme (SAP) in September 1986, which brings about devaluation of naira as a result of floating exchange rate regime (market forces determine foreign exchange market) which causes instability or volatility in exchange rate. But Nigeria economy depends heavily on imports from various countries as most manufacturing industries in Nigeria import their equipment, plants and machineries and other raw materials as well as massive importation of finished goods from foreign countries over the years, these have caused adverse effect on domestic production output, balance of payment position and the nation's external reserve level. Consequently, these affect manufacturing employment rate and also increase in unemployment rate in Nigeria. In light of these economic problems caused by the volatility of exchange rate in Nigeria over the years, studies on this field has not find solution to why depreciation has not favour manufacturing output in Nigeria? The contributions to the elasticity approach by Marshall (1923), Lerner (1936) and Harberger (1950) are often celebrated for formalizing the sufficient condition for a devaluation of the exchange rate to improve the balance of trade. In the course of this study is to determine the impact of exchange rate volatility on manufacturing output in Nigeria, to capture the instability of exchange rate, using the GARCH Model to establish whether volatility is overshooting, present and persistent or indicates no volatility and to examine whether inflation rate, interest rate and financial deepening affect manufacturing outputs. In other to achieve the objectives following questions will be answered, does exchange rate volatility affect manufacturing output? Is there volatility in the exchange rate (Naira /dollar) in Nigeria? And did interest rate, inflation rate and financial deepening affect manufacturing output?

2. Empirical Review and Theoretical Framework

On the empirical side, the controversy of the effect of exchange rate variation on manufacturing output is equally not resolved. Although many researchers found evidence for contractionary effect of depreciation like Aliyu et al., (2013); Elbadawi, Kaltani, and Soto (2012); Elbadawi and Sato (2005); Gnimassoun and Coulibaly (2014); Lensink (1995) and Obadan (2006) maintained that an increase in exchange rate volatility negatively affect volume of outputs.

On the other hand, some scholars in their submissions believed that the relationship between exchange rate volatility and manufacturing output is positive the likes of Coudert, (2013); Division, (2009); Mordi, (2006); Olugbenga and Oluwole, (2011). Also, Diaz-Alejandro (1963), Pierrer-Richard (1991) and Kandil (2004), Yaqub (2010), Bakare (2011) Adelowokan, Adesoye and Balogun, (2015). A pool of studies found evidence for expansionary effects of exchange rate depreciation for example Fry (1976), Edwards (1992), Lyons (1992), Adewuyi (2005) and Bahmani-Oskooee and Kandil (2007), Opaluwa, and Ameh (2010), Ehinomen, and Oladipo (2012) Dixit and Pindyck (1994) suggested that increased uncertainty caused by exchange rate variations reduce investment given the irreversibility of investment projects and, hence, increases the value option of delaying expenditures. Idris et. al (2015) investigated empirically the effect of exchange rate volatility on the output level of the five English speaking countries in ECOWAS, namely Nigeria, Ghana, Gambia, the Sierra Leones and Liberia, over the period 1991 to 2014. Co-integration test and error correction modeling were used as estimation techniques. Estimates of cointegration relations were obtained and the short-run and long-run dynamic relationships between the variables were obtained for each country utilizing the tests. They submitted exchange rate volatility has a significant impact on outputs at least for all the countries considered in the study, with all except Liberia having negative impact.

Enekwe et. al (2013) examined effects of exchange rate fluctuations on manufacturing sector in Nigeria over a period of 25 years (1985 – 2010). Using variables like manufacturing gross domestic product, manufacturing foreign private investment, manufacturing employment rate and Exchange rate. Ex-post facto research design was used as well as descriptive statistics and multiple regressions were employed and they submitted that manufacturing foreign private investment, manufacturing employment rate and Exchange rate have significant and positive relationship with manufacturing output with R^2 at 80%. Also, Ettah, et.al (2012) studied effects of price and exchange rate fluctuations on Agricultural exports in Nigeria. They observed that exchange rate fluctuations and Agricultural credits positively affect cocoa exports in Nigeria. They also revealed that relative prices of cocoa are insignificantly related to quantity of export, however, it has a negative sign which is in line with *a priori* expectation. This implies volatility on cocoa export in Nigeria.

Owolabi and Adegbite (2013) evaluated 27 years time series data and proved that foreign exchange rate volatility has a significant impact on Nigeria economy. This exchange rate has continuously fluctuating, imagine the country's foreign exchange rate volatility that favour Nigeria between 1981 and 1991 rises from N0.64 to N9.75 encouraged the nation's exportation. This continue, in 1992, the exchange rate rose to N17 to a US Dollar and in 1995 it increased to N21.89 but from 2003 to 2008 it reduces from N135.41 to N117.78 while later rises again to N147.20 and N150.3 in 2000 and 2010 respectively per US Dollar.

Owolabi and Adegbite (2012) also examine the effects of foreign exchange regimes on industrial growth in Nigeria for the period of 21 years (1985 – 2005). This study found out that exchange rate has significant effects on the economics growth with the adjusted R^2

of 69%. Opaluwa, et.al (2010) examined the impact of exchange rate fluctuations on the Nigerian manufacturing sector during a twenty (20) year period (1986 – 2005). The argument was that fluctuations in exchange rate adversely affect output of the manufacturing sector. This is because Nigerian manufacturing is highly dependent on import of inputs and capital goods. These are paid for in foreign exchange whose rate of exchange is unstable. Thus, this apparent fluctuation is bound to adversely affect activities in the sector that is dependent on external sources for its productive inputs. The methodology adopted for the study is empirical. The econometric tool of regression was used for the analysis. In the model that was used, manufacturing output employment rate and foreign private investment were used as the explanatory variables. The results of the regression analysis show that coefficients of the variables carried both positive and negative signs. The study actually shows adverse effect and is all statistically significant in the final analysis. Oladipupo and Onotaniyohuwo (2011) in their view, exchange rate has a significant impact on the balance of payments position. The exchange rate depreciation can actually lead to improved balance of payments position if fiscal discipline is imposed. They also found out that improper allocation and misuse of domestic credit, fiscal indiscipline, and lack of appropriate expenditure control policies due to centralization of power in government are some of the causes of persistent balance of payments deficits in Nigeria. Onwusor (2007) examines a granger-cause exchange rate volatility as key amongst other variables on manufacturing output decline in Nigeria. Also GARCH (1,l) model was applied while a single equation isomorphic to integrated data was employed. The GARCH results were found to be stable, results from error correction model unstable he submitted that exchange rate volatility shocks hit manufacturing output by affecting the sector's financial requirements. Jonathan, Emily and Kenneth (2015) undertook an empirical analysis of the link between exchange rate fluctuations and private domestic investment in Nigeria. Descriptive statistics and econometric method were employed. Thus, simple averages of descriptive statistics, and Error Correction Model (ECM) technique within the Ordinary Least Square estimation were employed to analyze the various trends in the data. They submitted that, the depreciation of the currency and interest rate does not stimulate private domestic investment activities in Nigeria. But, infrastructures, government size and inflation rate had a positive effect on private domestic investment in Nigeria.

Theoretical Framework

For the purpose of this study traditional flow theory and Monetary Model will serve as the theoretical backup. The traditional flow model is essentially based on the principle of the interplay of demand and supply. The forces of the market (interaction between demand and supply) determine the rate of exchange. However, when there is speculation or expectation of a change in the rate of exchange, this could lead to the disequilibrium even without any change in the initial determined factors. While the monetary approach to exchange rate determination postulates that the relative supply of and demand for money between two countries is the basis for the determination of exchange rate. It views increase in the supply of money as being able to generate inflation, hence, resulting in exchange rate depreciation. The model opines that a situation of falling prices with a given nominal money supply results in exchange rate depreciation. Exchange rate can adversely affect the ability to import and therefore manufacturing output. Fluctuations in exchange rate will cause instability in purchasing power and hence, negatively impact on investment in import of manufacturing inputs.

On the other hand, the effect on manufacturing output and overall income level will also affect investment in import of inputs, exchange rate and consequently

economic growth. This is because among the determining factors of exchange rate, demand for foreign exchange, by manufacturer is high. Hence, manufacturer should source for raw materials locally; by so doing economy will be boosted.

3. Methodology

Data for this study is secondary data and extracted from CBN Statistical Bulletin various issues and National Bureau of statistics as well as from Federal Office of Statistics (FOS) publications. Other reference sources are Journals, Books, Newspapers, Google scholar, and observations E-Views 9.5 will be the main econometric package to be used. Time series properties of the data is used and particularly, tests for stationarity and cointegration between interest rate, inflation, exchange rate volatility, financial deepening and manufacturing output. Generalised Autoregressive Conditional Heteroscedasticity (GARCH) is used other than the other conventional methodologies used in literature, particularly estimating the autocorrelation function and using the standard deviation to extract the volatilities in exchange rate.

Model Specification

To ascertain the relationship between Exchange rate volatility and manufacturing output the model becomes: MFO = *f* (EXRV, INF, INT, FD).

In econometrics form they can be expressed as;

MFO = +EXRV +INF+INT+ FD + μ_t…...3.1

Using Log-liner

LMFO = +EXRV +INF+INT+ FD + μ_t. ...3.2

MFO denotes Manufacturing output, LMFO denotes log of manufacturing output.
EXRV denotes Exchange Rate Volatility, INF denotes inflation.
INT denotes interest rate, FD denotes financial deepening

Measurement of variables

MS/GDP denotes "money supply to gross domestic product ratio" to capture effect-of financial deepening on manufacturing production

$\boldsymbol{\mu_t}$ - denotes stochastic disturbance term.

Capturing Volatility of Exchange rate

In developing an ARCH model, we consider two distinct specifications- one for the conditional mean and the other for conditional variance. Generalizing this, the standard GARCH (p, q) specification is expressed as:

$$\boldsymbol{\gamma_t} = \propto + \sum_{i=1}^{k} \emptyset_i \boldsymbol{\gamma_{t-i}} + \pounds_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (\mathbf{3.3})$$

$$\pounds_t \sim N(0, \sigma^2) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \mathbf{(3.4)}$$

$$\sigma^2 = \omega + \sum_{i=1}^{\rho} \propto_i \pounds_{t-1}^2 + \sum_{i=1}^{q} \beta_i \sigma_{t-1}^2 \ldots\ldots (3.5)$$

In the above mean equation considered measure of exchange rate volatility at time *t*. denotes autoregressive (AR) structure of order k. is taken as mean if other exogenous variables are assumed to be constant. denotes error term. - is the one-period ahead forecast variance based on past information, it is called *conditional variance.*

4. Presentation and Discussion of Results

For the purpose of investigating the impact of exchange rate volatility on manufacturing output in Nigeria, quarterly time series data covering the period of 1986:1 to 2016:4 was used. This is informed by the sensitivity of various model used in measuring volatility to large frequency data and the believe that, this will solve the problem of degree of freedom usually encountered in the introduction of lags and increase the reliability of the data for analysis.

Stationarity Test of Variables

Unit Root Test

The result of the stationarity test conducted on each variable explained in the model using Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) techniques in testing the hypothesis of unit root or no unit root as the case may be is presented in table 4.1.

Table 4.1: Unit Root Test Result

Variable	Augmented Dickey-Fuller (ADF) Test			Phillip-Perron (PP) Test		
	@ Level	@ 1st Diff.	Status	@ Level	@ 1st Diff.	Status
LMFO	-0.570554	-4.960775*	I(1)	-3.599021*	-	I(0)
EXR	-1.596546	-9.231906*	I(1)	-1.441764	-9.1781*	I(1)
INF	-3.255909**	-	I(0)	-2.180318	-6.9314*	I(1)
INT	-3.439549**	-	I(0)	-3.4098**	-	I(0)
FD	-2.355927	-13.126050*	I(I)	-2.400989	-1305068*	I(1)
Asymptotic Critical Values						
1%	-3.484198	-3.484198		-3.484198	-3.484198	
5%	-2.885051	-2.885051		-2.885051	-2.885051	
10%	-2.579386	-2.579386		-2.579386	-2.579386	

** Implies significant at 1% level and **Implies significant at 5% level; Source: Author's computation, 2017*

From the result presented in table 4.1, ADF result revealed that, INF and INT variables were stationary at level which means that they were integrated of order zero I(0), while LMFO, EXR and FD were not stationary at level until they were differenced once and they were said to be integrated of order one I(1). For the PP test, LMFO and INT were stationary at level, while EXR, INF and FD were stationary after first difference meaning that they were integrated of order one I(1). Given the mix results as shown by ADF and PP tests as well as the order of integration of the variables, the long run relationship among the variables will be tested using the ARDL model which can capture the characteristics of a mixture of I(0) and I(1) of the variables as postulated by Pesaran, et al. (2001).

Table 4.2: Lag selection criteria

AIC*	BIC	HQ	Adj. R-sq	Specification Value
2.336233*	2.567290	2.430074	0.819244	ARDL(2, 1, 0, 1, 1)
2.349974	2.604136	2.453199	0.818108	ARDL(2, 1, 1, 1, 1)
2.352372	2.560323	2.436829	0.814909	ARDL(2, 0, 0, 1, 1)
2.367068	2.598126	2.460910	0.813583	ARDL(2, 0, 1, 1, 1)
2.397299	2.605250	2.481756	0.806404	ARDL(2, 1, 0, 0, 1)
2.403787	2.588633	2.478860	0.803649	ARDL(2, 0, 0, 0, 1)
2.410035	2.641092	2.503876	0.805399	ARDL(2, 1, 1, 0, 1)

*Note: * Means that ARDL model selected by the selection criteri.*; *Source: Author's computation using E-views 9.5, 2017.*

Cointegration Test (ARDL Approach)

Lag selection criteria

The information criterion in table 4.2 showed that ARDL (2, 1, 0, 1, 1) is appropriate for the model in this study. This explains the advantage of an ARDL methodology as it is not necessary for all the variables to have the same lag(s) contrary to that of Vector Autoregressive (VAR) which all variables are given the same lag(s). The optimal lag selection must be considered as this may result to the problem of misspecification and autocorrelation if ignored.

Bound Test Approach to Cointegration

The long run relationship between the variables in the model can be tested using ARDL bound test. This is done by testing if the coefficients of β's are equal to zero in our estimated model or not. The F-Statistic value from the E-views result is shown in table 4.3

Table 4.3: ARDL Bound Test Result

Test Statistic	Value	K
F-statistic	0.738808	4
	Critical Value Bounds	
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's computation using E-views 9.5, 2017.

Table 4.3 revealed that, the estimated result of the F-statistics is less than the critical values of the lower bound at 1%, 2.5%, 5% and 10% significance level, and thus, inferring that there exists no co-integrating relationship among the variables.

Discussion of Regression Results

Expected short run equation and ARDL error correction form; short-run coefficient and error correction term

From the table 4.4, in the short run, all the variables have the expected sign as suggested by the *apriori* expectation, they are all significant in explaining manufacturing output in Nigeria except EXRV and INF. One period lag of LMFO and FD showed a positive and significant impact on LMFO. This means that a percentage increase in LMFO(-1) and FD will lead to 0.55 and 0.02 per cent increase in LMFO respectively.

Table 4.4: Short Run Equation and ARDL Error Correction Form

Dependent Variable: LMFO				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LMFO(-1))	0.558541	0.067183	8.313707	0.0000***
D(EXRV)	-0.008988	0.006902	-1.302338	0.1955
D(INF)	-0.002699	0.003981	-0.677925	0.4992
D(INT)	-0.098469	0.033058	-2.978686	0.0036***
D(FD)	0.029364	0.006715	4.373006	0.0000***
ECM(-1)	-0.095134	0.045583	-2.087049	0.0021***

*R^2=55% D.W = 2.2 F-statistics = 14.95; Note * (**) (***) denotes null hypothesis at 10%, (5%) and (1%) respectively; Source: Author's computation using E-views 9.5, 2017.*

Also, INF and INT with negative relationship with LMFO showed that one per cent increase in INF and INT will cause a decrease in LMFO by 0.002 and 0.09 respectively. Also, the result indicated that the coefficient of the error correction term ECM (-1) had a correct sign and significant at 1% level. The value of the coefficient is-0.095134; this means that, about 9.5% of the disequilibrium in the level of manufacturing output (LMFO) of previous year's shock adjust back to the long run equilibrium in the current year. In another word, the level of stock market volatility adjust to equilibrium with lags and only about 9.5% of the discrepancy between long and short run manufacturing output (LMFO) in Nigeria is corrected within a year.

Volatility and Its Interaction with Manufacturing Output

Generation and Establishment of EXR Volatility

The result in the table 4.5 is the conditional mean equation result of EXR regressed on its lagged value.

Table 4.5: EXR Volatility Equation (Mean Equation)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.665879	0.775516	0.858627	0.3905
EXR(-1)	1.008071	0.008684	116.0887	0.0000***
	Variance Equation			
C	0.078025	0.025945	3.007316	0.0026***
RESID(-1)^2	-0.042842	0.003608	-11.87398	0.0000***
GARCH(-1)	1.085206	8.04E-05	13503.38	0.0000***

Source: Author's computation from E-Views 9.5, 2017.

