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ARTICLE **PAGES**

IMPACT OF INTEREST RATE FLUCTUATION ON ECONOMIC GROWTH IN NIGERIA

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Henry Ahmed Eggon (Ph.D)[3] & Jude Chuka Esiaka [4]

ABSTRACT

The study examined the impact of interest rate fluctuation on economic growth in Nigeria covering the period 1986–2016. Annual data were collected from secondary sources. The study estimated a multiple regression model using the ordinary least squares method. However, before model estimation was carried out, the Augmented Dickey-Fuller unit root test of stationarity of the time series variables and the Johansen-Juselius cointegration test were reported. Findings from the unit root test revealed that time series variables were integrated of different orders while the results of the cointegration test showed that a long-run relationship exist between the time series variables considered. Findings from the estimated regression model showed that monetary policy rate and maximum lending rate impacted negatively and significantly on economic growth, while savings deposit rate had positive but insignificant impact on economic growth during the period investigated. Based on these findings, it was recommended that the Central Bank of Nigeria (CBN) should pursue interest rate policies that encourage investment and economic activities in Nigeria. This could be achieved by a sustained reduction in the prime lending rate to investors so as to encourage them to borrow more money and increase their levels of investment. Lastly, the CBN should increase the channels of financial access to the private sector to stimulate investment opportunities in the real sector of the Nigerian economy.

Keywords: Interest Rate, Interest Rate Fluctuation, Economic Growth, Nigeria

JEL Classification: E43, O40

INTRODUCTION

The Nigerian economy has at different times witnessed enormous interest rate swings since the mid-1980s under the deregulated regime. Prior to the commencement of deregulated regime in 1986, the regulated regime with preferential interest rates was based on the premise that the market, if freely applied would exclude some priority sectors (Oke, 2003). Thus, interest rates were administered in order to promote increased level of investment in the various preferred sectors of the economy. Prominent among the preferred sectors were the agricultural, manufacturing and solid mineral sectors which were accorded priority and deposit money banks were directed to charge preferential interest rates on all

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loans to encourage the upsurge of small-scale industrialization which is a catalyst for economic growth (Eregha, 2010). Closely followed by the regulated interest rate regime was the interest rate reform, a policy that evolved under the financial sector liberalization. The policy was put in place to achieve efficiency in the financial sector, thus, engendering financial deepening. In Nigeria, financial sector reforms started with the deregulation of interest rate in August 1986 (Ikhide &Alawade, 2001). According to Mckinnon (1973) and Shaw (1973), financial repression occurs mostly when a country imposes ceiling on deposit and lending nominal interest rate at a low level relative to inflation. The resulting low or negative interest rates discourage savings mobilization and the channelling of mobilized savings through the financial system thus having a negative effect on the quantity and quality of investment and in turn on economic growth (Mckinnon& Shaw, 1973).

The Nigerian government has since 1986 been pursuing a market-determined interest rate which does not permit a direct state intervention in the general direction of the economy (Oke, 1993). The variability of short-term and long-term interest rates is a prominent feature of the economy. Interest rates change in response to a variety of economic events such as changes in government policy, crises in domestic and international financial markets and changes in the prospects for long-term economic growth and inflation. However, economic events such as these tend to be irregular. There is a more regular variability of interest rates associated with the business cycle, the expansions and contractions that the economy experiences over time. For instance, short-term interest rates rise in expansions and fall in recessions. Long-term interest rates do not appear to co-vary much with the level of economic output. The term cyclical volatility of interest rates refers to the variability of interest rates over periods that correspond to the length of the typical business cycle (Onoh, 2007; Osundina&Osundina, 2014).The variation of interest rates affects decisions about how to save and invest. Investors differ in their willingness to hold risky assets such as bonds and stocks. When the returns to holding stocks and bonds are highly volatile, investors who rely on these assets to provide their consumption face a relatively large chance of having low consumption at any given time. For example, before retirement, people receive a steady stream of income that helps to buffer the changes in wealth associated with changes in the returns on their investment portfolios. This steady return from working helps them maintain a relatively steady level of consumption. After retirement, people no longer have the steady stream of income from working hence a less volatile investment portfolios is called for. The lower volatility of investment returns allows retirees to maintain a relatively even level of consumption overtime (Chris &Anyingang, 2012).

The major function of interest rate in Nigeria and indeed other countries of the world is to ensure a rate of interest capable of inducing savings mobilization in the economy which in turn would make loanable funds available for banks to lend to the real sector of the economy. However, the use of interest rate as stimulant in savings

mobilization has not been very effective in Nigeria. The argument put forwards as the cause is that the Nigerian financial sector is weak with unstable and unattractive interest rates. For this reason, most people prefer to keep or hold their money outside the banking system, which many believe is shallow and prone to distress (Acha, 2011). It is therefore the aim of this study to find out the extent to which fluctuation in interest rate impacts on economic growth in Nigeria. The study is guided by the following research questions:

i. What is the impact of monetary policy rate on economic growth in Nigeria?
ii. To what extent has lending rate impacted on economic growth in Nigeria?
iii. Is there a relationship between deposit rate and economic growth in Nigeria?

In line with the above research questions, the hypotheses of the study are stated as follows:

H_{0_1} : There is no significant relationship between monetary policy rate and economic growth in Nigeria.

H_{0_2} : There is no significant relationship between lending rate and economic growth in Nigeria.

H_{0_3} : There is no significant relationship between deposit rateand economic growth in Nigeria.

The rest of this paper is organized as follows; section two is the literature review while section three presents the methodology. Section four consists of results and discussion, and section five comprises of conclusion and recommendations.

LITERATURE REVIEW

Conceptual Review

Interest Rate: This is defined as the return or yield on equity or opportunity cost of deferring current consumption into the future (Uchendu, 2003). This definition clearly shows that interest is a concept which can mean different things depending from the perspective it is viewed. Interest rate can therefore be seen as a nebulous concept, a position affirmed by the availability of different types of this rate; some of which are savings rate, discount rate, lending rate and treasury bill rate. According to Jhingan (2001), interest rate is the price which equates the supply of credit to the demand for credit. This definition implies that an interest rate is the price of credit, which like other price is determined by the forces of demand and supply; in this case, the demand and supply of loanable funds. In effect, like other prices, interest rates perform a rationing function by allocating limited supply of credit among the many competing demands. Sanusi (2002) opines that interest rates are the costs a borrower has to pay when obtaining a loan in any economy. This definition implies that, interest rates are the determinants of the cost of credits in an economy.

Interest rate can be classified as nominal or real. Nominal interest rate is the observed rate of interest incorporating monetary effects while real interest rate is arrived at by considering the implications of inflation on nominal interest rate (Uchendu, 2003). Interest rate is also classified as monetary policy rate, lending rate and deposit rate. In Nigeria, these are the three major interest rates that dictate the pace of economic activities. The monetary policy rate which is determined by the monetary authorities is the anchor or benchmark interest rate upon which other classes of interest rates revolve. The lending rate is the rate of interest at which financial institutions lend money to their customers. According to Afolabi (1999), the lending rate is expected to take into account the cost of the fund, maturity profile of the credit, estimated or perceived risks, central bank's regulation, bank margin, etc. The deposit rate is the interest that depositors receive for depositing their money with the commercial banks. Deposit rate ranges from 3 months deposit rate to over one year deposit rate. In this study, interest rate is conceptualized as the rental payment for the use of credit by borrowers and return for parting with liquidity by lenders.

Economic Growth: This is a positive change in the level of production of goods and services by a country over a certain period of time. Economic growth is usually brought about by technological innovation and positive external force. It also represents the increase in the amount of the goods and services produced by an economy over time (Jhingan, 2007). It can also be viewed as the percentage or proportionate increase in real income during a given period. Romer (2006) sees economic growth as an increase in the average rate of output produced per person usually measured on a per annum basis. Economic growth is conventionally measured as increase in nominal or real Gross Domestic Product (GDP). The real GDP takes into account the implication or effect of inflation on the GDP. In this study, economic growth is taken to mean the increase over time of the economy's capacity to produce those goods and services needed to improve the well being of the citizen in increasing numbers and diversity.

Theoretical Review

There is a large body of literature on interest rate theories. The important ones are the Classical's loanable funds theory of interest rate, the Keynesian theory of interest rate, and the general equilibrium IS-LM model. The Classical's loanable funds theory of interest rate states that the rate of interest is determined by the supply and demand of capital. The supply of capital is governed by time preference and the demand for capital is determined by the expected productivity of capital. The time and preference are dependent on savings (Blanchard, 2006). The demand for capital consists of the demand for productive and consumptive purposes. Capital is demanded by the investors because it is productive. The productivity of capital is subject to the law of variable proportions (additional units of capital are not productive as their earlier units). However, the supply of capital depends upon

savings rather upon the will to save and the power to save. Some people save irrespective of the rate of interest. They would continue to save even if the rates of interest are zero. There are others who save because the current rate of interest induces them to save and reduce when the rates are low. The higher the rate of interest, the larger the community savings and more will be the supply of funds (Blanchard, 2006). The Classical's loanable funds theory of interest rate is considered as an incomplete theory of interest rate since a single (or equilibrium) interest rate for the economy cannot be determined simultaneously within the loanable funds theory framework.

In the Keynesian theory, interest rate is determined in the money market and is basically driven by the supply and demand for money. Keynes situates interest rate determination within the speculative demand for money. He argues that if there were no interest receivable, people would hold their assets in the form of cash. To get people to hold their wealth in any other form, we must be prepared to pay them interest because there is a cost associated with the conversion of the securities into cash. Like the Classical's loanable funds theory of interest rate, the Keynesian theory of interest rate is also considered as an incomplete theory of interest rate since a single (or equilibrium) interest rate for the economy cannot be determined simultaneously within the Keynesian framework.

The general equilibrium IS-LM model also known as the modern theory of interest rate postulates that the equilibrium level of money income and the equilibrium level of the rate of interest will be determined by the combination of income and rate of interest at which the condition of equilibrium in both real and monetary sectors occurs given savings, investment, demand for money and supply of money. Thus, we have the following algebraic expressions:

$$I = S \qquad (1)$$

$$Md = Ms \qquad (2)$$

Where I represents investment, S represents savings, Md represents the demand for money and Ms represents the supply of money. The above equations imply that interest rate works through the real and monetary sectors to affect aggregate demand (i.e., aggregate output). The general equilibrium IS-LM model also known as the modern theory of interest rate is superior to both the Classical's loanable funds and the Keynesian theories of interest rate. This is because it successfully considered and integrated the effects of interest rates on savings, investment, the demand for money, and the supply of money. Also, it provides a framework for determining a single (or equilibrium) interest rate for the economy simultaneously. This study is thus anchored on the general equilibrium IS-LM model also known as the modern theory of interest rate. It is evident that neither the Classical's loanable funds theory of interest rate nor the Keynesian theory of interest rate is adequate and determined in explaining the link between interest rate and aggregate output. An adequate theory to

determine interest rates must take into consideration both the real and monetary factors that influence the interest rate. The general equilibrium IS-LM model shows that interest rate works through the real and monetary sectors to affect aggregate demand (i.e., aggregate output) and that a unique (or equilibrium) interest rate for the economy can be determined simultaneously in both real and monetary sectors.

Empirical Review

A number of studies have been conducted on the impact of interest rates on economic growth in both developed and developing countries. Hansen and Seshari (2013) examined the relationship between interest rates and productivity growth (proxy for economic growth) in the United States of America. Using correlation estimation techniques, their study revealed moderate correlation between interest rate and economic growth. Specifically, they found that in the long-run low interest rate will lead to high productivity growth, while high interest rates would lead to low productivity.

Adeniyi (2001) investigated the effect of interest rate on the economic growth in Nigeria. Multiple regression technique was used for the analysis of data. The student t-test was used to test the hypotheses formulated. Findings revealed that inflation rate and exchange rate have negative and insignificant effect on GDP. Also it was found that deposit interest rate has positive and significant relationship with GDP. Obute, Asor and Idoko (2012) examined the impact of interest rate on economic growth in Nigeria. The result revealed that the interest rate has an insignificant impact on growth. Chris and Anyingang (2012) examined the relationship between interest rate and economic growth in Nigeria. The study employed Augmented Dicker-Fuller (ADF) unit root test as well as Johansen co-integration test followed by Error Correlation Model (ECM) approach. The ADF unit root test results indicated that the variables are all stationary at first difference. The variables were integrated of order one which implies that the null hypothesis of non-stationary for all the variables of interest is rejected. The Johansen co-integration test result revealed the existence of two co-integrating relationship between the variables at 5% level of significance. The ECM results showed that interest rate is inversely related to economic growth, but the relationship is statistically insignificant.

Adeniran and Yusuf(2014) examined the impact of exchange rate on economic growth in Nigeria, using secondary time series data for the period 1986-2013. They used regression analysis techniques to regress exchange rate, interest rate and inflation rate (the independent variables) against GDP (proxy for economic growth). The study found, among others, that interest rate had an insignificant negative impact on economic growth. Ifeanyi and Chukwu (2014) examined the impact of interest rate deregulation on economic growth in Nigeria using secondary data spanning the period 1986 to 2010. The study employed OLS technique and found that low interest rate stimulates and increases growth in real domestic product. The present study is unique and different from previous studies as it examines the impact of three classes

of interest rate (i.e., monetary policy rate, lending rate and deposit interest rate) on economic growth in Nigeria.

METHODOLOGY

This study adopted ex-post facto research design which uses secondary data to establish the relationship between the dependent variable and independent variables. The study covers the period 1986 to 2016, which is a total of 31 years. The rationale for choosing this period is because 1986 marked the commencement of indirect monetary policy rule in Nigeria through the introduction of the Structural Adjustment Programme (SAP) for the management of the Nigerian economy.

The data for the study were sourced from the Central Bank of Nigeria (CBN) statistical bulletin. Given that the data collected are time series data, they were tested for stationarity using the Augmented Dickey-Fuller (ADF) test method. The essence is to check whether the time series variables have unit root in order to avoid obtaining spurious regression results. The Johansen and Juselius cointegration test was used to ascertain if long-run (meaningful) relationship exists between the dependent variable and sets of independent variables in the specified regression model of study. The ordinary least squares (OLS) method is used to estimate the specified regression model. The regression model for the study is specified as follows:

$$GDP_t = \alpha_0 + \alpha_1 MPR_t + \alpha_2 DPR_t + \alpha_3 LNR_t + \varepsilon_t \quad (3)$$

Where:
GDP= Gross Domestic Product (Proxy for Economic Growth)
MPR= Monetary Policy Rate
DPR= Deposit Rate
LNR= Lending Rate
α_0= Constant Term
$\alpha_1 \alpha_2 \alpha_3$ = Partial Slope Coefficients
ε = Error Term
t = Time

In line with economic theory, it is expected that the relationship between economic growth (proxied by GDP) and monetary policy rate (MPR), deposit rate (DPR) and lending rate (LNR) be negative.
These a prior expectations are mathematically expressed as:

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

If $\beta_1, \beta_2 < 0$ (i.e., if negative), it implies that a rise in MPR, DPR and LNR will lead to reduction in the GDP as less credit or fund will be available for investment and productive purposes.

Table 1: Stationarity Test Results

RESULTS AND DISCUSSION

This section presents the empirical results of the study consisting of stationarity test results and regression results.

Variables	ADF Statistics			Remark
	Level	First Difference	Second Difference	
MPR	-3.085329**	-	-	*I*(0)
DPR	-1.699608	-5.978364**	-	*I*(1)
LNR	-3.011687**	-	-	*I*(0)

Note: Superscript ** denotes rejection of the null hypothesis of existence of unit root at 5% significance levels respectively.
Source: Computed using E-Views 9 Software.

From the ADF unit root test results in table 1, it is observed that MPR and LNRwere respectively stationary at level while DPR was non-stationary at level but became stationary after first differencing. This means that DPR is integrated of order one.

The results of the Johansen and Juselius trace and maximum Eigenvalue statistics of the unrestricted cointegration rank test are presented in tables 2 and 3, respectively.