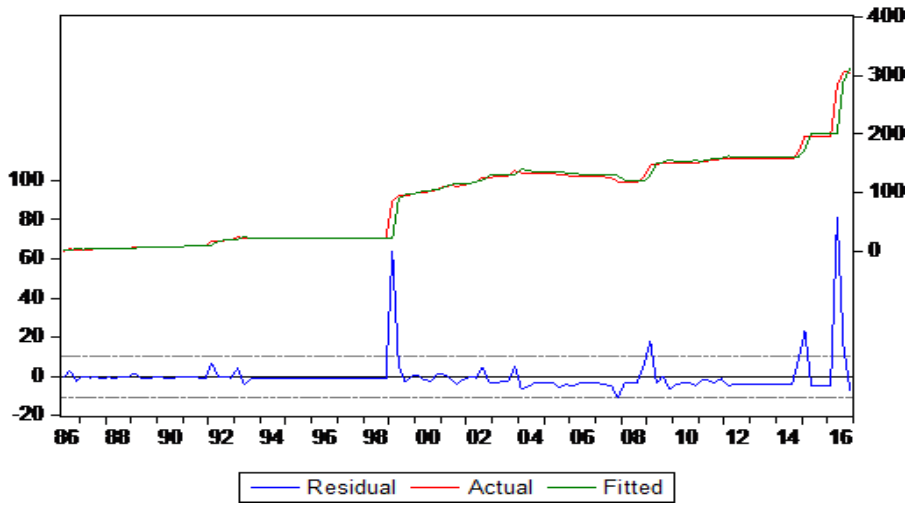

Figure 4.1: Graph of Volatility in Exchange rate.
Source: E-view 9.5 generated graph (2017).

This was made known by Engle (1982) who suggested that the residual of autoregressive process is liable to reveal volatility more than any other method. GARCH variance series volatility as shown in the graph was generated from the model and it served as the pure volatility (with neither exogenous nor endogenous) of EXR as it was also made known by Bollerslve (1986). Also, the graph depicts that the process of volatility is stationary as it possesses no trend pattern. It can be shown that all the variables in the model were statistically significant at 1%, 5% and 10% conventional level.

The establishment of the volatility of exchange rate requires checking whether the series is characterized by ARCH effect. In other words, we need to firstly ascertain if the variable (Exchange rate) is volatile or not. Following the graph shown in figure 4.1, it is clearly shown that there are period with larger and smaller volatility in the sample i.e there is a prolonged period of low volatility at some point and a prolonged period of high volatility (volatility cluster). In other words, the period of high volatility are followed by the period of high volatility and the period of low volatility are followed by that of low volatility. Therefore, the result suggests that residual or error term is conditionally heteroscedastic and it can be represented by ARCH and GARCH model.

ARCH and GARCH Model Analysis

From table 4.6, the result revealed that the ARCH effect is found significant. This means that information about previous year's

exchange rate volatility influences this year's manufacturing output.

Table 4.6: ARCH and GARCH Model Result

Dependent Variable: LMFO				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
		Mean Equation		
C	4.341994	0.205926	21.08525	0.0000
EXRV	0.093689	0.014408	6.502568	0.0000***
		Variance Equation		
C	2.497895	0.226112	11.04718	0.0000***
ARCH(-1)	0.294641	0.106310	2.771526	0.0003***
GARCH(-1)	0.569797	0.138308	4.119771	0.0000***
INF	-0.015490	0.005932	-2.611362	0.0090***
INT	-0.034170	0.017414	-1.962215	0.0497***
FD	0.008990	0.003651	2.462085	0.0138***
		Residual Diagnostic Test Result		
Normality Test Result:	JarqueBera Test		2.761081	
	Probability		0.251443	
Heteroscedasticity Test:	F- Statistic		0.011465	
ARCH	Probability		0.914900	

Source: Author's computation using E-views 9.5, 2017.
*Note * (**) (***) denotes null hypothesis at 10%, 5% and 1% respectively.*

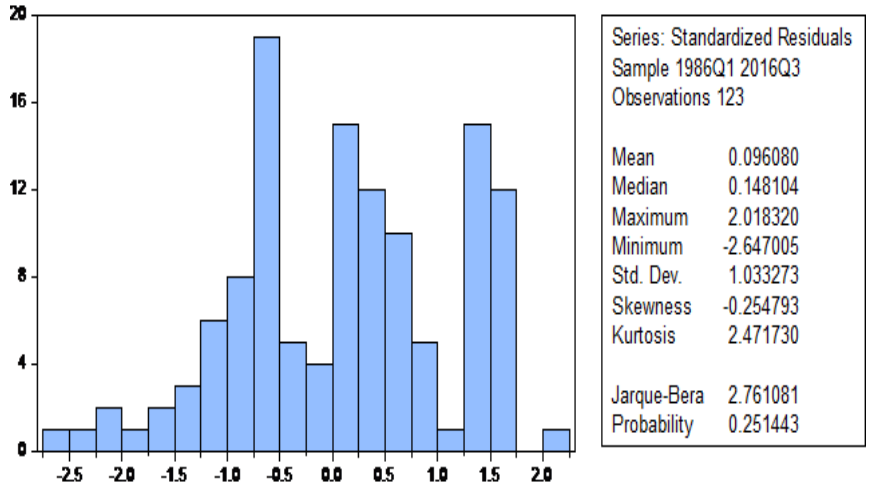

Figure 4.2: Jarque Bera Normality Test.
Source: E-view generated graph (2017).

Also, GARCH is found significant which is a pointer to the fact that, previous period exchange rate volatility can influence this year's manufacturing output. Also, the

results of the Generalised Autoregressive Conditional Heteroskedasticity (GARCH) suggests that the volatility shocks are quite persistent because the associated coefficient of GARCH (1, 1) approximately equals unity (0.85). We can therefore conclude that, manufacturing output in Nigeria is influence by exchange rate volatility. In the same vein, inflation, interest rate and financial deepening are also significant in the model. Inflation and interest rate showed negative relationship with the manufacturing output which is in line with the *apriori* expectation and is significant at both 1% and 5%. It then means that, one per cent increase in interest rate and inflation rate will lead to 0.034 and 0.015 per cent decrease in manufacturing output. While financial deepening showed positive and significant impact on manufacturing output and one per cent increase in financial deepening will cause 0.008 per cent increase in manufacturing output.

The residual diagnostic test result revealed that the null hypothesis of normally distributed and no ARCH effect is accepted. This means that the model is normally distributed and possesses ARCH effect.

Discussion of Findings

This section discusses the results from the short run and ARDL error correction form equation in table 4.5. A priori, the entire variable satisfied the theoretical expectations and they are all significant in explaining manufacturing output except exchange rate and inflation. Exchange rate volatility and interest rate were negatively related to manufacturing outputthis is because Nigerian manufacturing is highly dependent on import of inputs and capital goods. Monies are paid for in foreign exchange whose rate of exchange is unstable.These results were in line with submission of Onwuso (2007), Opaluwa et al (2010) and David et al (2010). Inflation rate has a negative effect on manufacturing output this shows that inflation rate is a threat to the manufacturer in Nigeria as this will reduce the purchasing power of buying raw material input for production. The autoregressive {LMFO(-1)} is positively related to manufacturing output which is a reflection of the backward-looking nature of manufacturing output that will improve the current state of manufacturing output in Nigeria.

The financial deepening (FD) was positively related to Manufacturing output (MFO), this means if market is more deepened, investment resources will be mobilized for lending to manufacturers and consequently market size will expand in the non-oil sector.

In terms of significance, interest rate, financial deepening as well as manufacturing output in previous years were significant at 5% significance level. However, exchange rate and inflation rate were negatively related and they are only variable factors that were not statistically significant. This was so for a number of reasons, first, exchange rate volatility creates the problem of shocks and consequently forced a number of manufacturer concern out of operation. Second, inflation pose a threat to the investors as it reduces purchasing power of procuring raw materials and other critical manufacturing inputs such as machine equipments etc. The standard GARCH (1,1) model used to measure volatility estimates shows that exchange rate volatility was present and persistent in exchange rate (see table 4.6). The three important conditions for stability were met that is, the constant was positive, the sum of ARCH and GARCH parameter were tend to unity (0.85) and their coefficients are statistically significant.

Implication of Findings

From the analysis, we discovered that effect of exchange rate volatility on manufacturing output is not favourable to economic activities in the manufacturing industry. It was also discovered that the performance of the manufacturing sector was affected as a result of continuous fluctuations of foreign exchange rate which bring about volatility clusters in exchange rate which hinders procurement of raw materials and machineries required for optimum production.

We equally find out that high inflation is not investment friendly, because as inflation increases manufacturing output will be affected in all ramifications from production down to output consequently, manufacturing employment generation will be affected adversely which may increase unemployment rate in Nigeria.

5.0 Conclusion and Recommendations

To achieve higher levels of manufacturing output, manufacturer must begin to look inward to source for their raw materials locally, the consumers or the Nigeria populace must buy made in Nigeria products to boost the sales revenue of the manufacturing sector which will bring about increase in production and consequently more labour force will be required in the manufacturing sector which will bring about unemployment decrease.

As a result there will be increase in aggregate income and gross domestic product. However, manufacturers must focus on good quality that will meet international standard, this will encourage consumer to buy made in Nigeria goods if all these are achieved and sustained it will bring about a sustainable naira appreciation as well as balance of payment favourable. Following from the findings, this study makes the following recommendations that will propel production in the manufacturing sector consequently, economic growth and development in Nigeria; the following recommendations were proffer:

- The wide gap between official and parallel market should be closed in order to bring proper stability in exchange rate in Nigeria. This can be achieved by making dollar accessible, available and cheaper in the official market.
- For manufacturing sector to provide inclusive growth, exchange rate must be stable. This is needed to enable investors form correct expectations in taking economic decisions, for instance, if the exchange rate depreciates instantaneously, borrowers may be in great difficult repaying their debts.
- It is high time manufacturers begin to look inward by sourcing their raw materials locally in order to be free from wild effect of exchange rate volatility which affect their output adversely.
- Manufacturers should focus on international good quality standard products so as to encourage consumer locally and internationally. Thereby, consumers will find made in Nigeria good more attractive and cheaper than foreign products. This can be achieved if adequate power supply, infrastructural facilities as well as adequate security can be provided by government.

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Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

An Empirical Assessment of the Okun's Law Postulation in Nigerian Economy: 1980 - 2015

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Abstract

Nigeria's current economic phenomenon poses far-reaching challenge to the age-old economic postulate that the growth rate of the gross domestic product (GDP) of an economy reduces unemployment. Many attempts have been made to verify this postulate otherwise known as Okun's Law. However, existing empirical studies on the Nigerian economy have generally focused attention on aggregate output thereby overlooking the disaggregation of output data into major sectors to examine their differential effect on unemployment in the economy. This study therefore, investigates whether Okun's law holds in the Nigerian economy by examining the short-run and long-run effects of aggregate output on unemployment, and by disaggregating the overall output data in to its major sectoral components to assess their effect on unemployment in Nigeria with time series data spanning 1980-2015. The econometric technique employed in the research is the Autoregressive Distributed Lag (ARDL) bound testing approach. The analysis began with pre-tests for stationarity using Augmented Dickey-Fuller (ADF) unit root tests. Two ARDL models were specified. In the first, bound testing revealed the existence of cointegration between unemployment and GDP growth, and growth of GDP is positively related to unemployment in the long run but a negative relationship was found in the short run. In the disaggregation (i.e the second ARDL model) that examines the various sectors and components of GDP, it was found that there is no long run relationship between unemployment and agriculture, industry, construction, trade, and services. The study therefore recommends among others, the need for forging a link among the primary, secondary and tertiary sectors of the economy, with the agricultural sector linked to the industrial sectors, and technological innovation to reduce reliance on imported manufactured goods, raw materials and spear parts used for industrial and agricultural production so that domestic output growth would be employment elastic.

Keywords: Economic Growth, unemployment, and Nigeria
JEL Codes: E23, E24, L60, L70, L80, L90

1. Introduction

In an attempt to tackle the menace of unemployment which is one of the major indicators for measuring the performance of any economy in the world, Arthur M. Okun in the early 1960s statistically established the relationship between change in the unemployment rate and economic growth. The empirical finding of Okun's work indicates 3:1 relationship between gross domestic product (GDP) and the unemployment rate (Babalola *et al.,* 2013; and Akeju and Olanipekun, 2015)**.** This implies that a sustained increase in the growth rate of the aggregate output of an economy increases employment and reduces unemployment (Akeju and Olanipekun, 2015)**.**

However, the problem of unemployment in Nigeria has maintained a rising trend even in

the years where the economy experienced relatively high growth rates of GDP, and the situation has been a puzzle in the minds of economists and policy makers. In general, Nigeria's unemployment figure has been growing in recent time. Unemployment in the first quarter of 2006 was 13.6 percent while the corresponding rate in 2007 was 14.6 percent. This figure increased to 19.7 percent in 2009, 21.1 percent in 2010 and 23.9 percent in 2011 respectively (Akeju and Olanipekun, 2015; Oloni, 2013). In 2014, it increased further to 25.1 per cent from 24.7 per cent in 2013 (World Bank, World Development Review 2013; Ajakaiye *et al*., 2016). Since 2000, the rate of unemployment has grown at a compound annual average of 4.8 per cent, even as it has continued to fluctuate and intensify (Ajakaiye *et al*., 2016). According to Akeju and Olanipekun (2015), the rate is higher in the rural areas (25.6 percent) than in the urban areas (17.1 percent).

On the other hand, the real Gross Domestic Product (GDP), measured in 1990 basic prices grew by 7.9 percent in 2010, compared with 7.0 percent in 2009. Growth in 2010 was attributed largely to the performance of the non-oil sector output which grew by 8.5 percent complimented by a significant increase in oil sector output. Real GDP growth stood at 7.4% in 2011, driven predominantly by crop production, wholesale and retail trade and telecommunications sectors, which accounted for 28.0%, 28.8% and 21.4% of real GDP growth respectively during the year (Akeju, and Olanipekun, 2015).

Economic growth has largely been driven by growth in the services sector without much growth in the sectors that are more employment creating such as solid minerals and agricultural sector. This 'tertiarization' of the economy has failed to deliver quality jobs hence recent growth has not translated into significant social and human development contrary to the postulates in the development literature that associate faster economic growth with poverty reduction (Ajakaiye *et al*. 2014). The phenomenon of 'jobless growth' also poses far-reaching challenges on the age-old economic assumption of growth in GDP directly resulting in reduction in unemployment (Akeju and Olanipekun, 2015).

The theoretical proposition relating output and unemployment as proposed by Okun (1962) has been found to hold for several countries and regions mainly, in developed countries (Christopoulos, 2004; Daniels and Ejara, 2009). However, recent evidences have shown that employment has not grown at the same rate as the gross domestic product (GDP) in developing countries particularly since the World Summit for Social Development held in Capenhagen in 1995 (Jose-Nghessan, 2006). Also, empirical findings in Nigeria have revealed that Okun's law does not hold in the economy (Babalola *et al.*, 2013, Arewa and Nwakanma, 2012; Akeju and Olanipekun, 2015). This has sparked debate on appropriate policies that could be designed to solve the problem of unemployment in Nigeria. It also implies that the prescriptions of orthodox economics that to reduce unemployment, policies should be designed to increase the GDP does not hold in all economies. Hence, new questions are being raised about the relationship between economic growth and unemployment.

It is pertinent to note that the many attempts made to verify the Okun's Law, empirical studies on the Nigerian economy (among which are; Njoku and Ihugba, 2011; Babalola, *et al.* 2013; Adudu and Ojonye, 2015; and Florence *et al.* 2015) generally focused attention on aggregate output thereby overlooking differential employment elasticity of major sectors in the economy. This could undermine policy making on employment as the studies did not reveal the relationship between sectoral growth and unemployment. Only Ajakaiye *et al.* (2016) to the best of our knowledge examined a disaggregated effect of growth on employment and their study was focused on manufacturing, services and agricultural

sectors. Also Ajakaiye *et al.* (2016) used time series variables and neither conducted unit root tests on the variables to determine the appropriate econometric technique to be employed, and their study did not examine both the short-run and long-run effects of output growth on employment.

Therefore, the objective of this study is to investigate the short-run and long-run effects of output growth on unemployment in Nigeria with time series data spanning 1980-2015. Thus the study will conduct unit roots test on the variables. Also output growth is examined in its aggregate and disaggregated components to include agriculture, industry, construction, trade, and services and investigate their respective impacts on unemployment. This is because according to Ajakaiye *et al.* (2016), the main reason for 'jobless growth' in Nigeria is that the economy is transforming from an agrarian economy to a service economy without going through the intermediate stage of industrialization. In view of the foregoing, this paper empirically examines whether Okun's law hold in the economy, and also investigates the relationship between the disaggregated components of GDP and unemployment in Nigeria based on data from 1980-2015. To achieve this, the paper is divided into five sections which includes introduction, trend of unemployment and Growth of GDP in Nigeria, literature review, research methodology, presentation of results and interpretation, and finally summary and conclusion.

2.0 Literature Review

This section examines the two key concepts that are used in this study. These are economic growth and unemployment. The section further examines the theoretical framework of the study, and lastly, review of empirical works done in the area.