Table 2: Cointegration Trace Statistic for all the Variables

Hypothesized No. of Cointegrated Equation(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	Probability Value**
None *	0.927565	208.0853	95.75366	0.0000
At most 1 *	0.844235	129.3334	69.81889	0.0000
At most 2 *	0.627626	73.55120	47.85613	0.0000
At most 3 *	0.572082	43.91547	29.79707	0.0007
At most 4 *	0.433029	18.45074	15.49471	0.0174
At most 5	0.046464	1.427338	3.841466	0.2322

Notes: Superscript * denotes rejection of the null hypothesis of no cointegration at the 5% level of significance, while ** indicates MacKinnon-Haug-Michelis (1999) p-values.

Trace statistic test indicates 5 cointegrating equation(s) at 5% level of significance.

Table 3: Cointegration Maximum Eigenvalue Statistic for all the Variables

Hypothesized No. of Cointegrated Equation(s)	Eigenvalue	Maximum Eigen Statistic	5 Percent Critical Value	Probability Value**
None *	0.927565	78.75195	40.07757	0.0000
At most 1 *	0.844235	55.78217	33.87687	0.0000
At most 2 *	0.627626	29.63574	27.58434	0.0269
At most 3 *	0.572082	25.46472	21.13162	0.0115
At most 4 *	0.433029	17.02341	14.26460	0.0179
At most 5	0.046464	1.427338	3.841466	0.2322

Notes: Superscript * denotes rejection of the null hypothesis of no cointegration at the 5% level of significance, while ** indicates MacKinnon-Haug-Michelis (1999) p-values.

Maximum Eigenvalue test indicates 5 cointegrating equation(s) at 5% level of significance.

From tables 2 and 3, we observe that both the trace and maximum Eigenvalue test statistics indicate 5 cointegrating equations at the 5% level of significance. Based on this evidence, we can safely reject the null hypothesis of no cointegrating vectors and conveniently accept the alternative hypothesis of the presence of cointegrating vectors among all the variables in the specified regression model. This implies that long-run relationship exists between the variables in the specified model of study.

Table 4: Regression Results

Dependent Variable: **GDP**

Variable	Coefficient	Std Error	t-Statistic	Probability
C	2016.455	12892.09	0.156410	0.8767
MPR	8683.032	1775.894	4.889386	0.0000
DPR	-837.3859	902.2090	-0.928151	0.3601
LNR	6250.515	1242.943	5.028804	0.0000
R^2= 0.87				F-Stat=9.686868
Adj. R^2= 0.82				Prob=0.00099
DW= 1.93				

Source: Computed using E-Views 9 Software.

From the regression results, it can be observed that the coefficients of the explanatory variables (MPR and LNR) were positive; indicating that a unit change in monetary policy rate (MPR) and lending rate (LNR), on average, increased the value of GDP by 8683.032 units and 6250.515 units respectively. On the other hand, the negative coefficient of DPR implies that a unit change in deposit rate (DPR), on average, reduced the value of GDP by 837.3859 units. The low probability values of MPR and LNR (i.e., $p<0.05$) imply that monetary policy rate (MPR) and lending rate (LNR) had significant impact on GDP, while the high probability value of SDR (i.e., $p>0.05$) suggests that deposit rate (DPR) had insignificant impact on GDP during the period investigated.

The value of the F-statistic (i.e., F=9.686868) with probability value of 0.00099 indicates that the parameters of the estimated model are jointly statistically significant at 5% level of significance. This implies that the estimated model is good for prediction, forecasting and policy purposes.

The coefficient of determination (R^2) shows that about 87% of the variation in GDP was explained by the changes in the explanatory variables in the model. This implies that the estimated model has a good fit. Also, the adjusted coefficient of determination ($\bar{R}^2$) shows that about 82% of the variation in GDP was explained by the changes in the explanatory variables of the estimated model after taking into account loss of degree of freedom. It also implies that the estimated model has a good fit. The value of the Durbin-Watson (d) statistic (i.e., d=1.93) suggests the absence of first-order auto correlation. This implies that the estimated model is valid and reliable.

CONCLUSION AND RECOMMENDATIONS

This study has examined the impact of interest rate fluctuation on economic growth in Nigeria and found that it is a key determinant of economic growth in the country. Based on this finding, it is recommended that the CBN should pursue interest rate policies that induce investors to borrow in order to boost investment and economic activities in Nigeria. This can be done by reducing the prime (maximum) lending rate so as to encourage investors to borrow more money from commercial banks and increase investment level. The CBN should also increase channels of financial access to the private sector to stimulate investment opportunities in the real sector of the economy. These channels include fostering of diversified inclusive financial institutions consisting of many types of financial institutions beyond commercial banks such as postal banks, microfinance institutions, and credit cooperatives that operate in different geographic regions to serve distinct customer segments. In this context, a legal and regulatory framework that allows for entry of diverse institutions is critical to reaching customers that are not adequately served by commercial banks. Another channel is the expansion of agent-based banking and other cost-effective

delivery channels by allowing for the use of low-cost delivery channels such as local retail shops serving as agents for financial service providers and "life" branches. Such approaches can cost-effectively expand the physical presence of financial service providers while providing meaningful benefits to those reached.

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TOURISM AND EMPLOYMENT GENERATION IN NIGERIA

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&
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ABSTRACT
This paper examines the relationship between tourism and employment generation in Nigeria using annual time series data for the period of 1989 through 2017, employing an autoregressive distributed lag model. The empirical results from this study confirm a significant and unidirectional causality running from tourism to total employment in Nigeria. Also, this study reveals that tourism has a positive and significant impact on employment generation. An important implication of these findings is that tourism sector drives job creation in Nigeria and also the level of development stimulates direct contributions of the tourism sector to gross domestic product. This suggests that there is the need for appropriate policy measure like improvement of the budgetary allocations to the sub-sector in order to consolidate, deepen and sustain the progress recorded in the tourism sub-sector. Furthermore, as a matter of urgency, the government should collaborate with non-governmental bodies for social dialogues that will boost job creation of the sector.
Keyword: Autoregressive Distributed Lag (ARDL) Model, Employment, Nigeria, Tourism
JEL: L83 E24 C22

INTRODUCTION

Tourism is a rapidly growing sector accounting for a growing share of economic activity in most countries. This upward trend is likely to continue into the future (World Tourism Organization and International Labour Organization, 2014). The United Nation World Tourism Organization further emphasized that international tourism continues to exceed expectations, supporting economic growth in both advanced and emerging economies as well as bringing much needed support to job creation and the balance of payments of many destinations.

Since the 1990s, tourism has increasingly contributed to Africa's growth, employment and trade. In light of the aforementioned, international tourist arrivals to Africa grew by an average of 6 per cent per year and tourism export revenues, 9 per cent per year. Furthermore, tourism generated more than 21 million jobs on average in 2011–2014, which translates into 7.1 per cent of all jobs in Africa. This means that over the period 2011–2014, the tourism industry was supporting 1 out of every 14 jobs (United Nations Conference on Trade and Development, 2017). The future for tourism in Nigeria is dependent on the opportunities and challenges being exploited and addressed. The diversity of cultural attractions, the friendly disposition of the

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people, a revamped National Tourism Organization, Human Resources Development and new Convention Bureau provide key opportunities (World Tourism Organization, 2006). In Nigeria, tourism could increase revenues, create jobs and wealth, and boost foreign reserves. However, the sector is not without some short comings such as low level of global awareness of the country's tourist attractions, under-developed infrastructure, security challenges, lack of attractive options for vacationing at home, and insufficient investment (Nigeria's Ministry of Budget & National Planning, 2017).

Many researchers in Nigeria have assessed the impact of tourism on economic growth (see Ezenagu, 2013, Ojo, 2014, Eneji et al 2016 & Yusuf, 2016). However, to the best of our knowledge, there are no empirical studies that have assessed the short-run and long-run impacts of total and direct contributions of the tourism sub-sector to employment generation taking into account other control variables like the service shares in Gross Domestic Product (GDP) and income per capita in Nigeria. This study investigates the relationship between tourism and employment generation in Nigeria and addresses one pertinent question: what is the relationship between Nigeria's tourism and employment generation? Following section one, section two provides the literature review which includes conceptual issues, the theoretical framework, tourism in Nigeria and empirical review. Section three discusses the methodology while section four provides the discussion of the results. Section five is conclusion and recommendations.

LITERATURE REVIEW

Conceptual Issues

According to World Travel and Tourism Council (WTTC, 2018), travel and tourism are simply activities of travelers on trips outside their usual domain for a period of less than one year. The direct contribution of tourism to employment is seen as the number of direct jobs within the travel and tourism sub-sectors, and this should be consistent with the total employment of the country while total contribution of tourism to employment is described as the number of jobs generated directly in the travel and tourism sector plus the indirect and induced contributions. More so, the direct and total contributions of the tourism sector to gross domestic product are viewed as the gross domestic product generated by industries that deals directly with tourists as well as the gross domestic product generated directly by the Travel and Tourism sector plus its indirect and direct impacts.

According to the World Travel and Tourism Council (2017), the direct contribution of travel and tourism to gross domestic product is calculated to be consistent with the output, as expressed in national accounting, of tourism-characteristic sectors such as hotels, airlines, airports, travel agents and leisure as well as recreation services that deal directly with tourists. This further indicated the significant contribution of the tourism sub-sector to national growth and development.

Theoretical Framework

The neoclassical growth model has been frequently modified by many authors (for example Pissarides, 1990) to augment for the tourism production function.This has often formed the basis for most tourism-growth nexus in empirical analysis, and this will form the basis for our study but with significant modification – inclusion of tourism specific factors and other control variables. However, the development of the tourism economy had contributed significantly to total employment and indirectly to tourism employment in most developing and developed economies (Holloway, 1994; Akkemik, 2012).

Based on the contributory effects of tourism to employment generation, Reime and Hawkins (1979) described tourism development stages based on industry growth, employment volume, impact factors and psychological effect. In addition, Nwanna (1996) studied tourism employment in the context of macroeconomic environment. Therefore, there is unanimity among authors that tourism infrastructures and employment contribute considerably to total employment in most economies, Nigeria inclusive. This study is hinged on the theoretical belief that the growth of tourism economy can enhance tourism technology, which leads to more career opportunities. The created jobs can help to reduce the effect of 'creative destruction.' However, realization of increasing tourism demand in this regards is largely determined by the inter-dependability between tourism and its related industries (Xiang, Hailin & Emilil, 2013). We extended the traditional models of the tourism-employment nexus by introducing the service shares of national income and income per capita as intervening variables.

Comparative Analysis of Travel and Tourism's Contribution to Gross Domestic Product and Employment in Nigeria and other African Countries

This section examines the total and relative contribution of tourism to gross domestic product and employment in Nigeria vis-à-vis other African countries. In this analysis, direct contribution to GDP simply implies the GDP generated by industries that deal directly with tourists. Also, the direct contribution to employment implies the number of direct jobs within the travel and tourism; and these numbers are consistent with total employment. However, total contribution to employment implies the number of jobs generated directly in the travel and tourism sector plus indirect and induced contributions.

The direct absolute contribution of travel and tourism to GDP in Nigeria was 7.4bn in 2016, a position that falls behind Egypt, South Africa and Morocco. The contribution of Nigeria's tourism sub-sector to GDP is far above the average of sub-Saharan Africa (SSA) region. However, the contribution of Nigeria to Tourism - to- GDP of about $7.1 is far below the world average of $19.1bn. This implies that the government of Nigeria is expected to improve on the policies geared towards

enhancing the activities of the tourism sub-sector, and more specifically, the budgetary allocation to the sector should be increased.

Table 1: Travels and Tourism Contribution to Gross Domestic Product (GDP) 2016

Country/ Region /World Average	Direct Absolute Contribution of Travel & Tourism to Gross Domestic Product		Total Absolute Contribution of Travels & Tourism to Gross Domestic Product		Relative Direct Contribution of Travels & Tourism to Gross Domestic Product		Relative Total Contribution of Travels & Tourism to Gross Domestic Product	
	Ranking	*Contribution 2016% share (US$bn)*	*Ranking*	*Contribution 2016% share (US$bn)*	*Ranking*	*Contribution 2016% share (US$bn)*	*Ranking*	*Contribution 2016% share (US$bn)*
Egypt	39	8.7	46	19.4	107	3.2	129	7.2
Tunisia	67	2.7	76	5.7	41	6.6	58	13.7
Morocco	42	8.3	48	19.0	33	8.1	41	18.5
South Africa	40	8.7	35	27.3	116	3.0	99	9.3
Namibia	142	0.3	125	1.6	124	2.8	51	14.9
Tanzania	78	2.1	75	5.9	62	4.7	58	13.7
Nigeria	**46**	**7.4**	**44**	**20.3**	**168**	**1.7**	**171**	**4.7**
Gambia	170	0.08	172	0.2	27	9.0	32	21.9
Senegal	121	0.7	126	1.6	59	4.8	74	11.0
SSA Average		**1.0**		**2.6**		**2.6**		**7.1**
World Average		**19.1**		**57.3**		**3.1**		**10.2**

Source: World Travels and Tourism Council, 2017

The absolute contribution of tourism to GDP in Nigeria as at 2016 was $20.3bn following that of South Africa of about $27.3bn. However, the total absolute contribution to GDP of Nigeria is still far below the expected world average of about $57.3bn. Hence, much attention is needed in the tourism economy and the impact of spending by the employees within the tourism economy should be given required policy attention. Concerning the relative direct and total contributions of travel and tourism contributions to GDP; in terms of the relative direct and total contributions, Nigeria lags behind other Africa countries (like Gambia, Morocco, Tunisia, Senegal, Tanzania, Kenya, Egypt, South Africa and Namibia). Specifically, the relative direct contribution to GDP in Nigeria was 1.7 percent share of GDP which is below the 2.6 percent share of SSA and 3.1 percent share of the world.

In terms of absolute direct contribution of travel and tourism to employment, Nigeria was ranked 24th below Morocco, Egypt and South Africa. In 2016, Nigeria generated about 649, 000 jobs which was above the SSA average of 146,900, but this was below the world average of 843,900. In related development, Nigeria was ranked 22nd in terms of absolute total contribution of travel and tourism to employment behind Morocco, and a little below the world average of about 2152.9 million as revealed in Table 2.

Table 2 : Travels and Tourism Employment 2016

Country/Region /World Average	Direct Absolute Contribution of Travels & Tourism to Employment		Total Absolute Contribution of Travels & Tourism to Employment		Relative Direct Contribution of Travels & Tourism to Employment		Relative Total Contribution of Travels & Tourism to Employment	
	Ranking	*2016 ('000 jobs)*	*Ranking*	*2016 ('000 jobs)*	*Ranking*	*2016 (% share)*	*Ranking*	*2016 (% share)*
Egypt	22	773.0	23	2152.9	114	2.9	130	6.6
Tunisia	61	206.4	75	429.8	48	6.0	64	12.6
Morocco	20	819.0	21	1902.4	36	7.1	46	16.6
South Africa	23	716.3	28	1533.2	69	4.6	85	9.8
Namibia	141	24.0	123	116.0	108	3.1	51	14.9
Tanzania	34	470.0	31	1388.8	83	3.9	72	11.6
Nigeria	**24**	**649.3**	**22**	**1792.8**	**167**	**1.6**	**166**	**4.5**
Gambia	114	54.6	116	138.8	34	7.4	38	18.8
Senegal	54	246.4	59	429.9	77	4.1	89	9.6
SSA Average		**146.9**		**375.5**		**2.4**		**3.0**
World Average		**843.9**		**2152.9**		**3.6**		**9.6**

Source: World Travels and Tourism Council, 2017

The relative direct contribution of Nigeria's travel and tourism sub-sector contribution to employment in 2016 was 1.6 percent share which was far below that of the SSA and the world average of 2.4 and 3.6 percent shares respectively. Also, Nigeria was ranked 166th in terms of her tourism's sub-sector relative total contribution to employment of 4.5 percent share far above below and that of the SSA and world averages of 3.0 and 9.6 percent shares respectively.