The Concept of Economic Growth

Economic growth is conceived as a sustained increase in the per capita income over a period of time. Anyanwu and Oaikhenan (1995), stated that economic growth refers to the increase over time, of a country's economic capacity to produce those goods and services needed to improve the wellbeing of the citizens in increasing numbers and diversity.

It should be noted that economic growth is sometimes used interchangeably with economic development. Jhingan (2005), made a distinction of the two concepts where he defined economic development as the "non-quantifiable measure of the growing economy" i.e the economic, social and other changes that lead to growth such as changes in techniques of production, social attitudes and institutions e.t.c No matter the distinction what is important is that there is no development without growth (King and Levine, 1993).

The Concept of Unemployment

The unemployment rate in Nigeria has been very high over the years. The indicator measures the proportion of active population that is without and actively seeking work **(**Ajakaiye *et al***.**, 2016). The total labour force in the country is made up of persons between the ages of 15–64 years excluding students, retired persons, stay-at-home parents, home-keepers, and persons unable to work or not interested in work (Kale and Doguwa 2015), while the unemployment rate is the proportion of the labour force who were available for work but cannot find work.

On the other hand, employment is examined from the concept of a good job which could be defined from the perspectives of an individual and the society. From an individual's perspective, a good job is a well-paid secured job. From a societal point of view a good job is one that maximises societal welfare. This simply reinforces the argument that in most countries the wages paid do not reflect the marginal social benefits. "Good jobs for development are those that make the greatest contribution to society, taking into account the value they have to people who hold them and also their potential spillovers on others" (World Bank, World Development Review, 2013, p. 154.). Therefore, those that are employed are the

people who are within the age of 15-64 years that have good jobs.

Theoretical Framework

The economic theory that can be used in explaining the relationship between output growth and employment is Okun's law which is an empirical observation of the relationship between unemployment rate and economic growth. Though the fundamental inverse relationship between the unemployment rate and the growth of real output had been accepted by economists for many years, Arthur Okun (1962) was first to formalise the relationship into a statistical one when he measured the extent to which the unemployment rate is negatively related to real output growth. He postulated that a 1% increase in the growth rate above the trend rate of growth would lead only to 0.3% in the reduction of unemployment. This implies that a 1% increase in unemployment will mean roughly more than 3% loss in GDP growth. Hence the rate of GDP growth must be equal to its potential growth just to keep the unemployment rate constant. To reduce unemployment, therefore, the rate of GDP growth must be above the growth rate of potential output (Akeju and Olanipekun, 2015; Jose, 2006).

Okun however, pointed out that changes in the unemployment rate per se cannot account for the changes in real output as the unemployment rate changes, but that there are intermediary factors, such as labour force participation and productivity linking unemployment rate and the real output in the specified relationship (Akeju and Olanipekun, 2015). This study is therefore based on the theoretical underpinning of the Okun's law.

Review of Empirical Studies

Several authors have estimated the relationship between employment and economic growth for a variety of nations. An International Labour Organization Report (1996) concluded that the positive responsiveness of employment growth to GDP growth has generally not declined in industrialized countries as a whole. However, a country-by-country analysis revealed mixed results, while those focusing on the Nigerian economy are largely based on aggregate GDP, and their findings indicated that productivity and employment relationship negates Okun's law as stated earlier. Some of these empirical studies existing in the literature both within and outside the Nigerian economy are examined below beginning with those conducted outside the country.

Seyfried (2005) examined the relationship between economic growth, as measured by both real GDP and the output gap, and employment in ten largest states of US from 1990 to 2003. Models were developed in the study to estimate the employment intensity of economic growth as well as the timing of the relationship between employment and economic growth. The results indicate that economic growth has some immediate positive impact on employment, and its effects continue for several quarters in most of the states considered.

Ahsan et al. (2010) argue that higher employment is not usually associated with higher per capita GDP. His study was carried out on poverty rates, employment, and the working-age population and observed over ten-year periods corresponding to the years 1983–1993 and 1993–2003. In their investigation of the aggregate growth profile of India, findings showed a negative relationship.

In another research, Geidenhuys and Marinkov (2007) tried to give answer to the question of how unemployment responds to changes in output in South Africa. For this reason, they estimated the relationship between economic activity and unemployment rate. The results indicated the presence of an Okun's law relationship in South Africa over the period 1970 -2005.

Villaverde and Maza (2008) analyzed Okun's law for Spanish regions using data for the period 1980- 2004. The results verified the existence of Okun's law for most of the regions and for the economy as a whole.

Among the studies carried out in Nigeria is that of Adudu and Ojonye (2015). They investigated the impact that economic growth in Nigeria had on employment generation. The Johansen vector- error correction model was used in the investigation. The findings revealed that, although economic growth had positive relationship with employment, the relationship is not significant. Foreign private investment has negative impact while Public expenditure has positive and significant impact on employment. It is concluded that the growth in Nigeria does not support employment.

In their study**,** Ajakaiye *et al.* (2016) examined the relationship between growth and employment in Nigeria. The study adopted the Shapley decomposition approach, complemented OLS technique. The findings indicate that Nigeria's growth over the last decade has been 'jobless' and sustained largely by factor reallocations rather than productivity enhancement. Labour reallocations have been mainly from agriculture and manufacturing towards the low employment generation services sector. The study further revealed that the employment elasticity of growth was positive and quite low, reflecting the country's poor overall employment generation record, especially in manufacturing.

Babalola *et al.* 2013) empirically tested the validity of Okun's law in Nigerian economy from 1980-2012. The two versions of the model approach of the Okun's law were used even though one of them is frequently used in the literature. The research utilized Var-cointegration method and examined the direction of causality using the Var Granger causality/Block Exogeneity Wald test. It was found that Okun's law does not hold in the Nigerian economy.

Arewa and Nwakanma (2012) conducted an empirical evaluation of the relationship between output and unemployment using the first difference and output-gap models of Okun's law. The study found no evidence to support the validity of Okun's law in Nigeria.

In their examination of the relationship between unemployment rate and economic growth, Aketu and Olanipekun (2015) employed Error Correction Model (ECM) and Johasen cointegration test to determine both the short run and long run relationships among the variables employed in the study. The Empirical findings showed that there is both the short and the long run relationship between unemployment rate and output growth in Nigeria. The paper found out that Okun's law is not valid in Nigeria.

In another study by Florence *et al.* (2015), within the framework of labour productivity theory, the interface between youth unemployment and labour productivity as they relate to growth of Nigerian economy was examined. The paper employed both qualitative and quantitative research methods to examine the incidence of youth unemployment as a function of labour productivity. It revealed that there is positive relationship between youth unemployment and labour productivity in Nigeria.

From the foregoing review of empirical studies conducted in Nigeria, it is observed that the authors generally focused attention on aggregate output thereby overlooking disaggregated impact of GDP growth on unemployment in Nigeria. Only Ajakaiye *et al.* (2016) examined a disaggregated effect of growth on unemployment focusing on manufacturing, services and agricultural sectors. This study first investigated the long-run and short-run effect of GDP growth on unemployment, and also employed a disaggregated technique as it examined agriculture, industry, construction, trade and services sectors and empirically investigated the effect of their growth on unemployment in order to reveal the sector(s) that is (are) more efficient in reducing unemployment.

3. Methodology

The method employed in carrying out the study is presented here as follows:

Data

This research, in view of its nature made use of secondary data. Annual data were employed and were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and National Bureau of Statistics (NBS) financial and external sector statistics for the period 1980-2015. The 36-year period is selected to meet the requirement of the Central Limit Theorem that sample size must not be less than thirty years for normality purpose, and the fact that the larger the sample, the greater the reliability or validity of time series research findings (Gujarati, 2005).

Variables

Unemployment rate is used as the dependent variable as it best reveals the labour force engagement; the data on it are easily accessible, and it is also considered appropriate in view of the theoretical underpinning of the study.

The independent variables are the GDP, agricultural output, industrial output, construction, services sector, and trade.

Model Specification

The econometric models used for the study is adapted from Ajakaiye *et al.* (2016) and are specified as follows:

$$UNEMP_t = \beta_o + \beta_1 InGDP_t + U_t \text{.....1}$$

$$UNEMP_t = \beta_0 + \beta_1 InAGR_t + \beta_2 InIND_t + \beta_3 InCONS_t + \beta_4 InTRADE_t + \beta_5 InSERVS_t\ U_t \quad .2$$

Where

UNEMP = Unemployment rate

β_o = Constant parameter

β_i = Coefficients of the explanatory variables

$\ln GDP_t$ = log of gross domestic product

$\ln AGR_t$ = log of agricultural output

$\ln IND_t$ = log of industrial output

$\ln CONS_t$ = log of construction sector's output

$\ln TRADE_t$ = log of trade

$\ln SERVS_t$ = log of services sector's output

U_t = Stochastic disturbance term

t = Time subscript

Therefore, equation 1 and 2 were employed as models for this research.

Method of Data Analysis

The data collected for this research were analysed using Autoregressive Distributed Lag (ARDL) model along with error correction model. The ARDL model is an innovation in time series econometrics developed by Pesaran and Shin (1996); Pesaran and Pesaran (2001); for testing the existence of co-integration among variables. One of the advantages of using the ARDL approach to testing for the existence of a long-run relationship between variables is that it is applicable irrespective of whether the underlying variables are purely I(0) or I(1), or a mixture of both (Khosravi and Karimi, 2010). However, in the presence of I(2) variables, the computed F-statistics provided by Pesaran *et al.*(2001) will become invalid.

Therefore, the use of unit root tests in the ARDL approach is inevitable to ensure that none of the variable is integrated of order I(2) or beyond. Therefore, unit root test was conducted using the Augmented Dickey-Fuller (ADF) technique based on the model expressed below:

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \alpha_i \sum \Delta Y_{t-i} + \mu_t .3 \text{ ..3}$$

Where:

ΔY_t = Differenced value of a given time series variable

β_0 = Constant Parameter

β_1 = Coefficient of the first lag value of the series variable

Y_{t-1} = First lag value of a series variable

α_i = Coefficient of the lag values of the differenced time series variable

ΔY_{t-i} = Lag values of the differenced series variable

u_t = Error term.

The two Autoregressive Distributed Lag (ARDL) models used in this study are expressed as follows:

ARDL I

$$\triangle \text{InUNEMP} = \delta_0 + \delta_1 \text{InUNEMP}_{t-1} + \delta_2 \text{InGDP}_{t-1} + \sum \lambda_1 \Delta \text{InUNEMP}_{t-i} + \sum \lambda_2 \Delta \text{InGDP}_{t-i} + \lambda_3 \text{ECM}_{t-1} + u_t \ldots\ldots\ldots\ldots\ldots 4$$

ARDL II

$$\triangle \text{InUNEMP} = \delta_0 + \delta_1 \text{InUNEMP}_{t-1} + \delta_2 \text{InAGR}_{t-1} + \delta_3 \text{InIND}_{t-1} + \delta_4 \text{InCONS}_{t-1} + \delta_5 \text{InTRADE}_{t-1} + \delta_6 \text{InSERVS}_{t-1} + \sum \lambda_1 \Delta \text{InUNEMP}_{t-i} + \sum \lambda_2 \Delta \text{InAGR}_{t-i} + \sum \lambda_3 \Delta \text{InIND}_{t-i} + \sum \lambda_4 \Delta \text{InCONS}_{t-i} + \sum \lambda_5 \Delta \text{InTRADE}_{t-1} + \sum \lambda_6 \Delta \text{InSERVS}_{t-i} + \lambda_7 \text{ECM}_{t-1} + u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 5$$

Where δ_0 = Constant Parameter
Δ = First difference operator
δ_i, λ_i = Vector of the parameter of the lagged values of the natural logarithmic values of the explanatory variables.
ECM_{t-1} = Error correction term
u_t = Error term

The terms with the summation signs ($\sum$) in the equations above represent the error correction dynamics while the second part of the equation with δ_i correspond to the long-run relationship. The null hypothesis in the four ARDL equations is $H_0 = a_1 = a_2 = a_3 = 0$. This denotes the absence of long-run relationship while the alternative hypothesis is H_1: $a_1 \neq a_2 \neq a_3 = 0$. The calculated F-statistic is compared with two sets of critical values. One set assumes that all the variables are I(0) and the other assumes they are I(1). If the calculated F – statistic exceed the lower and upper critical value, the null hypothesis of no co-integration will be rejected irrespective of whether the variables are I(0) or I(1). If it is below the upper value bound, there is no cointegration.

Once a co-integration relationship has been ascertained the long-run and short run parameters of the relationship are then estimated.

4. Presentation of Results and Interpretation

The findings of the study are presented as follows.

Unit Root Test Results

As a precondition for applying the ARDL bound testing technique to cointegration, the need to ensure that none of the variables is beyond being integrated of the first order i.e. I(1) requires unit root tests of each of the variables in the model. The outcome of the unit root tests using the Augmented Dickey Fuller (ADF) test reveal that all the variables satisfy this condition. The results are presented in the Table 1.

As a first step in the analysis, the explanatory variables were transformed into natural logarithm form. Tests for unit roots in the variables at both level and first difference values were conducted using the augmented Dickey-Fuller (ADF) test.

Table 1 shows that services and construction industries' output were stationary at level I(0) while unemployment, gross domestic product (GDP), and the outputs of agriculture, industry, and trade, were stationary after first difference. Therefore, it was found that the null hypotheses of a unit root at level and first difference values were rejected in the ADF test. This is because in absolute term, the t-test statistic values of the variables examined were found to be statistically significantly greater than their critical values.

Table 1: Unit Root Tests Results

ADF Unit Root Test				
Variables	Critical Values	At level I(0)	Critical Values	At First Difference I(1)
UNEMP			-4.309824	-6.63094***
InGDP			-4.252879	-8.566993***
InAGR			-4.252879	-4.447399***
InIND			-4.252879	-5.681937***
InSERVS	-3.207094	-3.347718*		
InCONS	-4.252879	-6.074624***		
InTRADE			-3.548490	-3.701722**

*Note: *** Statistical significance at 1% level; ** statistical significance at 5%; * Statistical significance at 10%; Source: Authors' estimation using E-views 9*

While the test statistic values of the variables were either significant at 1%, 5%, or 10% as the case may be. This implies that none of the series is I(2) and could all be included in the ARDL estimation.

Regression Results

The ARDL estimation was done using two different models specified above. It begins by examining the relationship between unemployment and GDP (i.e. ARDL I), followed by the relationship between unemployment, agriculture, industry, construction, trade, and services (ARDL II). The two different models were used in order to test the Okun's law on the relationship between economic growth and unemployment and see how the relationship differ from that of the main disaggregated GDP data in Nigerian context Also, maximum of two lag lengths were considered to reduce the problem of degree of freedom in the time series analysis.

In each of the ARDL procedure examined, the optimum lag length selection criteria was carried out in order to determine the number of lag(s) to be included in the ARDL models prior to the bound test. The results are presented in Table 2, and Table 6.

Table 2: Lag Length Selection for ARDL I Model

Lag	AIC	SC	HQ
0	5.962659	6.054267	5.993024
1	5.043673	5.279414	4.984641
2	4.882824	5.215875	4.984641

Source: Authors' computation using E-views 9

From Table 2, the Akaike Information Criterion (AIC), and Shwarz Criterion (SC) indicate that two maximum lags are to be included in the ARDL I model. The results of the ARDL bounds testing approach are shown in Table 3.

Table 3: ARDL Bounds Test for Cointegration (ARDL I Model)

Dependent Variable: ΔUNEMP

Function		F-Statistics
F(UNEMP/InGDP		8.454559***
	Lower	Upper
Critical Value	Bound	Bound
1%	3.17	4.14
5%	3.79	4.85
10%	5.15	6.36

*Note: *** Statistical significance at 1% level; ** statistical significance at 5%; * Statistical significance at 10%. Critical values are obtained from Pesaran et al. (2001).*
Source: Authors' computation using E-views 9

Having conducted the unit root test and the optimum lag selection, F-statistic test for cointegration is required to determine whether there is cointegration among the variables captured in the unrestricted error correction version of the ARDL model. This has been estimated using the bound testing approach and the results presented in Table 3 above.

From Table 3, the bound test results reveal the existence of a long run relationship between unemployment and GDP. In the function F(UNEMP/lnGDP), the null hypothesis that there is no cointegration is rejected at 1% level as the F-statistic, 8.454559 is greater than the critical value, 4.14, at the upper bound indicating that there is cointegration between unemployment and GDP. Next step is to examine the long run impacts of GDP growth on unemployment in Nigeria using OLS technique.

Table 4: Estimated Long Run Coefficients of ARDL I Model

Dependent Variable: UNEMP		
Independent Variables	Coefficients	P-values
C	-16.68093***	0.0000
InGDP	3.281959***	0.0000

R2 = 0.695924 F-Statistic = 68.65963 (0.000000)

Durbin-Watson Statistic = 1.943290

*Note: *** Statistical significance at 1% level; ** statistical significance at 5%; * Statistical significance at 10%' Source: Authors' computation using E-views 9*

We estimate the long run equilibrium relationship between the variables using OLS. From the results as reported in Table 4, it reveals that GDP growth is positively related to unemployment in Nigeria in the long-run, and the result is statistically significant at 1%. This negates the postulation of the Okun's law which states that there is negative relationship between economic growth and unemployment. The coefficient of determination (R^2) is 0.695924. The result shows that 70% of variation in unemployment rate is caused by variation in the explanatory variable. The Durbin Watson statistics is 1.943290 which shows the absence of serial correlation as it is close to 2. The F-statistic (68.65963) is significant at 1% which means that the model is adequate.

Table 5: Results of Estimated Short Run Coefficients of the Selected ARDL I Model

Dependent Variable: ΔUNEMP Independent Variables	Coefficients	P-values
C	6.375586***	0.0006
ΔInUNEMP(-1)	-0.146975	0.3981
ΔInUNEMP(-2)	0.001895	0.9908
ΔInGDP(-1)	-10.19356*	0.0758
ΔInGDP(-2)	-17.38017***	0.0081
ECT(-1)	-0.567536***	0.0005

*Note: *** Statistical significance at 1% level; ** statistical significance at 5%; * Statistical significance at 10%; Source: Authors' computation using E-views 9*

The results of the short run relationship is estimated and reported in Table 5. The error correction coefficient (ECT(-1)) which is approximately -0.57 not only has the expected negative sign but it is also statistically significant at 1% considering the probability value which is 0.0005. The value of the ECT(-1) implies a fairly high speed of adjustment to equilibrium after a shock. Approximately 57% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year. For the explanatory variable, the differenced one period and two period lag values of GDP show the existence of significant negative relationship between economic growth and unemployment at 10% and 1% levels respectively. This means that economic growth and unemployment relationship in the short run follows the Okun's law in Nigeria.

Table 6: Lag Length Selection for ARDL II Model

Lag	AIC	SC	HQ
0	5.171571	5.446397	5.262668
1	5.189700	5.802626	5.381661
2	5.209209	6.113205	5.485569

Source: Authors' computation using E-views 9

We estimated the ARDL II model to investigate whether there is long run relationship between unemployment, agriculture, industry, construction, trade, and services. The procedure starts with the optimum lag length selection criteria as reported in Table 6. Based on Akaike Information Criterion (AIC) Shwarz Criterion (SC), and Hanna-Quinn Criterion (HQ), one lag length was selected.

Table 7: ARDL Bounds Test for Cointegration (ARDL II Model)

Dependent Variable: ΔUNEMP **Function**		**F-Statistics**
F(UNEMP/InAGR,InIND, InCONS, InTRADE,InSERVS)		1.283452
Critical Value	Lower Bound	Upper Bound
1%	3.41	4.68
5%	2.62	3.79
10%	2.26	3.35

*Note: *** Statistical significance at 1% level; ** statistical significance at 5%; * Statistical significance at 10%. Critical values are obtained from Pesaran et al. (2001). Source: Authors' computation using E-views 9*

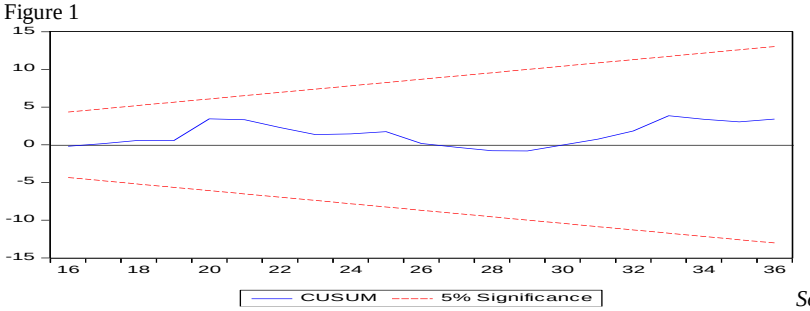
From Table 7, the bound test results reveal that there is no long run relationship between unemployment, agriculture, industry, construction, trade, and services sectors

growth as the F-statistic, 1.283458 is less than all the critical values at the upper and lower bounds. Hence, we could not go further to estimate the long run coefficients and speed of adjustment of the variables to long run equilibrium. Since there is no long-run relationship among the variables in the system above, we then stop here as further regression will present spurious results.

Stability Test

The study examined the stability tests for the first ARDL model that indicate long run relationship among the variables used (i.e. ARDL I). We relied on cumulative sum (CUSUM) test and the results are presented below.

Figure 1



Source: Authors computation using E-views 9 software

Figure 1 plots the CUSUM statistics for the first ARDL equation used in the study that revealed the existence of cointegration. It can be seen in the figure that the plot of the CUSUM stays within the critical 5% bounds which confirms the long run relationship among the variables and thus shows the stability of the ARDL I model.

5. Summary and Conclusion

This paper investigates whether Okun's law holds in the Nigerian economy by first examining the relationship between aggregate GDP and unemployment, and further investigating the relationship between disaggregated component of GDP and unemployment in Nigeria. We applied ARDL bound testing, OLS and error correction model (ECM) in the analysis and also used CUSUM to test the stability of the model used, and it was found that the ARDL I was stable. The results of the unit root tests indicated that the variables are of mixed stationary properties i.e. I(0) and I(1). The cointegration results show that there is long-run relationship between GDP and unemployment but no long-run relationship among the disaggregated component of GDP and unemployment in Nigeria. The error correction model for ARDL I examined revealed a relatively high speed of adjustment to equilibrium. From the OLS results on GDP and unemployment, it was revealed that Nigeria's economic growth is positively related to unemployment in the long-run, while growth in the short-run is unemployment reducing. This implies that economic growth in the long run negates the postulations of Okun's law while that of the short run is in line with the theory.

The result underscores the fact that economic growth in recent times is accounted for largely by factor reallocation from manufacturing and agriculture to trading largely in imported goods and other services which do not create sustainable job that can endure into the long run. This is consistent with the tertiarisation of the economy alluded to by Ajakaiye et al (2016). Hence the findings of the long run growth-unemployment relationship is consistent with

other studies in Nigeria conducted by Babalola *et al.,* 2013; Arewa and Nwakanma, 2012; Akeju and Olanipekun, 2015.

On the disaggregated component of GDP, the findings revealed no long-run relationship as earlier stated. This could be because there is no inter-sectoral linkage in the Nigerian economy in line with input-output framework that could result in high labour force participation rate. The agricultural sector suffers from neglect; the services sector is not employment elastic as the growth of the sector does not absorb much labour, and the industrial sector on the other hand is faced with competition from foreign goods and reliance on imported raw materials, while construction sector relies on foreign technology. The trade sector is dominated by importation which implies labour input from outside the Nigerian economy. All these reduce the labour participation rate in the economy. Hence, the growth of the economy is generally not unemployment reducing, and not in line with Okun's law.

However, Okun also pointed out that the relationship between output and unemployment is hinged on the linkage between productivity of real output and unemployment. Where this linkage does not exist, Okun's law may not hold. Thus the lack of proper linkage between primary, secondary and tertiary sectors of the Nigerian economy is the reason for jobless growth. Hence, policy should be directed at forging enduring links between the sectors in Nigeria to reduce unemployment.

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Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

ARDL BDM t-test and Robust Inference for the Long-Run Relationship Between Energy Consumption and Economic Growth in Nigeria: 1976-2015.

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Abstract

Although there is a voluminous literature focused on examining whether energy use granger causes growth of GDP or growth of GDP granger causes energy use, it is still inconclusive just as the understanding regarding the concept of growth which has been studied right from the time of Adam Smith, but yet still remains largely inconclusive. The results from different studies are ambiguous not only because of varying statistical techniques but also because of different parameters that have been used in these models. This paper tests, in a country specific context, the long-run relationship between energy access, and economic growth for Nigeria from 1976-2015 by employing (ARDL BDM t-test) Error Correction Mechanism tests for cointegration in a single-equation Framework. We adopt a three stage approach, consisting of unit root, cointegration and Granger causality tests to study the dynamic causal relationship between energy consumption, energy prices and growth. Results show there is a stable relationship between GDP, oil price and energy consumption. By estimating these long run relationships and testing for causality using the Toda Yammoto approach, we found evidence of unidirectional causality between energy consumption and GDP. This provides evidence for the energy growth hypothesis consistent in the literature. Thus if we cut back on our energy use, growth would abandon us.

Keywords: BDM-t test, Economic Growth, Cointegration, Energy Development
JEL Codes: Q43

1. Introduction

This research is focused not on the importance of energy in economic growth but rather the role of energy in achieving the long term rise in capacity of an economy to supply increasingly diverse economic goods to its population as professor Simon Kuznets conceptualize economic growth. Energy development, interpreted broadly to mean increased availability and use of energy services, is an integral part of enhanced economic development. For centuries economists have worshiped in the shrine of economic growth, preoccupied with the understanding of the growth of nations (Todaro & Smith, 2016). This simple but yet complex concept of growth have been studied continually since the days of Adam Smith. Subsequently, a literature has emerged that has focused on the existence of a relationship between energy consumption and economic growth. A feature of this literature has been to utilize a battery of test to investigate the integration properties of energy variables (Smyth & Narayan, 2015). Consequently this effort has produced a better understanding of the sources of economic growth. But again the subject has proved elusive, and many mysteries remain (Helpman, 2004). These reports tell us nothing besides the fact that energy has a disproportionate role in economic growth of both developed and developing countries. We do not know a lot as we should on the

precise link that surrounds energy development. Most concern with energy development arises from the assumption that the character of future energy availability will have a major impact on the quality of life, and the level of economic activity is a primary measure of this quality. In addition, the analysis and results of the first Energy Modelling Forum (1977) study emphasized that the relationship between energy and GNP is neither one to one nor is it nonexistent. Thus interest in understanding the nature of the energy-economy link continues to intrigue researchers. We revisit energy and economic growth because there is an existing hypothesis that suggests the two are inseparable owing to the close interrelationship between them[1]. The difficult question is can energy demand growth be dampened further by higher energy prices without proportional reductions in economic activity?

Early literature dating back to the energy modeling forum downplayed the role of energy in economic growth. For instance, the fable of the Elephant and Rabbit applies to an aggregate view of the economy with a single output and two inputs. Using the US economy, (Hogan & Mann, 1977) represent the economy in terms of just two inputs—energy and all other items. As of the 1970, the value of primary energy inputs did not exceed 4% of the GNP. This relationship was assumed to represent something like an elephant –rabbit stew[2]. "If such a recipe contains just one rabbit (the energy sector) and one elephant (the rest of the economy), won't it still taste very much like the elephant stew"?

The fact that expanded availability and use of energy services is strongly associated with economic development still leaves open how important energy is as a causal factor in economic development. A more recent illustration of the importance accorded to energy development in economic development, is the call for affordable and clean energy utilization in the Sustainable Development Goals developed to achieve a better and more sustainable future for all**.**

Perhaps the expanded availability of electricity has contributed to progress recorded in improvement in the levels of living observed across both developed and developing countries. In examining the role of energy, the literature has focused on understanding whether the relationship between energy variable and non-energy variable is immutable or unimmutable? An answer to this question is important in designing an effective energy and environmental policy that will promote sustainable development (Menegaki, 2014)**.** A review of the recent literature points to the fact that the literature has given much consideration to how developing societies use energy, and less to how energy-using societies develop. This is evident in the recent stylized facts on energy (Csereklyei, Rubio-Varas, & Stern, 2016). The most significant conclusion coming from a review of the granger causality literature in energy economics is that, the direction of causality between energy consumption and economic variables has remained empirically elusive and controversial. In the light of the aforementioned, we revisit the debate with an application of cointegration testing in single equation framework, so as to understand the pattern of changes that has taken place in Nigeria.

The paper is organized as follows. Section 2 briefly reviews related studies regarding energy consumption in Nigeria, as well as multi country studies where Nigeria was

[1] What has sustained this macroscopic relationship is the way in which the growth of capital seems to have been matched by growth in output per capita over a very long time period

[2] The small relative size of the energy sector motivates the metaphor of the elephant and the rabbit. It indicates that small changes in energy availability do not produce proportional changes in economic activity.

included among the countries in the panel. Section 3 highlights the model formulation, data and estimation strategy. Section 4 presents the results. Section 5 concludes the paper with future research directions.

2. Theoretical and Empirical Review.

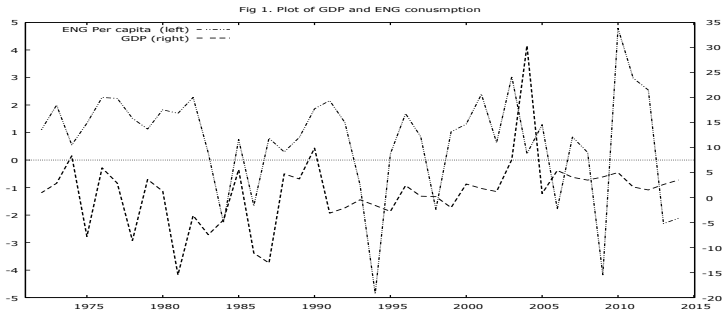
Theoretical Review.

Economist views potential improvements in the productivity of labour, through the use of capital and of capital through improved technology. In the electricity type energy – GDP literature it is common to analyze economic relevance of energy by means of causality test of the energy-GDP relationship (Bruns & Gross, 2013; Ozturk & Acaravci, 2011). Usually the ARDL bounds testing approach to cointegration, the Engle and Granger (1987) causality test as well as batteries of test are applied to time series for developing countries as well as developed countries at varying levels of development to infer the nature and existence of causality. An understanding of the role of energy in the economy is a complex issue because energy availability affects every aspect of our life style from production to consumption. As an extension to the growth debate, energy economist have extended the analysis to understanding how aggregate energy as well as disaggregate energy type influence growth of an economy. From this argument a branch of literature has developed that tries to look at disaggregated energy consumption because what may be true for the use of electric power in smelting iron need not be true for the use of oil in automobiles. Uncertainty regarding the supply as well as regional differences also contributes to the difficulty in understanding the interactions among energy sector and the reminder of the economy[3]. Disaggregating various causality literature with respect to the parameter used, and direction of causality, Gross (2012) concludes that if different energy aggregates are used across studies, the results naturally differ by comparison. Although Toman and Jemelkova (2003) documents that energy plays a disproportionate role in economic development, it however is important to nearly any activity that is non-natural. Rafindadi and Ozturk (2016) rightly clarified the role of energy despite its disproportionate role. For instance energy is important in communication, transportation, education, health, financial operation and industrial operations.

Fig 1 shows a plot of growth energy consumption and GDP growth. The correlation of energy consumption with GDP suggests that energy is an important partner variable for a causality analysis with total GDP. However, in the light of the elephant rabbit fable, the question then becomes is consumption of energy also a relevant factor with respect to its market share? The movements further suggest that there is a positive correlation between energy and economic growth.

Gross (2012) rightly a point out that one major determinant for the declining energy intensity is the role of technological progress. In a analyzing technological progress and economic growth, Helpman (2004) explains the fact that "growth that is driven by general purpose technologies is different from growth driven by incremental innovations. Unlike incremental innovations, general purpose technologies such as steam engine, electricity and computer can trigger an uneven trajectory, which starts with a prolonged slowdown followed by a fast acceleration."

[3] There is some evidence that the relationship between energy and economic growth is not immutable, but the degree of potential flexibility is disputed**.**



Empirical Review

Beginning with (Yemane Wolde-Rufael, 2009) for the case of African countries there is a relatively small subset of this literature which uses an augmented production function to examine the statistical properties between energy and economic growth. Similarly, beginning with (Iwayemi, Adenikinju, & Babatunde, 2010; Odhiambo, 2010; Ouedraogo, 2013b; Yemane Wolde-Rufael, 2014) there is a small subset of the literature that considers the relationship between energy consumption, disaggregated by type, and economic growth. There are also a few studies that have compared the relationship between both aggregate and disaggregated energy consumption and economic growth in alternative specifications. For instance see (Odhiambo, 2009b; Sa'ad, 2010).

OF the existing study for Nigeria, most use a bivariate framework to examine the relationship between energy consumption and economic growth (Akinlo, 2009; Sa'ad, 2010). Other studies use a multivariate framework where, in addition to economic growth and energy consumption, the model includes carbon emissions (Rafindadi, 2016), energy prices (Lean & Smyth, 2014; Ouedraogo, 2013a). One finding with most of these studies which have employed unit root testing as a precondition is that energy variables have a unit root. A summary of the literature suggests that findings with respect to Ganger causality between energy consumption and economic growth are mixed. For instance in the case of Malaysia (Lean & Smyth, 2014) documents that studies that employ the use of the multivariate framework, indicate that the direction of Granger causality is mixed and seems to depend on the ad hoc choice of the other variables other than energy consumption and economic growth included in the model.

Using a three-stage approach, consisting of panel unit root, panel cointegration and Granger causality tests model of energy consumption, energy prices and economic growth for selected West African States (1980-2008), (Ouedraogo, 2013b) finds the existence of long-run and causal relationships between energy consumption and economic growth for the sample of fifteen countries. A unidirectional causality was running from GDP to energy consumption in the short-run, and from energy consumption to GDP in the long-run.