Table 3 shows the economic contribution of Nigeria's travel and tourism sub-sectors in terms of real 2017 prices. There was significant improvement of the country's visitors' export from 2015 to 2016 and higher projected values for 2018. However, there were declines of the visitors' export from 2012 to 2015. In terms of direct contribution of employment impact, there were significant improvements from 2012 to 2016. In terms of total contribution to travel and tourism to employment, Nigeria recorded a much significant improvement from 2018.

Table 3: Economic Contribution of Travel and Tourism real 2017 prices

Nigeria (NGN, real 2017 prices)	2012	2013	2014	2015	2016	2017	2018E	2018F
Visitor Export	148.1	134.8	126.6	117.0	324.8	278.0	282.1	428.5
Domestic expenditure(include government individual spending)	2830.2	3096.5	3217.1	3195.0	3481.7	3527.7	3628.6	5469.5
Internal tourism consumption	2978.4	3231.3	3343.7	3311.9	3806.5	3805.8	3910.7	5898.1
purchases by tourism provider including imported goods(supply chain)	-1213.6	-1271.1	-1318.0	-1315.5	-1508.7	-15707.7	-1545.8	-2292.4
Direct contribution of travel and tourism to GDP	1764.8	1960.2	2025.7	1996.4	2297.7	2298.0	2364.9	3605.7
Other Final Impacts (Indirect And Induced) Domestic supply chain	1054.5	1171.3	1210.4	1192.9	1373.0	1373.1	1413.1	2154.5
Capital investment	928.3	1107.8	1165.5	1265.7	1280.0	1248.9	1232.7	2204.8
Government collective spending	22.1	20.5	19.8	18.8	16.9	16.9	17.4	32.1
Imported goods from indirect spending	-499.3	-260.2	-144.9	-178.2	-141.6	-137.2	-139.3	-194.5
Induced	923.8	1154.3	1225.7	1237.5	1426.8	1406.1	1418.8	2291.9
Total contribution of travel and tourism to GDP	4194.2	5153.8	5502.3	5533.0	6252.7	6205.8	6307.5	10094.5
Employment impacts('000) Direct contribution of travel and tourism to employment	962.1	1047.6	1050.0	1034.1	1215.2	1218.8	1275.8	1794.3
Total contribution of travel and tourism to employment	2306.5	2776.4	2872.8	2886.2	33177	3316.1	3427.3	5033.7
Other indicators of expenditure on outbound travel	1554	1460.1	1444.2	1720.1	1201.3	1352.2	1435.9	2654.8

Source: World Travel and Tourism Council, 2018

Table 4 assesses the direct and total impacts of Nigeria's travel and tourism sub-sectors to employment. In terms of direct contribution, Nigeria witnessed a negative growth rates in 2012 and 2015. However, there were marked improvements of about 8.9 and 17.5 percent growth rates in 2013 and 2016 respectively. Again, in terms of total contribution of travel and tourism to employment, Nigeria witnessed a significant growth in 2013 and 2016.

Table4: Tourism and Travel and Employment in Nigeria

Nigeria Growth (%)	2012	2013	2014	2015	2016	2017	2018E	2018F
Employment Impacts('000) (Direct Contribution of Travel and Tourism to employment)	-6.1	8.9	0.2	-1.5	17.5	0.3	4.7	3.5
Total Contribution of Travel and Tourism to employment	1.6	20.4	3.5	0.5	15.0	0.0	3.4	3.9

Source: WTTC, 2018

Empirical Review

This section reviews related literature on tourism in relation to employment. The results obtained by previous studies have mixed results based on the data set used and the methodology. Xiang, et al, (2013) analyzed tourism employment model with 17-year time series data in China. The model reveals that tourism employment does not always grow in accordance with the tourism economy. The results indicate that tourism employment in China is driven mainly by the development of tourism-related industries. Ezenagu (2013) examined the effect of tourism on wealth creation in Awka Metropolis of Nigeria, and noted that tourism is essentially the industry that specializes in providing tour related services to tourists. Furthermore, the author emphasized that annually, millions of people travel to various parts of the globe experiencing and enjoying nature's splendor, cultural glamour and man's creativity. This is an indication that tourism is a catalyst to employment generation and capable of promoting the Metropolis's level of development.

Ojo (2014) employed simple random sampling techniques to examine the management of tourism in socio-economic development in Nigerian local government using Idanre local government as a case study. The study revealed that there is a significant relationship between tourism and the level of revenue derived from tourism and socio-economic development in Nigeria. Ojo, Busayo and Yusof (2014) examined travel and tourism business confidence indices in Nigeria relying on the 2013 travel and tourism competitiveness index report of 140 countries conducted by the world economic forum. They noted that the current state of the Nigerian travel and tourism business environment and infrastructure did not encourage significant tourism investment. Dayananda and Leelavathi (2016) opined that tourism stimulates employment and investment, alters structure of an economy, contributes to foreign exchange earnings and maintains favorable balance of payment. They further explained that tourism helps in the significant growth of economic, social, cultural, educational and political sectors. They opined that the sub-sector creates direct, indirect and induced employment and produces a vast spectrum of employment from highly qualified and trained managers of star hotels to room boys, sales girls and artisans.

Eneji, Odey and Bullus (2016) used descriptive statistics to investigate whether tourism subsector has any significant impact on the Nigerian economy. The authors revealed from their findings that tourism has significant positive impact on the economy, but the subsector is still under-invested and under-utilized. They showed that tourism has direct impact on employment, income, infrastructure and standard of living. Yusuff (2016) analyzed the trend of tourism sector's total contribution to Gross Domestic Product and employment generation in Nigeria and noted that tourism has proven to be a surprisingly strong and resilient economic activity that is a fundamental contributor to economic growth of nations by generating billions of dollars in exports and creating millions of jobs. The study revealed that poor funding;

poor infrastructural facilities, insecurity and unfriendly business environment are among several impediments to the growth of the tourism sub- sector in Nigeria.

METHODOLOGY AND MODEL SPECIFICATION

This paper employs the unrestricted error correction autoregressive distributed lag estimation techniques. On a general note, the methodology allows for flexible dynamic relationships between the overall tourism and employment generation. Hence, the baseline empirical model specified for the study is:

$$\Delta \ln tempy_t = \alpha\eta_{t-1} + \sum_{j=1}^{k}\varphi_i \Delta \ln tempy_{t-1} + \sum_{j=0}^{p}\delta_i \Delta \ln tcgdp_{t-1} + \sum_{j=0}^{p}\lambda_i \Delta \ln dcgdp_{t-1} + \sum_{j=0}^{p}\omega_i \Delta \ln gdpsv_{t-1} + \sum_{j=0}^{p}\vartheta_i \Delta \ln gdppc_{t-1} + \sum_{j=0}^{p}\varpi_i \Delta \ln tcsem_{t-1} + \mu + \varepsilon_t \quad (1)$$

A priori expectations for the model are: $\varphi, \delta, \lambda, \omega, \vartheta, \varpi > 0$

Where: tempy is total employment; real GDP represented by gdppc used as a proxy for level of economic development; the share of service sector in GDP represented by gdpsv; total contribution of tourism sector to GDP represented by tcgdp; and direct contribution of tourism sector to GDP represented by dcgdp while tcsem represents tourism employment contributions to total employment. Also, α is the error correction coefficient, η_{t-1} is the error correction term, denotes the error term, p and k represents the lag structures. In this paper, the chosen lag and the choice of the Akaike Information Criterion (AIC) was automatic, using E- views 9.0 software. The data set used was sourced from the World Tourism and Travel Council 2017 and World Development Indicators 2017. The scope of the study ranges from 1989 to 2017 due largely to data availability.

Unit Root Test

This study used the Augmented Dickey – Fuller (ADF) Unit root test to examine the stationarity status of our individual variables, specified as:

$$\Delta X_t = \beta_o + \vartheta X_{t-1} + \sum_{i=1}^{m}\lambda_i \Delta X_{t-1} + \varepsilon_t \quad (2a)$$

$$\Delta X_t = \beta_o + \beta_1 t + \vartheta X_{t-1} + \sum_{i=1}^{m}\lambda_i \Delta X_{t-1} + \varepsilon_t \quad (2b)$$

In the two equations, X_t = [tempy, tcgdp, dcgdp gdpsv, gdppc, tcsem], t = time trend, $\Delta X_{t-1} = X_{t-1} - X_{t-2}$, ε_t is the independently and identically distributed disturbance with mean 0 and variance σ^2 and α, β, ϑ and λ are the coefficients. We adopted the ADF approach to examine the null hypothesis (Ho) that $\vartheta = 1$ in the ADF equation above; against the one – sided

alternative (H_1) $\vartheta < 1$. Thus the hypotheses of interest are H_0: series contains a unit root versus H_1: series is stationary.

Co integration Test

Since the variables are not integrated of the same order, the residual-based co integration approach specified as below was employed to establish the existence of a long-run equilibrium among the variables employed for our study.

$$\Delta \hat{e} = \alpha_i \hat{e}_{t-1} + \sum_{i=1}^{n} \delta \Delta \hat{e}_{t-1} + v_t \qquad (3)$$

Where $\hat{e}_t$ is a residual, however we do not include a constant nor a time trend.

Autoregressive Distributed Lag Framework

The ARDL framework employed for this study is specified as:

$$\Delta \ln y_t = \alpha \eta_{t-1} + \sum_{i=1}^{k} \varphi_t \Delta \ln y_{t-1} + \sum_{j=0}^{p} \delta_{it} \Delta \ln X_{t-1} + \mu_t + \varepsilon_t \qquad (4)$$

Where: Y=dependent variable, and X= vector of independent variables φ_{it} (coefficient of lagged dependent variable) and δ_{it} (coefficient of the regressor). t is time trend, α is the error correction coefficient, η_{it-1} is the error correction term, μ represents time effects, denotes the error term, p and k represent the lag structures.

PRESENTATION AND DISCUSSION OF EMPIRICAL RESULTS

Descriptive Statistics

The descriptive statistics (Table 5) revealed that the average total contribution of tourism to gross domestic product is about 4 percent, direct contribution to GDP is about 2%, and the average contribution of the entire service sector to GDP in Nigeria between the period of 1989 and 2017 was about 111341.6. However, the GDP per capita of the country in the said period averaged 1765.927, and total employment on average was about 43240.640 million. In view of this, the total and direct contribution of the tourism sub-sector to GDP is relatively low, and this implies that there is need for concern by the government to improving the sub-sector. The normality test, conducted using the Jarque Bera statistic and the respective probability values reveal that all the variables are normally distributed, hence, the acceptance of the normality assumption for each of the variables given the non-significance of the JB statistics. This indicates homogeneity in the data set employed for this study, and the absence of lopsided dispersion of the variables of interest in this study.

Table 5: Descriptive Statistics

Statistics	*Tempy*	*Gdppc*	*Gdpsv*	*tcgdp*	*Dcgdp*
Mean	43240.640	1765.927	111341.600	4.007	1.921
Median	40988.000	1426.903	46696.340	4.100	2.000
Maximum	55407.050	2563.092	307859.900	5.600	2.700
Minimum	30206.000	1242.738	20401.980	2.600	1.300
Std. Dev.	8431.426	518.886	100465.400	1.004	0.447
Jarque-Bera(JB)	2.463	3.731	3.639	2.530	2.587
Probability	0.292	0.155	0.162	0.282	0.274
Sum	1253978.000	51211.890	3228905.000	116.200	55.700
Sum Sq. Dev.	199000.000	7538783.000	283000000000.000	28.239	5.588
Observations	29.000	29.000	29.000	29.000	29.000

Stationarity Result

Table 6 shows the results of the stationarity test and revealed that total contribution and direct contribution of tourism to GDP were found to be stationary at levels unlike those of other variables (like total employment, GDP per capita and service share of GDP) that were all stationary after first differencing. Thus they are all integrated of order one, that is, they are I(1) variables. This means that variables are a mix of I(0) and I(1) variables.

Table 6: Stationarity Result

	Levels						First Difference					
Variables	AD-F Test Statistics	AD-F Test Critical Values			prob.	Remarks	AD-F Test Statistics	AD-F Test Critical Values			prob.	Remarks
		1%	5%	10%				1%	5%	10%		
Tempy	-1.245	-4.324	-3.581	-3.225	0.881	Non Stationary	-4.306	-4.339	-3.588	-3.229	0.011	Stationary
Gdppc	-1.552	-4.324	-3.581	-3.225	0.786	Non Stationary	-3.979	-4.339	-3.588	-3.229	0.022	Stationary
Gdpsv	-1.887	-4.324	-3.581	-3.225	0.635	Non Stationary	-4.313	-4.374	-3.603	-3.238	0.011	Stationary
Tcgdp	-3.535	-4.324	-3.581	-3.225	0.055	Stationary	-5.228	-4.356	-3.595	-3.233	0.001	Stationary
Dcgdp	-3.476	-4.324	-3.581	-3.225	0.062	Stationary	-5.573	-4.356	-3.595	-3.233	0.001	Stationary

Residual Base Co integration Result

The residual based tests for co-integration (Table 7) indicates the rejection of the hypotheses of no co integration among the variables of interest. This implies that the variables employed for this paper are co integrated, confirming the existence of a long-run relationship among them.

Table 7: ADF Residual - Based Co integration Test

Order of Integration: Level

	AD-F Test Statistics	AD-F Test Critical Values			prob.	Remarks
		1%	5%	10%		
Residual	-5.348***	-4.374	-3.603	-3.238	0.001	Stationary

*** is 1% significant level

Econometric Analysis

This paper adopted the auto regressive distributed lag model to examine the relationship between tourism and employment generation in Nigeria. The choice of this estimation technique is to allow us capture the idea that an equilibrium relationship links tourism and employment generation in the long run and also to accommodate the long run equilibrium as well as likely heterogeneous dynamic adjustment process. From Table 8, the result shows that the one-period lag of total employment is positive and significant at one percent significant level, and it contributes about 85.9 percent change in the current level of total employment. The level of development has a positive and insignificant relationship with total employment.

The share of the service sector in GDP in the current period has a positive and significant relationship with total employment at 10 percent significance level. It shows that a one percent change in the service share of GDP may lead to a 4.5% change in total employment in Nigeria. However, a one-period lag of the service share of GDP reveals a negative and insignificant relationship with total employment.

A one-period lag of total contribution of the tourism sector to GDP reveals a positive and significant relationship with total employment in Nigeria at 1% significant level. In terms of magnitude, this finding reveals that a percentage change in total tourism contribution to GDP will lead to about 24.5% change in total employment in Nigeria. This empirical result implies that tourism is a catalyst for employment generation in Nigeria. However, the current level of total tourism-to-GDP ratio shows a negative and not significant relationship with total investment. The magnitude of the absolute value of the coefficient of ECM associated with the model indicates that in the event of displacement from equilibrium, the speed of restoration to equilibrium is rather

quite slow, and this is consistent with convergence to a long - run relationship. The coefficient of determination shows that about 99 percent of a systematic change in tourism sector in relation to employment generation while the F-statistic shows that the independent variables are jointly significant at 1 percent in employment generation.

Table 8: Short-Run Auto regressive distributed lag model result

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
lntempy(-1)	0.859***	0.076	11.363	0.000
Lngdppc	0.026	0.050	0.531	0.604
Lngdpsv	0.045*	0.025	1.815	0.091
lngdpsv(-1)	-0.030	0.018	-1.640	0.123
Lntcgdp	-0.084	0.071	-1.198	0.251
lntcgdp(-1)	0.245***	0.078	3.159	0.007
Lndcgdp	0.080	0.079	1.018	0.326
lndcgdp(-1)	-0.210**	0.087	-2.413	0.030
ecm(-1)	-0.018**	0.007	-2.611	0.021
Constant	1.023	0.761	1.344	0.200
R-squared	0.998	*Meandependent var*		10.704
Adjusted R-squared	0.997	*S.D. dependent var*		0.169
S.E. of regression	0.009	*Akaike info criterion*		-6.340
Sumsquaredresid	0.001	*Schwarz criterion*		-5.804
Log likelihood	90.254	*Hannan-Quinn criter.*		-6.192
F-statistic	893.339***	*Durbin-Watson stat*		2.044
Prob(F-statistic)	0.000			
Selected Model: ARDL (1, 0, 1, 1, 1, 1)				

***(**)* 1(5) 10 percent significant levels

In the long run, there is positive and significant relationship between direct tourism contribution to GDP and total tourism contribution to employment in Nigeria at 10 percent significant level. It indicates that a percentage change in direct tourism contribution to GDP will lead to a 19.7 percentage change in total tourism contribution to employment in Nigeria. This implies that direct tourism contribution to GDP is a driver of total tourism employment in Nigeria (See Table 9).