In a related study (Ouedraogo, 2013a) investigated not aggregate energy but rather focused on electricity which is an important form of secondary energy using panel unit root, cointegration and causality tests. The result of the panel causality tests between real GDP and electricity consumption for the 15 countries revealed only a unidirectional long run causality running from electricity consumption to real GDP existed. In the case of Nigeria, the country specific result showed that 47% of Nigerian population had

access to electricity. Cointegrating result for Nigeria showed a significant and positive long-run relationship with GDP with income elasticity of 0.44. The result also revealed no evidence of causality between energy consumption and income, indicating neutrality between energy consumption and income in the short run, no Granger causality between electricity consumption and income is found with respect to Nigeria in the short run However, there exists a long-run causality between electricity consumption growth. Esso (2010) investigates the long-run causal relationship between energy consumption and economic growth for 7 Sub-Saharan African countries for the period 1970–2007. For this purpose, the study use the Gregory and Hansen (1996) threshold cointegration approach and the Toda and Yamamoto version of Granger causality test. The results of the test show that energy consumption and economic growth are cointegrated. This further suggests that finding of long-run relationship is a stylized fact in the energy literature.

As discussed above, there are just few studies that model the relationship using energy prices, as a result this study follows the suggestion by Narayan (2015) that calls for more country specific study as against multi country studies. Consequently, we focus our attention on identifying specific country as against multi country study. This is so as to identify how results differ according to level of economic development.

3. Methodology

The test of the causal relationship among our variable is conducted in three stages. First, we test for the order of integration in GDP, energy consumption, and price series. Secondly, if they are integrated at order one I (1) we employ the BDM-t test (Banerjee, Dolado, & Mestre, 1998) Error correction Mechanism test for cointgertaion in a single-equation framework, to examine the long-run relationships among the variables. Our approach of utilizing the BDM-t test is because the t-ratio form of the ECM test has better power properties than the normalized bias form when the common factor restrictions are grossly violated. This test is superior to the bounds F test that has been relatively used in most literature which impose possibly common-factor restrictions in the estimation underlying the test. If the variables are cointegrated, the long -run cointegration vector is estimated using Ordinary Least Squares. Finally, we use the VAR models to test for the existence and direction of causality.

Estimation Strategy

The standard approach in the literature assumes a functional relationship between energy demand and the key explanatory variables of prices and income, see (Iwayemi et al., 2010; Ouedraogo, 2013b). A perception in the literature that a complex model with extensive input data produces more accurate results might not always be true. Moreover a model is simply a representation of our understanding. Complex models do not replace careful thinking. Therefore we employ a simple multivariate model as against the bivariate model because drawing specific economic conclusions with regards to single types of energy from bivariate causality analysis is difficult because of omitted variable bias (Bruns & Gross, 2013). Cointegration analysis is the appropriate approach to investigate the long-run relationship between energy consumption, prices and GDP.

Unit root test

To test for a unit root in each of the series we employ the LM unit root test with one structural break proposed by Lee and Strazicich (2004). Allowing for structural breaks is important giving that during the period considered, the Nigerian economy has experienced several shocks, such as the SAP era, the Global financial crisis and policy shifts which have potentially caused a break inn economic growth and energy consumption. If one does not allow for a break, this will reduce the power of the unit root test to reject the null in the presence of a break, therefore pointing towards a model mis-specification which comes with not one

but multiple costs (Smyth & Narayan, 2015). The LM unit root test have better size properties and identify the break more accurately than the alternatives. We employ both the LM unit root test with one break in the intercept (Model A) and the LM unit root test with one break in the intercept and slope (Model C).

$$y_t = \delta Z_t + X_t, \quad X_t = \beta X_{t-1} + \varepsilon_t \quad \text{--3.1}$$

$$\Delta y_t = \delta' \Delta Z_t + \phi \tilde{S}_{t-1} + \mu_t \quad \text{----------3.2}$$

BDM -t test of no cointegration

Testing for cointegration has become an important facet of empirical analysis of economic time series, and various tests are being used. In this paper we use the BDM t-test[4], in a single equation framework proposed by Banerjee et al. (1998) to examine the cointegration between energy consumption and economic growth. Our choice of the variant of ADL models is premised on theoretical underpinning in the econometric literature, Smyth (2013) argued that with a single time series, if one or more of the variables, including energy consumption or production is stationary, the appropriate approach to testing for cointegration is the autoregressive distributed lag or bounds testing approach. This class of model has traditionally been used in the empirical literature to seek a tentatively adequate data characterization that encompasses rival models, displays parameter constancy, has martingale difference errors with respect to a selected information set and parsimoniously orthonomarlizes the regressors. There are several advantages of using the BDM t –test over other test such as the Engle and Granger (1987) and the Cochrane-Orcutt (1990) tests. (1) Here the limit distribution does not depend upon nuisance parameters but does depend on the dimension of the system. (2) cointegration statistics such as the Engle and Granger (1987) test, suffers in finite samples from imposing potentially invalid common-factor restrictions. Banerjee et al. (1998) have shown that when the restrictions are invalid, the power properties of the Corut Ochrane and Engel Granger test may have poor power properties. (3) a summary of empirical studies have shown that when the state of the art econometric techniques are used energy variables are infact stationary. This means they are I(0) in nature and further justifies our use of the BDM t test.

The testing procedure has the following form:

$$\Delta\gamma_t = \alpha\Delta\chi_t + \beta(y_{t-1} - \lambda\chi_{t-1}) + \varepsilon_t \quad ..3.3$$

$$\Delta\chi_t = U_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.4$$

Where α, λ and x_t are k X 1 vectors of parameters and explanatory variables. The regressand y_t is a univariate process and β is a scalar; the initial conditions are, without loss of generality, set to zero and T is the sample size. The elements of x_t correspond to different regressors.

The ECM test statistics for cointegration, as suggested by Banerjee et al. (1998) is based upon estimating (1)by OLS. According to this procedure β is estimated by OLS from the unrestricted dynamic model**.**

$$\Delta\gamma_t = \alpha\Delta\chi_t + \beta\gamma_{t-1} + \theta\chi_{t-1} + \varepsilon_t = \alpha\Delta\chi_t + \Pi w_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.5$$

Where $w' = (y_t, x_t')$ and $\pi' = (\beta, \theta')$

Granger Causality Test

Granger causality testing has been the most common approach to determining the causal validity of energy-output models (Stern & Enflo, 2013). Therefore having found that

[4] We apply the level ARDL formulation instead of the ECM-ARDL form, and test the corresponding null hypothesis as specified in gretl estimation software.

there exists a long-run relationship between the variables, we then investigate the dynamic relationship using VAR models. The optimal lag order is selected following the minimum values of the Bayesian information criterion (BIC). In the energy growth literature, Gross (2012) provides a generally accepted concept of causality as a condition where a time series (X) is said to Granger –cause another time series (Y) if the prediction error of current Y declines by using past values of X in addition to past values of Y. This study specifically employs the Toda Yamamoto hereafter (TY) procedure. The advantage of using the TY approach over the Engle Granger procedure is that (1) the TY procedure does not require pre-testing for the cointgerating properties of the system and thus avoids the potential bias associated with unit root and cointegration test. Therefore it can be applied regardless of whether a series is I(0), I(1) or I(2), not-cointgerated or cointegrated of an arbitrary order (Menyah & Wolde-Rufael, 2010).

The TY approach fits a standard vector auto regression model on level of the variables (not on their first differences) and therefore makes allowance for the long run information often ignored in systems that require first differencing and pre whitening (Odhiambo, 2010). The basic idea of the TY approach is to artificially augment the correct order, k, by the maximal order of integration, say d_{max}(Yemane Wolde-Rufael, 2009). To undertake the TY version of the Granger non-causality test, for VAR (2), (k = 1 and d_{max} =1) we estimate the following system equations:

$$\begin{bmatrix} LGDP_t \\ LENG_t \\ LaLP_t \end{bmatrix} = A_0 + A_1 \begin{bmatrix} LGDP_{t-1} \\ LENG_{t-1} \\ LaLP_{t-1} \end{bmatrix} + A_2 \begin{bmatrix} LGDP_{t-2} \\ LENG_{t-2} \\ LaLP_{t-2} \end{bmatrix} + \begin{bmatrix} \varepsilon LGDP_t \\ \varepsilon LENG_t \\ \varepsilon LaLP_t \end{bmatrix} \quad \text{.....6}$$

In equation (6) A_1 and A_2 are two 3 by 3 matrices of coefficients with A_0 being the 3 by 1 identity matrix, $\mathcal{E}$ are the disturbance terms with zero mean and constant variance. From equation (6) we can test the hypothesis that energy consumption (ENG) Granger causes economic growth (LGDP), in the following hypothesis: $H_0 = a^1_{12} = 0$, where a^1_{12} is the coefficient of the energy variable in the first equation of the system presented in equation (6). Additionally we can test the opposite causality from economic growth to energy consumption in the following hypothesis: $H_0 = a^1_{21} = 0$, where a^1_{21} is the coefficient of the economc growth variable in the second equation of the system presented in Eq. (6).

4. Empirical Results.

Unit Root Test

The study conduct several unit root test to make a case for stationarity or non stationarity of the variables used in the study. We do not present the results to conserve space, but the results show that the all series were I(1). Since our series are integrated of the same order, BDM-T test is the most appropriate approach for testing for cointegration while the Toda Yamamoto approach is the most appropriate approach for testing for causality.

Cointegration Test

In this section, the longrun relationship among [GDP, ENG, OILP] is examined using the BDM t-testing procedure. In the first procedure, the selection of lags is based on the Akaike Information Criteria and specification tests. To test for cointegration using the ECM t test the procedure depends on the significance of the lagged dependent variable. This is equivalent to testing the significance of the error-correction terms in the ECM reparametrization of the model. The decision rule is to reject the null of no cointegration if the t-statistics exceeds the upper bound critical value. The null of no cointegration is rejected at the 5 per cent level, based on (Banerjee et al., 1998) upper bound critical values.

Table 1 BDM boot strap t-test based on ARDL (1,1)

T –Statistics	t –statistics	Bootstrap p value
F_{lnGDP}(FGDP|LnENG,LnOILP)	3.138	0.330
F_{lnENG}(FENG|LnGDP,LnOILP)	2.708	0.349
F_{lnOIL}(FOILP|LnENG,LnGDP)	8.722	0.026**

*Notes * denotes rejection of the null of no contgertion at 5% significant level. We use the non-parametric bootstrap method with with replacement from the estimated residuals.*

Table 2 Estimate of the Long Run Relationship

Estimated Long-run coefficients, dependent variable, lnGDP			
Regressors	Coefficient	Standard error	t-ratio [probability)
OILP	-0.11	0.04	9.88[0.000]***
ENG	-2.47	0.97	-2.57[0.000]**
Constant	22.05	6.28	3.51[0.001]***

*Notes: *** and ** denote significant at 1% and 5% respectively.*

Specifically a 1% increase in OILP leads to -0.11% increase in economic growth, while a 1% increase in ENG increases output by only -2.47%. Surprisingly, the sign of the coefficient of the energy variable is negative. From an economic point of view, this is difficult to interpret, perhaps it suggest we are using energy inefficiently. Similarly, a negative longrun relationship between energy consumption and GDP has been reported for Nigeria (Yemane Wolde-Rufael, 2005, 2006; Yemane Wolde-Rufael, 2009) and South Africa (Odhiambo, 2009a).

Granger Causality Test

The Granger causality test is very sensitive to the selection of the lag length, we therefore use the minimum SIC criteria to select the optimum lag of the model. Selecting the appropriate lags in the causality testing is important because if the chosen lag length is less than the true lag length, then the omission of relevant lags can cause bias. In addition Menyah and Wolde-Rufael (2010) argued that in order to avoid spurious causality or spurious absence of causality, it is important to determine the optimal lag length k in the (granger causality equation). On the other hand if the chosen lag length is more than the true lag length, the irrelevant lags in the equation cause the estimates to be inefficient Having established the optimum lag length (k), the next step is to conduct Granger non-causality test by augmenting the VAR (k) by the maximum order of integration of the series, $d_{(max)}$ Table 3 presents results of the Granger non-causality tests. We find that there is a bidirectional causality running from OILP to GDP. This is consistent with the results from the long-run test presented in table 2.

Table 3 Granger Causality results

Granger Causality test using VAR (3) using OILP, GDP, and ENG as dependent variables

	DV OILP		DV ENG		DV GDP	
	F statistics	P value	F statistics	P value	F statistics	P value
All lags of OILP	2.9233	[0.0692]*	0.2232	[0.8013]	2.6056	[0.0905]*
All lags of ENG	2.1273	[0.1368]	12.877	[0.0001]*	3.4045	[0.0465]*
All lags of GDP	2.8298	[0.0748]*	21.224	[0.3082]	78.884	[0.0000]*

5. Conclusion

There is a large literature on energy and economy wide interaction beginning from the first Energy Modeling Forum in 1977. The literature has adopted different framework in the analysis ranging from complex models to simple models. Although Bhattacharyya and Timilsina (2009) argues that a perception in the literature that complex models produce more accurate results might not ne necessarily true. A summary from the most recent research points to the fact that energy is indeed a key factor in production but yet has a disproportionate role in GDP. The divide in the literature has always being on the interpretation of the direction of causality because evidence of cointegration has become a stylized fact when the state of the art cointegration techniques are applied (Smyth & Narayan, 2015). In this paper we have attempted to pull together some of the ways in which energy might exert a significant influence on growth process. We focus on Nigeria because we know quite a lot about developed countries but less about developing countries where much is needed in energy analysis. The influence may be especially important at lower levels of development, where the overall opportunity cost of less efficient energy forms and the relative payoff to use of more efficient forms seem especially high. We utilized the ARDL BDM-test of cointegration in modeling the long run relationship between energy and economic growth along with the Toda Yamamoto approach to causality testing. Our long-run findings is consistent with (Iwayemi et al., 2010). Regarding the causality testing, we find that there is a unidirectional causality from energy consumption to economic growth. The policy implication suggests that energy conservation policies which reduce energy consumption may have an adverse impact on economic growth. Thus if we care about growth we have to be focus on not reducing energy consumption but rather focus on efficient use of energy. This finding is also consistent with the empirical evidence found by (energy growth studies grouping) example (Odhiambo (2010) for Nigeria in a panel of African countries, Tamba (2017) for Cameroon and Apergis and Tang (2013)) but not consistent with Esso (2010) for Nigeria and Zhang and Cheng (2009) Tang, Tan, and Ozturk (2016) for Vietnam.

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Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Impact of Inflation on Economic Growth in Nigeria: 1981-2016

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Abstract

The study examines the impact of inflation on economic growth in Nigeria, using annual time series data from 1981-2016. A review of literature shows that inflation can either have positive or negative effects on economic growth in Nigeria. The Augmented Dickey Fuller (ADF) and Phillip Peron (PP) technique were employed to run the unit root test and the results shows some variables are stationary at level while others at their first difference. The Auto regressive distributive lag (ARDL) bound test is adapted to test for co integration and error correction model. From the results generated from ordinary least square (OLS) shows that there exist a negative and insignificant relationship between inflation and economic growth. Exchange rate has a positive and significant effect on real GDP at 1% level of significant. Interest rate also has positive and significant effects on real GDP at 1% level of significant. This study, recommend that, the government of Nigeria should design sound and productive macro-economic policies to address factors that drive inflation high and to encourages local producers with the necessary facilities to boost production and supply of goods. This will help in reducing demand pull inflation and accelerate economic growth in Nigeria.

Keywords: Economic Growth, Inflation Rate; Exchange Rate; Interest Rate.
JEL Codes: E52

1. Introduction

One of the key macroeconomic challenges threatening output growth in Nigeria is the inflation rate. The rate of inflation over the last three decades has significantly increased thereby affecting the macroeconomic growth and international competitive drive of the growing economy. After numerous attempts by successive administrations to regulate this economic problem using both monetary and fiscal policies, efforts seem to be abysmal (Idris & Bakar, 2017).

One of the most fundamental objectives of macroeconomic policies is to sustain high economic growth together with low inflation. Specifically, the question whether inflation is necessary for economic growth or it is harmful, generates a significant debate both theoretically and empirically. Some consensus exists, suggesting that macroeconomic stability specifically defined as low inflation, is positively related to economic growth (Hossin, 2013).

Rate of Inflation is one of the basic macroeconomics objectives which has been a cankerworm eaten deeply in the growth fabric of most economy of the world, most especially the developing countries-such as Nigeria. Moderate inflation rate is an official monetary policy target in many countries because of the positive effects it generate on economic growth (Victoria, Hoogennveen, Simon & Kulpers, 2000).

The beginning of inflation in Nigeria can be said to be a direct results of the policies of the government, to stimulate a fast rate of

economic growth and development since 1951 when ministerial government was introduced. Inflationary trend since independence shows two distinctive periods in terms of digital analysis. Until 1969 the growth rate of inflation was in a unit with the highest being about 9% in 1966 and even negative growth rate was recorded in 1963, 1967 and 1968. Since 1969, inflationary growth has become two digits, except in 1972, 1973, and 1982. Information shows that 1975 recorded 33.7% indicating the effects of the 1974 increase in money supply via Udoji salary awards in the face of inadequate supply of commodities. It was 11.4% in 1980, 21% in 1981, 7.7 % in 1982, 23.2 % in 1983, 40% in 1984 and 40.9% in 1989 (Anyanwu, 1993).

The relationship between inflation and economic growth is wide both theoretically and empirically. In 1970's there was a debate on the relationship between inflation and economic growth. The argument then was, there is no relation or there is a positive relationship between the variables. The monetarist also believe that inflation is detrimental to economic growth (Behera, 2014).