Table 9: Long-Run coefficients of auto regressive distributed lag model

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.**
ltemy(-1)	0.970***	0.051	18.843	0.000
Lgdppc	0.077	0.052	1.476	0.156
Lgdpsv	0.019	0.022	0.869	0.395
lgdpsv(-1)	0.040**	0.016	-2.368	0.028
Ltcgdp	-0.022	0.067	-0.338	0.738
ltcgdp(-1)	0.133*	0.070	1.891	0.073
Ldcgdp	0.030	0.076	0.390	0.700
ldcgdp(-1)	-0.230***	0.079	-2.911	0.018
Constant	-0.097	0.581	-0.168	0.868
R-squared	0.997	*Mean dependent var*		10.667
Adjusted R-squared	0.996	*S.D. dependent var*		0.191
S.E. of regression	0.011	*Akaike info criterion*		-5.868
Sum squared resid	0.002	*Schwarz criterion*		-5.440
Log likelihood	91.164	*Hannan-Quinn criter.*		-5.737
F-statistic	962.428***	*Durbin-Watson stat*		2.465
Prob(F-statistic)	0.000			
Selected Model: ARDL(1, 0, 1, 1, 1)				

***(**)* 1, 5, 10 percent significant levels

In the long run, there is positive and significant relationship between the one-period lag of total employment and the current level of employment at 1 percent significant level. The total tourism contribution to GDP exacts positive and significant relationship on total employment at 10 percent significant level, and there is a relatively high magnitude of the total contribution of tourism to total employment. Also, there is a negative and significant relationship between one-period lag of direct tourism contribution to GDP and total employment in Nigeria at 1 percent significant level. The empirical outcome of the tourism-employment nexus indicates that the total contribution of tourism to employment is consistent with the total employment unlike that of the direct tourism contribution in the long run. This implies that total contributions of the tourism sector generate direct and indirect jobs in the economy. Furthermore, service shares have a positive and significant relationship with total employment at 5 percent significant level. The result shows that a one percent change in the service-to-GDP ratio will lead to 4 percent increase of total employment in Nigeria. In addition, the level of development exhibits a positive and insignificant relationship with total employment in Nigeria. The coefficient of determination of 0.99 shows about 99 percent of the systematic variation in the dependent variable

while the F-statistic of 962.428 shows that the independent variables are jointly significant at 1 percent level of significance.

CONCLUSION AND RECOMMENDATIONS

This study analyzed the relationship that exists between tourism and employment generation in Nigeria. Apart from empirically establishing a nexus between tourism contribution to GDP and total employment, the study also as a matter of model robustness check examined the relationship between the determining factors of tourism and tourism as a share of employment in Nigeria. Arising from the dynamic estimation used, it is evident that tourism sector drives job creation in Nigeria. Also, the level of development stimulates direct and indirect contributions of the tourism sector to GDP and the multiplier effects of such development will lead to employment generation.

The findings from this study have far reaching implications for policy options which could contribute to the formulation of economic and non-economic policies that would enhance tourism sector in Nigeria, as well as facilitating tourism employment in the country. In light of this, the government should garner strong political support for tourism at various tiers of government; consolidate, deepen and sustain the success already recorded in the sector. It is also important to create effective institutions to coordinate dialogues among stakeholders in the industry. Finally, the government should engage the donors by leveraging their capacity to boosting the tourism-related jobs.

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MICROECONOMIC DETERMINANTS OF EDUCATIONAL INEQUALITY IN NIGERIA: AN EMPIRICAL INVESTIGATION

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ABSTRACT

The imperative of equal distribution of opportunities such as education for achieving social inclusion and political stability in a country is widely recognised by policy makers. Despite this interest, little is known about the determinants of educational inequality in Nigeria. The paper is aimed at examining the role of educational attainment as well as income per capita and other household characteristics on educational inequality in Nigeria. Using Household data from the World Bank 'Living Standards Measurement Survey' of Nigeria and utilizing a multiple regression technique, the paper examined how variations in household characteristics as well as educational attainment affect educational inequality. The Regression results reveal the extent of the impact of household characteristics on educational inequality. Educational attainment and income per capita seem to curb the increase in educational inequality. The findings emphasize the role of household characteristics in explaining educational inequality and substantial improvements of those characteristics will improve educational distribution. Therefore, investing in programmes that ensure equal access to education and support for the poor households to send their children to school will be a very helpful strategy.

INTRODUCTION

One of the most enduring investments a nation can have for development is the provision of education to the majority, if not all, of its populace. Indeed, education is the most important component of human capital and its even distribution presents the opportunities available for building an inclusive society. The importance of education distribution in the development process of a society and its welfare has been emphasized in the literature (Rodríguez-Pose & Tselios, 2011). Equitable distribution of opportunities such as education is a sign, not only of a well-functioning economy, but also a prerequisite for sustainable economic development. As such, reducing inequality has been a central concern for policy makers all over the world. Persistence inequality among individuals or group of individuals within a country could have far-reaching implications not only on the development agenda of the country, but on its entire future survival as a nation. The development and stability of a nation's economy depend partly on its socio-political stability, which in turn depends on the level of equity attained by that society.

Inequality in educational opportunities can lead to other forms of inequality, especially that of income among individuals in a society (Crespo-Cuaresma, Samir

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& Sauer, 2013 Lorel, 2008). Similarly, Nilsson (2004) viewed lower inequality as intrinsically desirable because the existing socio-political unrest in most parts of the world is perceived to be the result of unequal access to opportunities and resources which are detrimental to the peaceful coexistence of a country. Galor and Moav, (2004) posit that more even distribution of opportunities such as education stimulates economic performance as well as offers a number of economic opportunities especially for the disadvantaged groups and later minimize, the income gap within the economy. In an unequal society, the gap between the average wage earned by low-skilled labourers and their potential income (i.e. the actual amount they should be given as compensation) is tremendous. Thus, this is a likely push factor for the destitute to partake in disruptive activities and other forms of violence that may halt the progress of the nation (Nilsson 2004, in RodrÃguez-Pose & Tselios, 2010).

Since the return of Nigeria to civil rule in 1999, the Nigerian government has been implementing economic reforms that shifted the economy towards market-based. A number of liberal economic policies have been introduced; which include the privatization of public owned enterprises; deregulation and public-private partnership scheme (PPP). With these new developments, extensive dimensions of economic activities were liberalized, leading to a significant higher economic growth. Over this period, particularly between 2010 and 2015, the growth rate of the economy averaged about seven percent (7%) annually placing the economy among the top growing economies in the African continent and also the biggest economy in the continent. Despite such outstanding macroeconomic performance, the level of poverty has been increasing in the country, and wealth has been distributed unequally among individuals in the country. Thus, the country remains a heterogeneous economy with outstanding economic and social differences between its populace (Madu, 2006; Ogbeide & Agu, 2015). This is also the reason for the income discrimination between expatriates and indigenous workers in the oil and gas and construction industry.

A skewed distribution of education in a particular society can lead to a substantial economic loss as many talented people may be left out in the skill and knowledge acquisition processes. Thus, more than land and machineries, an equitable distribution of education constitutes a precondition for individual productivity and ability to rise to the challenges of life and subsequently escape poverty (Lopez, Thomas and Wang, 1998). Furthermore, equitable distribution of educational opportunities is desirable over a redistribution of existing assets or incomes. This is because education builds new assets and enhances social welfare by its overflow impact, without making anybody in the society worse off (Lloyd and Hewett, 2009). Guaranteeing access to educational opportunity to all citizens by attending to both the supply and demand sides is a policy that supposed to be embraced by every

country that wants to overcome the challenges of modern time. Thus, Policy makers have recognized the imperative of educational distribution for achieving social and political stability in a country. Despite this interest, little is known about the determinants of educational inequality in Nigeria. This paper seeks to address this gap by examining the role of educational attainment as well as income per capita and other household characteristics on educational inequality. The paper also utilized a large sample size which is very appropriate for empirical analysis.