Inflation can have either positive or negative impact on the economic performance of an economy. Positively, inflation can lead to a higher sustained growth due to the effect it has on capital accumulation. The Phillips curve for example, shows that high inflation is consistent with low rates of unemployment, implying that it has an impact on economic growth. It is widely believed that moderate and stable inflation rates promote economic growth as it supplements return to savers, enhances investment, and therefore accelerates economic growth of the country (Ahmed & Mortaza, 2005).

On the contrary, inflation imposes negative externalities on the economy. It creates more burdens on the cost of living and makes the life of common man more miserable. It is also known that inflation leads to uncertainty about the future profitability of investment projects especially, which have long gestation period. The increased price variability may lead to an increased in cost of production and less profitability. Besides this, inflation may lead to uncertainty about the future profitability of different investment projects, It may also reduce the country's international competitiveness. Inflation undermines the confidence of domestic and foreign investors. Inflation also affects the accumulation of other determinants of growth like investments, research, growth and development (Veni & Choudhury, 2007).

It is against this background that this paper is devoted to providing better understanding on how inflation rate affects the desired level of economic growth in Nigeria this is because at the time of conduct of this study empirical literature has shown there is no conclusive result on the relationship between inflation and economic growth. In fact, the relationship between inflation and economic growth is more complicated. The results obtained in various studies varies across time, country experiences and methodology used. The main objective of this paper is to examine the impact of inflation on economic growth in Nigeria, using annual time series data from 1981 to 2016.

2. Literature Review and Theoretical Framework

Concept of Inflation

According to Peter and Sean (2011), the word inflation is use to describe a situation in which the general level of price in the economy is rising. This situation doesn't mean that every price of every good is going up-a few prices may even be falling-but the overall trend is upward. Typically, the trend is for price to go up only a small percentage each year, but people dislike even mild inflation because no one likes paying higher prices.

As observed by Parkin (2005) inflation is a process of rising prices. Inflation is a rate at which there is the percentage change in the average price level. A common measure of

the price level is the consumer price index (CPI).

Concept of Economic Growth

Ahuja (2014) opined that, economic growth has been defined in two ways. In the first place, economic growth is defined as sustained annual increases in an economy's real national income over a long period of time. In the other words, economic growth means rising trend of net national product or constant prices.

Furthermore, Dwivedi (2004) define economic growth as the sustained increase in per capital natural output over a long period of time. Economic growth is measure as a percentage change in the Gross domestic product.

Theoretical Framework

Researchers adopted Keynesian theory of inflation as the basis of the research. This is because the theory is relevant and add value to the work. In addition, in Keynesian framework, the positive relationship between inflation and growth exhibited in the short-run dynamics is unsustainable in longer term and turns negative with higher inflation rate.

Review of Empirical Literature

Empirical studies reviewed have revealed that there are mixed results on the relationship between inflation and economic growth. Studies by Veni and Choudhury (2007), Omoke (2010), Shuaib, Augustine and Frank (2015) and Anochiwa and Maduka (2015) concluded that the change in inflation rate has no relationship with economic growth. However, there is also considerable evidence by some studies that inflation has an identifiable negative effects on economic growth such include Saaed and Afaf (2007), Kasidi and Mwakanemele (2011), Sultan and Shah (2013), Hossin (2015), Enu, Attah-Obeng and Hagan (2013), Tihanh (2015), Eze (2015), Bawa and Abdullahi (2016), Michael and Mbam (2017) and Idris and Bakar (2017). Finally, a number of other studies have also found that inflation has positive effects on economic growth which includes Umaru and Zubairu (2012), Osuala, Osuala and Onyeika (2013), Jaganath (2014), Echekoke, Kanayo and Amokor (2015), Chude, Daniel, Chude and Nkiru (2015), Olu and Idah (2015), Yelwa, David and Omuniyi (2015), Ihugba, Ebomuche and Ezeonye (2015), Saidu and Mohammed (2015), Olalere (2016), Madurapperuma (2016), Enejoh and Tsauni (2017) and Ndri (2017) among others.

3. Methodology

Method of Data Collection

This study makes use of time series data over a period of 35 years (1981-2016). Data is obtained from secondary sources. The data used for this study is drawn from the Central Bank of Nigeria (CBN) Statistical Bulletin, National Bureau of Statistics (NBS), World Bank and International Monetary Fund (IMF) reports on measure of inflation and economic growth in Nigeria

Model Specification

This research adopts the model of Chude and Chude (2015) with little modifications. In the model , Real Gross Domestic Product (RGDP) is used as dependent variable while the independent variable is inflation rate and control variables include exchange rate and interest rate. The model is therefore specified as follows:

$RGDP_t = \beta o + \beta_1 INF_t + \beta_2 EXR_t + \beta_3 INTR_t + e_t$ …………………………………..…….. 1

Where:

RGDP= Real Gross Domestic Product a proxy for Economic Growth.
INF= Inflation Rate
EXR= Exchange Rate
INTR=Interest Rate
e =Error Term
t = Time Series
βo = Constant
$\beta 1$, $\beta 2$, $\beta 3$ are parameters of the variables to be estimated in the model

4. Results and Discussions

Statistical Properties of Data Series

In line with the methodology of this study, all variables are subject to stationarity test, the two types of technique employed are

Augmented Dickey –Fuller (ADF) and the Phillip Peron (PP) tests. The results are presented below:

Table 4.1: Result of ADF and PP unit root test

S/N	VARIABLES	ADFT-STAT	P-VALUE	I(d)	PP T-STAT	P-VALUE	I(d)
1	Real GDP	-3.163951	0.0312**	1(1)	-2.981512	0.0468**	1(1)
2	Inflation rate	-3.252798	0.0252**	1(0)	-3.153543	0.0316**	1(0)
3	Exchange rate	-5.015670	0.0002***	1(1)	-5.015670	0.0002***	1(1)
4	Interest rate	-2.817597	0.0661*	1(0)	-2.735226	0.0783*	1(0)

Source: Researchers Computation Using E-Views-9 Software (CBN 2015,; World Bank 2016)
*(Note: ***, ** and * means significant 1 %, 5% and 10% levels respectively)*

From Table 4.1, with a sample of 35 observations, the null hypothesis states that there is non stationarity. The ADF and PP tests are run against the null hypothesis that there is unit root and non- stationarity of series. The results of these test shows some variables are stationary at level while others at their 1^{st} differences. The inflation and interest rate are stationary at level form 1(0) and Real GDP and exchange rate are stationary at 1^{st} difference 1(1). This implies that all the variables in the model are stationary at both 1% and 5% respectively. The mixture of 1(0) and 1(1) order of integration met the condition of Auto Regressive Distribution Lag (ARDL) bound test. The best model in this case is the Autoregressive distributive lag developed by Pesaran et al (1999), which is used to test for co integration and vector error correction model (VECM) to find the short run and long run relationship among the variables.

Test for Cointegration

Since the unit root test shows that Real GDP and exchange rate are stationary at level form 1(0). While others at 1^{st} differences 1(1). It is therefore necessary to test for co integration among these variables.

Table 4.2: Result of Cointegration using ARDL Bound Test

F-statistic	52.223	3
Level of significance	Critical value I(0) Bound	Critical value I(1) Bound
10%	2.37	3.2
5%	2.79	3.67
2.5%	3.15	4.08
1%	3.65	4.66

Source: Researchers Computation Using E-Views -9 Software (CBN 2015,; World Bank 2016)

From Table 4.2 the value of F-Statistic is 52.223, which is more than the lower and upper bound values of Pesaran table at 1 % level of significant. There is evidence of long run relationship between the variables.

Short run Error Correction Model

Having found the evidence of cointegration among the variables, the study proceeded to estimate the short run and long run relationships among the variables and the results are presented below.

Table 4.3: Result of Short run Error Correction Model

Short run error correction model				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LINF)	-0.031260	0.006025	-5.188531	0.0000
D(LINF(-1))	0.064209	0.006031	10.646859	0.0000
D(LINF(-2))	0.023191	0.006342	3.656717	0.0015
D(LINF(-3))	0.014898	0.005387	2.765477	0.0116
D(LEXR)	-0.071636	0.012392	-5.780684	0.0000
D(LEXR(-1))	-0.063024	0.012568	-5.014552	0.0001
D(LINTR)	0.022357	0.013944	1.603314	0.1238
CointEq(-1)	-0.075514	0.004275	-17.664186	0.0000
Cointeq=LRGDP-(-0.9697*LINF+0.1115*LEXR+0.1988*LINTR+19.8286)				

Source: Researchers Computation Using E-Views 9 Software (CBN 2015; World Bank 2016)

Table 4.3 shows that in the Short run, inflation has a negative and significant impact on economic growth in the current year at 1% level of significant, but the impact was positive and significant at lag -1, lag -2 and lag -3. This implies that an increase in inflation rate by 1% will lead to a decrease in real GDP by 31% at current year. Exchange rate has a negative and significant impact on economic growth. Indicating an increase in exchange rate by 1% will reduce real GDP by 72%. Interest rate also has positive and insignificant effect on economic growth. The error correction term measures the speed of adjustment towards the equilibrium after the initial deviations are corrected. The error correction model ECM (-1) coefficient is -0.075 and significant at 1%. This implies that the speed of adjustment for correcting disequilibrium from the previous year to current year is 7.5%.

Long run coefficient

Table 4.4: Long run Coefficient

Long run coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LINF	-0.969724	0.216908	-4.470660	0.0002
LEXR	0.111458	0.047677	2.337773	0.0294
LINTR	0.198837	0.255454	0.778366	0.4450
C	19.828599	0.690082	28.733683	0.0000

Source: Researchers Computation Using E-Views 9 Software (CBN 2015, ; World Bank 2016)

From Table 4.4, in the long run, inflation has a negative and significant impact on economic growth at 1% level of significant. Therefore, if inflation increases by 1%, it will reduce real GDP by 97%. The result further shows that exchange rate has a positive and significant impact on economic growth at 5% level of significant. Indicating that an increase in exchange rate by 1% will increase real GDP by 11% and interest rate also has a positive and insignificant impact on economic growth in Nigeria during the study period.

Test for Auto correlation

Table 4.5: Results of the test for Autocorrelation

F-statistic	0.128644	Prob. F(2,13)	0.8804
Obs*R-squared	0.621031	Prob.Chi-Square(2)	0.7331

Source: Researchers Computation Using E-Views 9 Software (CBN 2015,; World Bank 2016)

From Table 4.5, the test for autocorrelation was conducted because the Durbin Watson (DW) statistics result (0.637) obtained in the Ordinary Least Square is very low and not close to the conventional point 2, indicating the presence of auto correlation problem; therefore, after conducting the unit root test and test for autocorrelation the Durbin Watson (DW) statistics (2.46) is very high and are up to the conventional point 2. The variables are also not significant at 5%, we conclude that the model is free from auto correlation problem.

Test for Heteroskedasticity

Table 4.6: Results of the test for Heteroskedasticity

F-statistic	1.238184	Prob. F(16,15)	0.3419
Obs*R-squared	18.21123	Prob. Chi-Square(16)	0.3117

Source: Researcher Computation Using E-Views 9 Software (CBN 2015,; World Bank 2016)

The test for heteroskedasciticity was conducted to find out if there is heteroskedasciticity problem so as to know the best alternative model to apply. Therefore, based on the results in table.4.6, it shows that the variables are not significant at 5%, meaning that the model is free from heteroskedascity problem.

Normality Test

Table 4.7: Normality test

Statistic	Value
Skewness	-0.464056
Kurtosis	2.724323
Jarque-Bera	1.406086
Probability	0.495076

Source: Researcher Computation Using E-Views 9 Software (CBN 2015,; World Bank 2016)

From the above table, normality test was also conducted to find out if the variables are normally distributed. The conditions for normality are all met. Therefore, based on the results in table 4.7, the skewness is negative and less than one, Kurtosis must be close to 3, while Jarque-bera probability is not significant. Therefore, the data is normally distributed.

Ordinary Least Square Results

The ordinary least square regression results obtained are presented as;

Table 4.8: Regression Result

Independent Variable	Coefficient	Std. Error	t-Stat	Prob.
LINF	-0.083227	0.052860	-1.574495	0.1252
LEXR	0.271388	0.021804	12.44682	0.0000
LINTR	-0.566961	0.131198	-4.321430	0.0001
C	17.94132	0.333131	53.85661	0.0000
R-squared	0.847522	Mean DV	17.12688	
Adjusted R-squared	0.833227	S.D. dependent variance	0.535872	
S.E. of regression	0.218839	Akaike info criterion	-0.096526	
Sum squared resid	1.532489	Schwarz criterion	0.079420	
Log likelihood	5.737472	Hannan-Quinn criterion	-0.035116	
F-statistic	59.28883	Durbin-Watson statistic	0.637436	

Source: Composed By Researchers From Data Set Using Eview-9(CBN 2015,;World Bank 2016)

The ordinary least square (OLS) result is presented in table 8, shows that the inflation coefficient value is negative and not significant, indicating that there exist a negative and insignificant relationship between inflation and economic growth. Exchange rate has positive and significant effects on real GDP at 1% level of significant. This implies an increase in exchange rate by 1% will lead to increase in real GDP by 27%. Interest rate also has negative but significant effects on real GDP at 1% level of significant. An increase in interest rate by 1% will lead to decrease in real GDP by 57%.

The R square value of 0.847, implies that, 84% changes in dependent variable (Real GDP) is cause by independent variables such as inflation rate, exchange rate and interest rate. Thus, only 16% is cause by other factors. Again, the F-Statistic is significant at 1%, which indicates that the model is adequate and fit.

Granger Causality Test

The results of granger causality test between inflation and real GDP, exchange rate and real GDP and interest rate and real GDP. The first null hypothesis is that the inflation rate does not granger cause Real GDP. Thus, the null hypothesis is accepted because inflation does not have any significant impact on Real GDP. On the other hand, there is evidence of unidirectional causality running from economic growth to inflation and no evidence of causation on the other side.

The second null hypothesis is that exchange rate does not granger cause Real GDP. However, the results show that exchange rate does cause real GDP. The third null hypothesis is that interest rate does not granger causes Real GDP. The hypothesis is accepted as the p-value is not significant at all levels. This implies that interest rate does not cause economic growth in Nigeria.

CUSUM Test

The results of CUSUM plot for stability of the model shows that CUSUM test is within 5% level of significant. The results further shows that all the variables passed the CUSUM test. There are no chances of having spurious regression because the blue line is in-between the two red lines. Implies that all the variables used are stationary and the model is stable.

5. Discussion of Results

This study examines the impact of inflation rate on economic growth in Nigeria. Other macroeconomic variables used are exchange rates, interest rate were incorporated into the

model. This section analysis the extent to which findings of this study conforms to or deviates from those of other researches of similar interest. This study found an evidence of a negative and non-significant relationship between inflation and economic growth. This is not surprising considering the fact that the Nigerian government has taken measure to increase productive capacity and supply of goods and service. That is why the negative impact of inflation is not significantly affecting economic growth in Nigeria during the study period. Another finding of this study has to do with direction of causality between inflation and real GDP.This study finds evidence of unidirectional causality running from economic growth to inflation and no evidence of causation on the other side during the study period.

In addition, the study also found an evidence of positive relationship between exchange rate and economic growth in Nigeria; though the relationship is significant irrespective of the degree of volatility of the exchange rate, as such exchange rate influence economic growth. This study also finds evidence of unidirectional causality running from exchange rate to economic growth.

The interest rate also has negative but significant effects on real GDP. The implication of the finding from the study implies that the negative relationship existing between the two macro-economic variables will continuously shrink the Nigerian economy. This is because an increase in interest rate by 1% will reduce economic growth by 56%. The increase in interest rate would result in increase in cost of production that led to decrease investment and supply of goods and services, which affects economic growth.

To make a decision on the result, the null hypothesis states that there is no significant relationship between inflation and economic growth in Nigeria while the alternative hypothesis says there is a significant relationship between inflation and economic growth in Nigeria. Therefore, we accept the null hypothesis (H_0) that there is a negative and no significant relationship between inflation and economic growth and reject the alternative hypothesis (H_1) that states there is a significant relationship between inflation and economic growth in Nigeria during the study period.

However, the negative impact of inflation on economic growth is in line with Keynesian theory of inflation, which states that there exists a positive relationship between inflation and output in the short run. However, the positive relationship between inflation and growth exhibited in the short-run dynamics is unsustainable in longer term and turns negative with higher inflation.

Furthermore, the negative impact of inflation on economic growth in Nigeria is in line with the findings of Kasidi and Mwakanemele (2011), Enu, Attah-Obeng and Hagan (2013), Tihanh (2015), Bawa and Abdullahi (2016) and Michael and Mbam (2017) among others.

6. Summary of Major Findings

This study investigates the impact of inflation on economic growth in Nigeria. The research covers a period of 35years from 1981 to 2016. It used time series data in analyzing the data on real GDP, inflation rate, exchange rate and interest rate. The study made use of the Augmented Dickey Fuller (ADF) Phillips Peron (PP) test to administer the unit root tests, Auto Distributive Lag (ARDL) and Error Correction Model. The findings of the study are therefore summaries as follows:

The results generated from Ordinary least square shows that there exist a negative and insignificant relationship between inflation and economic growth. Exchange rate has positive and significant effects on real GDP at 1% level of significant. Interest rate also has negative but significant effects on real GDP at 1% level of significant. However, the R squared value is highest at 0.847. The R square value 0.847. That is, 84% of variation in Real GDP can be explained by inflation rate, exchange rate and interest rate. Thus,

only 16% is due for other factors. This shows that the model is significant and adequate. The Durbin Watson (DW) statistics is very low and not close to the conventional point 2, indicating the presence of auto correlation problem; therefore, the unit root test was conducted to make the variables stationary. Again, the F-Statistic is significant at 1% which indicates that the model has a good fit.

Surprisingly, the ADF and PP tests run on the data shows that the inflation rate and interest rate were stationary at level form 1(0) and Real GDP and exchange rate are stationary at 1^{st} difference 1(1). This implies that all the variables of the model are found to be stationary at both 1% and 5% respectively.

The co integration test conducted reveal that the value of F-Statistic is 52.223 is more than the lower and upper bound values of Pesaran table at 1 % level of significant. This indicates that there is evidence of long run relationship between the Real Gross Domestic Product and Inflation rate, Exchange rate and Interest rate. More so, the Short run error correction model shows that inflation has a negative and significant impact on economic growth in the current year at 1% level of significant, but the impact was positive and significant at lag -1, lag -2 and lag -3. Interest rate also has positive and insignificant effect on economic growth. The error correction model ECM (-1) coefficient is -0.075 and significant at 1%. This implies that the speed of adjustment for correcting disequilibrium from the previous year to current year is 7.5%.

The long run ARDL results shows, inflation has a negative and significant impact on economic growth at 1% level of significant. Therefore, if inflation increases by 1%, it will reduce real GDP by 97%. The result further shows that exchange rate has a positive and significant impact on economic growth at 5% level of significant. Interest rate also has a positive and insignificant impact on economic growth in Nigeria during the study period.

The test for autocorrelation conducted shows the Durbin Watson (DW) statistics is very high and is up to the conventional point 2. The test for heteroskedasticity was also conducted to find out if there is heteroskedasticity problem the results further shows that the variables are not significant at 5%, meaning that the model is free from heteroskedasticity problem.Normality test conducted shows that all the conditions for normality test are all met.

Finally, the results of CUSUM plot for stability of the model shows the CUSUM test is within 5% level of significant. The results further shows that all the variables passed the CUSUM test. There are no chances of having spurious regression because the blue line is in-between the two red lines. Implies that all the variables used are stationary and the model is stable.

7. Conclusions

On the basis of the findings of this study, the following conclusions were drawn:

Inflation is one of the major macroeconomic problems in Nigeria economy. There is evidence of co integration between the variables. Inflation has a negative and insignificant impact on economic growth; as such inflation does not influence economic growth.

In addition, exchange rate has a positive and significant impact on economic growth. An increase in exchange rate will increase economic growth. However, exchange rate exerts an influence on economic growth.

Finally, interest rate has a negative and significant impact on economic growth. The study therefore concludes that the inflation rate during the study period has a negative effect on the realisation of macroeconomic objective of sustainable economic growth.

This study suggests an optimal and sound macroeconomic policy which will control the excessive increase in inflation rate and stimulate economic growth.

8. Recommendations

Based on the findings of the study, the following are suggestions that would

improve the standard of the economy.

- To reduce the adverse effects of inflation, the monetary authorities should keep the inflation rate between 3 to 5% through effective monetary policy. This is because moderate inflation facilitates investment, productivity and economic growth.
- Regulatory authorities should ensure compliances with the monetary policy objectives by strengthen the supervisory role of price control board in ensuring inflation rate does not grow to the level it affects economic growth negatively.
- Government should address all key factors which cause persistent increase in prices such as shocks in price of crude oil, exchanges rates volatility, increase in money supply, electricity inadequacy and ensure a routine on this indication are check with appropriate policies since they have link with inflation in Nigeria.
- The government should take timely measures to design suitable framework that will encourage the local producers to engage in the agricultural productivity, investment and economic activities in order to boost production and supply of goods. This will reduce demand pull inflation and help to fight against inflation.

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Abuja Journal of Economics & Allied Fields, Vol. 7(3), June, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Impact of Globalization on Economic Growth in Nigeria :1986 – 2016

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Abstract

Globalization has increased the integration and interdependence of economies among one another. It has come to be seen as a panacea for improved economic growth. This is made possible by an integrated global market marked by improved technology, investment and competition. The research work examined the impact of globalization on economic growth in Nigeria from 1986 to 2016, a period of 34 years. Data sourced from Central Bank of Nigeria (CBN) statistical Bulletin and National bureau of statistics (NBS). The total export (EXPT), import (IMPT) and degree of trade openness (DTOP) were proxy for globalization while the real domestic growth (RGDP) was used as proxy for economic growth. Using ARDL it was discovered that they have long run and short run relationship on economic growth. The study concluded that if Nigeria is to benefit from the global integration, it has to address a number of challenges and implement appropriate strategies and policies in order to maximize the benefits of globalization and minimize the risks of destabilization and marginalization, as well as promote rapid economic growth and achieve substantial poverty reduction. It was recommended that necessary policy instrument should be put in place to harness the human resources so as to maximize the benefits of openness and the economy also has to fight seriously against the monocultures export syndrome among others.

Keywords: Globalization, Export, Economic Growth, Import, ARDL
JEL Codes: F01

1. Introduction

Globalization has attracted a lot of researchers interest from various fields in the 21st century due to its multi-dimensional nature. Globalization is a multi-dimensional concept because of the fact that it covers a lot of areas; such as economic, political and social areas. Its multi-dimensional structure makes it really challenging for different definitions to come to an agreement on what the concept exactly means. Because of this, Globalization is defined by many people and institutes in different ways. Although these definitions share a lot in meaning, they show many differences in what they cover, so it can't be defined in an exact definition.Globalization involves economic integration; the transfer of policies across borders; the transmission of knowledge; cultural stability; the reproduction, relations, discourse of power; a global process, a concept; a revolution and an establishment of the global market free from sociopolitical control. It has helped to liberalize national economics by creating a global market place in which all the nations must participate directly. The existence of global markets leads to growing activities and international investments in different countries.

Because of its multi-dimensional structure, different opinions on globalization's definition come into question when the effects of globalization on economic growth is taken into account. While the globalization

is a component of creating opportunities for countries' economies and effecting their economic growth in a positive way thanks to these opportunities for some, it causes poverty and injustice income dispersal and it also effects the economic growth in negative ways for others.These different opinions about the effects of globalization uncovered the need to calculate the globalization index to detect the concrete effects of the concept. After this need arouse, firstly, by Dreher (2006) a globalization index is calculated and upgraded by Dreher (2008) himself again to make it to its final status. General globalization index, which is prepared by Dreher (2006) and Dreher (2008) includes three sub globalization index. These are:

- Economic Globalization Index: This index includes two sub-indexes which are actual flows and restrictions. Actual flows are calculated with GDP percentages of trade, foreign trade investments and stocks, portfolio investments, income payment to foreign nationals. Restrictions are calculated with hidden import barriers; mean tariff rate, current revenue percentages of taxes on international trade and capital account restrictions. Both actual flows' and restrictions' immensity in economic globalization index is %50.
- Social Globalization Index: This index includes three sub-indexes which are personal contact, information flows and cultural proximity. Personal contact is calculated with telephone traffic, GDP percentages of transfers, international tourism, the foreign population according to the total population and international letters per capita. Information flows is calculated with internet usage per 1000 people, television per 1000 people and GDP percentages of trades in newspapers. Cultural proximity is calculated with number of McDonald's restaurants per capita, number of Ikea per capita and GDP percentages of trades in books. By order of, the percentages of personal contact, information flows and cultural proximity are %33, %35 and %32.
- Political Globalization Index: This index is calculated with four sub-indexes which are number of embassies in country, membership in international organizations, participation in United Nations (UN) Security Council mission and international treaties. With the latest update by Dreher (2008), it is assessed that, by order of the portions of economic, social and political globalizations in general index of globalization of 2014 are %36, %38 and %26 (KOF Index of Globalization, 2014).

Many non-economists believe that in attempt to harness whatever benefit of globalization for the growth of the economy, the country exposes its economy to external aggressions and the adverse effects of globalization, while others emphasis caution and complete restructure and transformation of the economy in order to confront contemporary global challenges. Goldberg and Paverik (2006) note that one uncontroversial insight of trade theory is changes in a country's exposure to international trade, and world markets more generally, affect the distribution of resources within the country and can generate substantial distributional conflict. The authors note that while globalization was expected to help the less skilled who are presumed to be the locally relatively abundant factor in developing countries. There is overwhelming evidence that these are generally not better off, at least not relative to workers with high skill or education levels. Thus, globalization has a mechanism in which it affects inequality since there are other forces at work that could override the effects of globalization, such as "too stylized" to capture the reality in the developing world like Nigeria (Goldberg and Paverick, 2006).

However, it has also been argued that the consequence of globalization for inequality has improved and that such effect depends on many factors, several of which are country and time specific; a country's trade protection pattern prior to liberalization, the particular form of liberalization and the sector it affects, the flexibility of domestic

market or its ability to adjust to changes in economic environment, especially the degree of labour and capital mobility within the country and available skill based on technology in the country (Afzal, 2007 and Obadan, 2008).

On the whole, there exist two contracting paradigms about globalization; interdependence and imperialism. The interdependence paradigms is of liberal persuasion and sees it as a frame work of complex and growing interdependence among nations that will lead to economic growth (See Obadan, 2008). The imperialism paradigm is of radical persuasion and insists that globalization represents nothing but capitalism and neo-colonialization, a way of transformatory capitalist project, which impoverish the already underdeveloped countries (Ake, 1995; Omotola, 2010 and Aina, 1996). Obadan (2001) and Obadan (2008) observe that the phenomenon of globalization has numerous implications for both developed and developing countries, with powerful force of shaping world economics for good or for ill.

This study aims to analyze the impact of economic, social and political globalization on economic growth levels of Nigeria. The introduction part of the study investigates the relationship between globalization and economic growth and stresses its importance. The second part was reviews of conceptual and the existing empirical studies in the literature about globalization and economic growth. The third part of the study gives information about the data and methods used in the study. Fourth part of the study analyses data and interpreted results findings obtained in the research. Final part of the study gives concluding remarks and policy recommendation.

Globalization essentially, is a marriage among unequal partners (Ogboru,2010). It involves a relationship between developed and developing nations, in which the former is a stronger partner benefiting from this relation, at the expense of the latter being weaker. In the Western World globalization is viewed as a phenomenon which has a positive influence on developing countries. But most developing nations are still far from reaping the benefits of globalization. Therefore the question of whether globalization brings economic growth is debated among different economists. In this research focused on how globalization has impacted on domestic Economic growth in Nigeria and how its impact can be looked upon.

2. Literature Review and Theoretical Framework

Concept of Globalization

Many authors have defined globalization in various ways, depending on their professional background without having a universally accepted definition. According to UNDP (2001), globalization can be defined as a multidimensional process of unprecedented rapid and revolutionary growth in the extensiveness and intensity of interconnections on a purely global scale. This manifest itself in various forms such as the globalization of democracy; global ideological shift; global technological revolution particularly through information and communication technologies; globalization of culture and the environment, and above all, globalization of the economy.

Jike, (2003 in Ime, 2015), Believes that globalization came as a result of the constriction of time and space in the exchange of goods and services between countries. This narrows the transactional space and increases the intensity of commercial interactions between countries. According to him, Africa has become a subservient partner in this global exchange relationship. Globalization, like all the preceding ideologically conditioned concepts of the West connotes unequal relationship between the developed and developing world. It is an exchange relationship that has very painful consequences for every social spectrum of contemporary African society.

Yashin, (2000 in Igudia, 2003) defines globalization as an economic revolution of the new millennium in which the World is shrinking into a global village in part by advances in information and communication

technology (ICT). Capital globalization to him, has been responsible for the integration of national systems of production and finance whose enhanced mobility ensures that borrowers such as governments and private entities compete with each other for capital in global rather than national market. From the financial perspectives, Schmukler and Zoido – Lobaton (2001 in Igudia, 2003) define globalization as the integration of country's local financial system with those of the international financial markets and institutions. The integration, they observe, can only be achieved if governments would liberalize their domestic financial sector and control account. The same argument was put forward by Delbruck (1993) when he opines that globalization is a process of denationalization of clusters of economic, political and social activities to allow for free flow of capital, political ideologies and cultural rejuvenation across national boundaries. While this definition is clear and instructive, the matter arising is whether this free flow of capital, political ideology and culture have the tendency to move from the developing to the developed countries rather than the other way round.

According to Fischer (2000), globalization has tended to mean different things to different people and different things to the same people across time and space. It therefore means that very many definitions have been given to the word globalization. Caselli (2004) cited in Obadan (2008) sees globalization as a set of processes, which (a) increase the number and heighten the intensity of contacts, relations, exchanges and dependence and inter-dependence among various parts of the world; (b) transfer the importance of "space" and "time" with respect to those relations and relationships, as well as of their importance for their personal lives. However, Obadan (2008) is of the view that globalization is not just an economic phenomenon, which integrate world economics but also of culture, technology and governance. Nevertheless, economic globalization is of most importance. Thus, the author defines it as the process of change toward greater international economic integration through trade, financial flows, exchange of technology and information and movement of people, with its most dramatic feature being trade liberalization, and unrestricted flow of capital. Accordingly, openness and markets constitute the platforms of economic globalization while trade, finance, investment and entrepreneurs are the heart. But the major key of competitiveness among nations with respect to wealth creation and distribution is trade and development.

Concept of Economic Growth

Economic growth on the other hand, is related to a quantitative sustained increase in thecountries per capita output or income accompanied by expansion in its labour force, consumption, capital and volume of trade.It also involves not only more output derived from greater amount of inputs but also greater efficiency, that is, an increase in output per unit of input.

Todaro, (2004), defines economic growth in terms of three components. These are:

(a) Capital accumulation, including all new investments in land, physical equipment, and human resources through improvements in health, education and job skills. It results when some proportion of present income is saved and invested in order to augment future output and income. New factories, machinery, equipment and materials increase the physical capital stock of a nation, the total net real value of all physically productive capital goods and make it possible for expanded output levels to be achieved.

(b) Growth in population and hence eventual growth in the labour force. Population growth, and the associated eventual increase in the labour force, has traditionally been considered a positive factor in stimulating economic growth. A larger labour force means more productive workers, when the labour force is employed, and a large overall population increases the potential size of domestic markets.

(c) Technological progress. In its simplest form, technological progress results from new and improved ways of accomplishing

traditional tasks such as growing crops, making clothing, or building a house. Therefore, the source of economic growth can be traced to a variety of factors, but by and large, investments that improve the quality of existing physical and human resources, that increase the quantity of these same productive resources, and raise the productivity of all or specific resources through invention, innovation, and technological progress have been the primary factors in stimulating economic growth in any society.

From the above, it is clear that globalization and economic growth are related at least theoretically.

Review of Empirical Literature

Most of the empirical studies that examine the effects of globalization on economic growth are done after 2006. The main reason for that, most of the studies used the globalization index which is prepared by Dreher (2006) (Some of them used financial integration, liberalizing, trade and financial receptivity variants, representing globalization). When surveying the literature that analyses the globalization's effects on economic growth, studies that are done after 2006 are taken into account.

Dreher (2006) analyzed the relation between globalization and economic growth with panel data analysis technique by using the data of 123 countries from years 1970 to 2000. He found out that globalization affects the economic growth in a positive way. Afzal (2007) analyzed the globalization's effects on economic growth with an error-correction model by using the Pakistan's data from years 1960 to 2006. He used trade receptivity and financial integration variants, representing globalization. He arrived at a conclusion of the powerful connection between economic growth and trade gap and financial integration and he also found out that this connection leads to a development on economic growth in long terms.

Shaikh and Shah (2008) analyzed the globalization's effects on Pakistan's economy with the help of Computable General Equilibrium Model. Results of the analysis show that globalization affects Pakistan's macro economy performance in a positive way and leads to a fast economic growth. Chang and Lee (2010) analyzed the connection between general globalization index and its components, which are economic, social and political globalization indexes, and the economic growth of 23 OECD countries, whose data is collected between years 1970 and 2006, with the help of cointegration analysis. The result of the analysis show that there is a weak connection between variants and causality in short terms but in long terms there is a one way connection from general, economic and social globalization to economic growth.

Polasek and Sellner (2011) analyzed globalization's effects on the regional growth of 27 European Union (EU-27) countries, data of which is collected between the years 2001 and 2006, by using the Spatial Chow-Lin Procedure, which is formed by writers. Polasek and Sellner (2011) found out that globalization, thanks to the trade gap and direct foreign investment, affects many region's economic growth in a positive way. Rao (2011) analyzed the connection between globalization and economic growth for Singapore, Malaysia, Thailand, India and Philippines in the extent of Slow (1956) growth model. According to the results of the research; as the globalization grows in these countries, the growth percentages of stabilized status goes higher too.

Mutascu and Fleischer (2011) analyzed the connection between globalization and economic growth in Romania between the years 1972 and 2006 by using the Unrestricted Vector AutoRegressive Model (UVAR). Mutascu and Fleischer found out that in middle and long terms globalization would maximize the economic growth. Acikgoz and Mert (2011) analyzed the causality connection between economic, social and political globalization and economic growth in Turkey between the years 1970 and 2008 by using the Auto-Regressive Distributes Lag (ARDL), which is defined by Pesaran (2011). They found out that in Turkey; there isn't a causality connection from economic globalization to

economic growth but there is a causality connection from social and political globalization to the growth.

Leitão (2012) analyzed the connection between economic growth, globalization and trade in the U.S.A between the years 1995 and 2008 by using the panel data technique. He found out that globalization increases or provokes the economic growth. Ray (2012) analyzed if there is a causality connection between globalization and economic growth in India by using the Granger causality test. He found out that there is a mutual causality connection between globalization and economic growth. Umaru (2013) analyzed globalization's effects on Nigeria's economic performance between the years 1962 and 2009 by using the Annual Average Growth Rate (AAGR) technique. Umaru (2013) found out that globalization effects petrol, manufacturing industry and solid mineral sectors in negative ways, but it effects the agriculture, transportation and communication sectors in positive ways.

Meraj (2013) analyzed the connection between the trade gap and economic growth in Bangladesh between the years 1871 and 2005 by using Auto-Regressive Distributed Lag (ARDL) and Granger causality test. Meraj (2013) found out that globalization has positive effects on developing countries' (like Bangladesh's) trade and economic growth. Ying (2014) analyzed the connection between social and political globalization and economic growth in ASEAN countries between the years 1970 and 2008 by using Fully Modified Ordinary Least Squares (FMOLS) technique.

Ying (2014) found out that economic globalization effects economic growth in a positive way but social and political globalization effects it in negative ways.

Okpokpo, Ifelunini and Osuyali (2014) through their study interrogated globalization as a potent driver of economic growth in Nigeria using the non-oil (agricultural and manufacturing) export as reference point from 1970 – 2011. The study employed the ADF unit root test and OLS technique and found that globalization has no significant impact on non-oil export and that globalization has not been a potent driver of growth of the non-oil export in Nigeria. Shuaib, Ekeria and Ogedengbe (2015) examined the impact of globalization on the growth of the Nigerian economy over the period 1960 – 2010. The study employed the Johansen cointegration and error correction model and found that growth of external debt ratio was inversely related to economic growth in Nigeria.

Utuk (2015) analyzed the impact of globalization on economic growth in Nigeria in terms of trade and capital flows from 1970 – 2011. Using descriptive method of analysis, the study found that increased trade and capital flows engendered by globalization can enhance the country's growth performance.

3. Methodology

An ex-post facto design (quantitative research design) was used to carry out this study.The data used in this study come from secondary sources. The data generated are quantitative time series data on Manufacturing Sector Output, Total Capital Expenditure on Road Infrastructure, Total Capital Expenditure on Health and Total Capital Expenditure on Communication from the central bank of Nigeria publications and those of the Federal Bureau of Statistics for the period between 1990 and 2012. This period chosen for the study encompasses the phases when government capital expenditure is inconsistency.

Model Specification

Globalization has been identified in literature as a key to economic growth. Also, a vast empirical literature concludes that globalization contributes significantly to economic growth. Three variables namely: trade openness; imports and exports have been identified in both theoretical and empirical literature to be the major drivers of that contribution. Thus, the framework of this study is anchored on the model developed by Maduka, Madichie and Eze (2017) which real gross domestic growth (RGDP) was used as proxy for economic growth and degree of trade openness, import

and export was also used to proxy globalization.Thus economic growth becomes a function of many variables as follows:

RGDP = f (EXPT,IMPT DTOP) ……..3.1

In line with the above, our model is fully specified in its natural logarithm form as follows:

$$LRGDP = \beta0 + \beta1EXPT + \beta2IMPT + \beta3DTOP + \mu \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.2$$

Where LRGDP = natural log of real gross domestic product; LEXPT = natural log of export; LDTOP= natural log of degree trade openness (ratio of export plus import to GDP); LMPT = natural log of import; L = natural log notation; μ = stochastic error term; β0 = intercept term and β1 – β5 = partial regression coefficients.

A Priori Expectation: β1, β2, β3> 0

Following the stationarity tests, cointegration test was carried out using the Autoregressive Distributed Lag (ARDL) bound testing approach to cointegration as proposed by Pesaran Shin &Smith (2001). This procedure has numerous advantages over the alternative methods (ie Engle-Granger (1987), Johansen and Juselius (1990), and Philip and Hansen (1990)). Apart from its better small sample properties, other advantages of ARDL framework include: (i) it is based on estimating an unrestricted ECM which seems to take satisfactory lags that captures the data generating process in a general-to-specific framework of specification (Nwogwugwu, Maduka&Madichie 2015; Laurenceson& Chai, 2003); (ii) unlike other cointegration techniques (e.g., Johansen'sprocedure which require certain pre-testing for unit roots and that the underlying variables to be integrated of the same order), the ARDL model provides an alternative yet a simple test for examining a long-run relationship irrespective of whether the underlying variables are purely I(0) or I(1), or fractionally integrated; (iii) while the traditional cointegration methods may also suffer from the problems of endogeneity bias, the ARDL method can distinguish between dependent and explanatory variables in a single-equation set-up. Thus, estimates obtained from the ARDL method of cointegration analysis are unbiased and efficient, since they avoid the problems that may arise in the presence of endogeneity bias. In line with the model of this study, the ARDL bounds testing procedure consists of estimating the following generic form of an unrestricted error correction model:

$$\Delta LRGDPt = \alpha + \Sigma\beta i\Delta LRGDPt\text{-}i + \Sigma\delta j\Delta LEXPTt\text{-}j + \Sigma\lambda k\Delta LIMPTt\text{-}k + \Sigma\phi l\Delta LDTOPt\text{-}l + \delta1LRGDPt\text{-}1 + \delta2LEXPTt\text{-}1 + \delta3LIMPTt\text{-}1 + \delta4LDTOPt\text{-}1 + \mu \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.3$$

The above equation shows the unrestricted ECM version of ARDL model specification. The bounds test is mainly based on the joint F-statistic whose asymptotic distribution is nonstandard under the null hypothesis of no cointegration (Pesaran, Shin &Smith. 2001). The first step in the ARDL bounds test approach is to estimate equation (5) by OLS, which tests for the existence of a longrun relationship among the variables by conducting an F-test for the joint significance of the coefficient of the lagged level of the variables.

Furthermore, if a stable long run relationship is confirmed from the ARDL bound test, then we shall estimate the short run dynamic model through the following error correction model:

$$\Delta LRGDPt = \alpha + \Sigma\beta i\Delta LRGDPt\text{-}i + \Sigma\delta j\Delta LEXPTt\text{-}j + \Sigma\lambda k\Delta LIMPTt\text{-}k + \Sigma\phi l\Delta LDTOPt\text{-}l + \Psi ECM(-1) + \mu t \quad 3.4$$

Where ECMt-1 is the error correction term resulting from the verified long-run equilibrium relationship and Ψ is a parameter indicating the speed of adjustment to the equilibrium level after any particular shock. The sign of ECMt-1 must be negative and significant to ensure effective convergence of shortrun dynamics to the long-run equilibrium. The value of the coefficient, Ψ, which signifies the speed of convergence to the equilibrium process, usually ranges from -1 to 0. The value of -1 signifies perfect and

instantaneous convergence while 0 means no convergence after a shock in the process.

Also, as pointed out by Pesaran and Pesaran (1997), it is imperative to ascertain the constancy of the long-run multipliers by testing the above error-correction model for the stability of its parameters. The commonly used procedures for stability test are the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMQ), both of which have been introduced by Brown et al. (1975) and used extensively in many empirical researches.

4. Results and Discussion of Findings

Unit Root Results

The characteristic feature of trend in time series data often makes them susceptible to spurious correlation. In order to avoid this, the data are always detrended on confirmation of the presence of unit root. The test for the presence of unit root were carried out with the Augmented Dickey Fuller. However, it should be noted that stationarity test is not a customary practice when using ARDL bound test for cointegration analysis, but the need to carry out stationarity test in this study is to ensure that none of the variables is I(2) as ARDL becomes meaningless in the face of I(2) variables. For stationarity test, the study employed the Augmented Dickey-Fuller (ADF) .The ADF test consists of estimating the following equation:

$$\Delta\gamma_t = \beta_1 + \beta_2 t + \delta\gamma_{t-1} \sum_{i=1}^{m} \alpha i \Delta\gamma_{t-1} + \varepsilon t$$

……4.1

Where εt is a pure white noise error term; t is time trend; Yt is the variable of interest; β1, β2, δ and αi are parameters to be estimated; and Δ is the difference operator. In ADF approach, we test whether δ = 0. There were two versions of test under each category. These are; results at levels and results at first difference. This therefore ascertained the stationarity status of the data. Table 1 below presents the stationarity results.

Table 4.1 Summary of Unit Root Test Results

Variables	ADF Test Statistic(at first difference)	Order of Integration
RGDP	-6.893064 (-3.580623)*	*I(1)*
EXPT	-6.370761(-3.574244)*	*I(1)*
IMPT	-9.896397 (-2.986225)*	*I(1)*
DTOP	-5.323113(-2.976263)	*1(1)*

Source: Authors Computation, 2018 (Eview-10)

From table 4.1 RGDP,EXPT, IMPT and DTOP were stationary at levels under ADF test. All of the variables were not stationary at levels but after first differences they became stationary. This says that they were integrated of order one I(1).

The results of the unit root tests show that the chosen variables are allI(1) and that none is I(2). This implies that we can safely proceed to the ARDL bound test for cointegration analysis. The results of the ARDL bound tests are reported in Table 2 below.

Table 4.2 ARDL Bound Test for Cointegration

DependentVariable	F-Statistic	Critical Value Bounds Lower Bound (Upper Bound)	At 1% and 5% Lower Bound (Upper Bound)
ΔLRGDP	6.745624**	4.29(5.61)	3.23 (4.35)
ΔLEXPT	17.32711**	4.29(5.61)	3.23 (4.35)
ΔLIMPT	16.51365**	4.29(5.61)	3.23 (4.35)
ΔLDTOP	22.10614**	4.29(5.61)	3.23 (4.35)

Source: Authors Computation, 2018 (Eview-10)

Table 4.2 the null hypothesis of no cointegration is rejected for all variables when they are made the dependent variables. This is because the F-statistic for the joint significance of the lagged of level variables is greater than the upper bound critical value at both 5% and 1% levels of significance. This shows evidence of cointegration when each of the variables is made the dependent, meaning that they are all endogenous variables. Although all variables seem to be endogenous by the cointegration results, there is no fear of endogeneity bias in reporting the longrun coefficients with respect to the variable of interest which is the dependent variable (LRGDP), as ARDL has the advantage of distinguishing between endogenous and exogenous variables in a single-equation setting. Furthermore, it is a customary practice to report the longruncointegrating coefficients with respect to the variable of interest (LRGDP). This result is based on ARDL automatic normalization process. It shows the longrun impact of each of the explanatory variables on the dependent variable (LRGDP). This is reported in Table 4.3 below.

Table 4.3 ARDL Normalized Long run Coefficients (Dependent Variable: LRGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXPT	-0.019163	0.017816	-1.075582	0.3101
IMPT	0.181695	0.058259	3.118730	0.0123
DTOP	301218.6	84308.28	3.572823	0.0060
C	46415.80	54214.71	0.856148	0.4141
R-squared	0.999009	Mean dependent var		417379.7
Adjusted R-squared	0.997358	S.D. dependent var		191408.4
S.E. of regression	9839.377	Akaike info criterion		21.48452
Sum squared resid	8.71E+08	Schwarz criterion		22.26460
Log likelihood	-252.5565	Hannan-Quinn criter.		21.70088
F-statistic	604.8899	Durbin-Watson stat		2.592137
Prob(F-statistic)	0.000000			

Source: Authors Computation, 2018 (Eview-10)

Table 4: Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.937156	Prob. F(2,7)	0.1185
Obs*R-squared	1.40704	Prob. Chi-Square(2)	0.2033

Source: Authors Computation, 2018 (Eview-10)

Table 4.3 the longrun model is grossly robust, meaning that all the explanatory variables taken together have significant impact on the dependent variable (LRGDP). This is occasioned by the fact that the F-statistic (with its p-value) is statistically significant at 5% level. Thus, all the explanatory variables (export, import and degree of trade openness) jointly explain variations in the dependent variable (real gross domestic product). Also, there is goodness of fit as all the explanatory variables account for about 99.7 percent of total variations in the dependent variable (LRGDP) based on the value of R-squared. The Breusch-Godfrey Serial Correlation LM Test (a test for the presence of autocorrelation in the residuals) in table 4, confirms that the model is not plagued by autocorrelation of any order as the F-value with its associated p-value is statistically insignificant at any level. This implies that our model could be relied upon for drawing inferences. Furthermore, the results in Table 3 reveal that all the explanatory variables conform to a priori expectation as they all have positive impact on the dependent variable except export. However, with the exception of exports (LEXPT), all other variables are individually statistically significant at 5% level of significance. This implies that import(IMPT) and degree of

trade openness (DTOP) individually have significant positive impact on economic growth of Nigeria in thelongrun. Thus, any policy action taken on IMPT and DTOP will bring about significant positive change in economic growth of Nigeria over the longrun. Based on the foregoing discussion, it is evident that globalization has longrun significant positive impact on economic growth in Nigeria. Therefore, it is safe to say that Nigeria has actually benefited from globalization through enhanced trade, investment and financial flows. This finding is consistent with that of Adesoye, Ajike and Maku (2015) and Maduka, Madichie and Eze (2017). The result in Table 5 is the parsimonious ECM version of the ARDL model for the shortrun dynamics. The parsimonious model was arrived at through the automatic selection of SIC in ARDL model provided in EVIEWS 10, following a maximum lag length of 4. The result shows that RGDP (a proxy for economic growth), on its longrun growth path, effectively adjusts to short run shocks by about 51.03 percent in each period. Also, the stability tests reported in Figure 1 show that the estimates of the ARDL model is dynamically stable over the longrun as the fitted line falls within the 5% critical regions for both cumulative sum and cumulative sum of squares.

Table 4.4 Parsimonious ECM version of the ARDL Model

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1))	0.468035	0.155762	3.004802	0.0148
D(RGDP(-2))	0.911754	0.219069	4.161956	0.0024
D(RGDP(-3))	0.310232	0.205115	1.512481	0.1647
D(EXPT)	-0.004604	0.003765	-1.222901	0.2524
D(EXPT(-1))	0.024016	0.004071	5.899441	0.0002
D(IMPT)	0.041201	0.009229	4.464471	0.0016
D(IMPT(-1))	-0.066026	0.014613	-4.518391	0.0015
D(IMPT(-2))	-0.091012	0.015564	-5.847700	0.0002
D(IMPT(-3))	-0.090358	0.016312	-5.539233	0.0004
D(DTOP)	12855.03	15856.59	0.810706	0.4384
D(DTOP(-1))	-51741.62	17994.03	-2.875488	0.0183
CointEq(-1)*	-0.510274	0.076466	-6.673194	0.0001

Source: Authors Computation, 2018 (Eview-10)

5. Conclusion and Recommendation

Conclusion

This Study is of the view that increased trade and capital flows engendered by globalization can enhance the country's growth performance. However, if Nigeria is to benefit from the global integration, it has to address a number of challenges and implement appropriate strategies and policies in order to maximize the benefits of globalization and minimize the risks of destabilization and marginalization, as well as promote rapid economic growth and achieve substantial poverty reduction. Nigeria can achieve this hope by the promotion of manufactured exports, regional integration, human capital development, promotion of foreign direct investment flow, raising the level of domestic savings and investment, development of technology and infrastructures.

Recommendations

The analysis of the regression results provides us the following policy implications:

With the one-period lagged RGDP estimate, it shows that the country is working productively with regards to the rate of growth per annual. This calls for the vibrant

policy makers, researchers to keep the ball rolling.

DTOP is positively related to growth as clearly indicated by the findings the growth of the economy should be shaved for those that promote it.

Necessary policy instrument should be put in place to harness the human resources so as to maximize the benefits of openness. For one thing, globalization can be exploited to enhance RGDPgrowth rate in Nigeria, especially if the economy improves on human capital.

The fact is that much as export does not currently contributes to the RGDP growth rate of Nigerian economy, the evidence from the results still shows it is still having the potential to contributes to it, if she harnesses her natural resources well.There is a need to diversify the economy from a major primary product exports to manufactured exports to harness the benefits.

The economy also has to fight seriously against the monocultures export syndrome.

Taxation policy should be made in such a way that it doesn't discourage the private hands and helps to redistribute income properly and help investment. Tax holidays and incentives such as provision of infrastructure to argument the tax paid by investors should be ensured

Exchange rate is negative. Its deteriorating condition in Nigeria is obvious. No further devaluation of the currency should be tolerated till Nigeria is able to meet its industrial goals. In short, the authority should a more stable exchange rate policy to improve the value of the currency.

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