In order to address the key issues in this paper, it has been structured into five sections. While section one is the introduction, section two presents the theoretical underpinnings and related empirical literature. The third section presents methodology, section four is devoted to results and discussion while section five is conclusion and recommendations.

THEORETICAL AND EMPIRICAL CONSIDERATIONS

There are multiple factors that affect educational inequality. The expansion of educational achievement is probably the most important one. The general theory of industrialisation suggests that, increase in the stock of education reduces educational inequality in an economy (Ram, 1990) while increase in educational attainment narrows human capital inequalities within societies by promoting a meritocratic basis for status attainment in which the talented can achieve appropriate positions in the economy, regardless of their social background (Hannum & Buchmann, 2005). The empirical studies on the determinants of educational inequality are not many and virtually there is little or none on Nigeria. Empirical studies by Thomas, Wang, and Fan (2001) and Umar, Ismail and Abdul-Hakim, (2013), illustrate that educational inequality is negatively associated with the average years of schooling in a country.

Income is another factor that affects educational inequality. Generally, the overall impact of personal income and Gross Domestic Product (GDP) per capita on educational inequality seems to be negative. The higher the GDP, the more resources would be available to spend on public education. The same goes with individual income; the richer people are, the higher the expenditure on education for all strata. This raises the educational opportunities for the lowest strata, which implies a lower level of educational inequality. This identi?es education as a key instrument for securing equal opportunities for people and for helping to improve their life chances (Wolf, 2002). Similarly, the link between income inequality and educational inequality is unambiguous. Checchi (2000) argued that lower income inequality unties poverty trap that may subsequently increase educational distribution. The more skewed the income distribution, the larger the share of the population that are excluded from schooling and the greater the inequality in educational attainment. Empirically, some studies have found evidence that poverty and income inequality force households to keep their children out of school (Mayer, 2001; Blanden, & Gregg, 2004)

Industrialisation is another important factor determining the distribution of opportunities such as education. It brings about educational expansion which, in turn, reduces educational inequality. The more industrialised a society is, the better would be the economic climate in terms of income and opportunities for the government and the households, the greater the educational expansion. This implies more educational opportunities for the lower strata, greater overall educational attainment, and thus, a more even distribution of educational opportunities (Foster & Rosenzweig, 2003). Another important factor that may impede the distribution of education is household size. Literature shows that low income households are associated with large household size especially in developing countries like Nigeria. The larger the household size, the higher the intra household educational inequality as poor households have usually less resources to pay for education of their children than the rich households do. There is no horizontal equity in education between urban and rural citizens, because the problem of lack of information is greater for individuals in lower socioeconomic groups and rural areas as information is costly to acquire due to distance or cost. Since information has a positive in?uence on educational attainment and educational inequality, low-income rural areas are likely to have not only low educational attainment, but also high educational inequality (Bettinger, Long, Oreopoulos & Sanbonmatsu, 2012).

METHODOLOGY

This paper used data from the World Bank Living Standard Measurement Survey (LSMS, 2013). The survey provides detailed information on several socio-economic characteristics of households. The survey covers a sample of approximately 5,000 households from all parts of Nigeria. To estimate the determinants of educational inequality, the following speci?cation is used:

$$EdIneq_{ir} = \beta_1 EdAtt_{ir} + \beta_2 Incpc_{ir} + \beta_3 IncIneq_{ir} + X'_{ir}\beta_4 + \mu_{ir}$$

EdIneq stands for educational inequality, EdAtt is educational attainment, Incpc is income per capita, IncIneq is income inequality, X is the vector of control variables that includes household size, population ageing, industrialization and urbanization. $\beta_{0....3}$ are coef?cients and μ is the composite error. The subscript i is denoting individuals (i=1…. N) and r (r=1…N) is the state to which an individual household belongs.

The Average Years of Schooling (AYS) is used to obtain the educational attainment variable (AYS) from the data set. This involves assigning some values to reflect years of schooling (YS) of each and every level of education attained by an individual, with each value somewhat reflecting the level of formal schooling involved and its contribution to total educational stock. This is somewhat similar to the International Standard Classification of Education (ISCED) developed by UNESCO but, in this study, with some modifications to capture partial completion of

a particular level of education (for example a person having primary 4 only, or JSS 3). In this case, no schooling could have a value of zero. In Nigeria, the duration of primary education is six years so also secondary education, therefore complete primary could have a value of six and lower if otherwise and the value, in such a case, will depend on the level one stops (e.g. primary 2 will have the value of 2; primary 3 will have the value of 3 and so on). Completing lower secondary such as JSS 3 could have a value of nine, upper secondary could have a value of twelve, and post-secondary (i.e. sub degree qualifications such as diploma) could have a value of 14. Degree certificates and equivalents have the value of 16; while Masters and PhD could take the value of 18 and 21 respectively.

To minimize the level of measurement error while determining our indicators, some effort is put in selecting the most suitable and reliable observations, by trimming down the sample size to only include the relevant age cohorts in the data set. Here, all individuals with less than 18 years of age as at the survey period were excluded. The rationale behind this decision is to reject people who did not finish their study at the time of the survey. Doing this would help to minimize the measurement errors in the education variable, since demographic patterns could vigorously influence the results. In such a case, if the proportion of school going age individuals is high in the sample, the calculated educational attainment will be lower and its dispersion will be overestimated. The threshold of 18 years is chosen because it is the standard definition of the starting point of the adulthood age as per the law in Nigeria.

To measure the extent of educational inequalities in Nigeria, the Theil measure of inequality known as Theil Index is used. The index was introduced by Theil in1967 and extensively discussed by, among others; Puga (2002) and Akita (2003). The 'Theil index' is a member of the Generalized Entropy (GE) family of inequality measures; it has the advantage of being additively decomposable (Meschi & Scervini, 2010). This is a desirable quality for both analytical and computational reasons. Substantively, the ability to measure the contribution to a country's inequality that is attributable to inequality between and within different partitions of the observational units is the main advantage associated with this measure; therefore, it can provide a deeper understanding of a country's inequality.

RESULTS AND DISCUSSION

Table1 shows the de?nition, description and sources of the main and control variables.

Table 1: Description of Variables and Data sources

Variable	Description	Sources
Income	household per capita expenditure	LSMS (2013)
HHsize	Total number of household members	LSMS (2013)
Popage	Age of the household head	LSMS (2013)
EdAtt	Educational attainment from 0-21 (illiterate=0, Doctorate=21)	LSMS (2013)
Theil index	Measure of educational inequality that takes a value between 0 &1 (0=perfect equality; 1=perfect inequality	LSMS (2013)
GDPPC	Gross Domestic product per capita	http://www.zawya.com/nigeria
Industry	Whether a household head is working in agricultural sector or not (Agriculture=1; otherwise=0)	LSMS (2013)
Urbanization	Household living in Rural or Urban areas (rural=0; urban=1)	LSMS (2013)
IncIneq	Measure of income inequality that takes a value between 0 &1 (0=perfect equality; 1=perfect inequality	LSMS (2013)

Note: Data are taken from World Bank Living Standard Measurement study (LSMS) database, Zawya (2013)

The descriptive statistics of the key variables used in this study are presented in table 2.

Table 2: Description of the key continuous variables

Variable	Description	Unit	Mean	Std. Deviation
Ln_Income	Log of household per capita expenditure	-	4.79	0.37
HHsize	Total number of household members	people	6.00	3.00
Age	Age of the household head	years	49.5	15.0(5.2)
Edu	Educational attainment from 0-21 (illiterate=0, Doctorate=21)		5.87	5.73
Totexp	Total household expenditure per annum	'000	417782	408469
Theil index	Measure of educational inequality that takes a value between 0 &1		0.27	0.16
GDPPC	Gross Domestic product per capita	'000	2382.8	3320.1
N=4979				

Source: *Authors' calculations using World Bank LSMS Data (2013)*

This paper employed multiple regression analysis. The Ordinary least squares (OLS) estimation technique is used for data analysis. This technique (OLS) is appropriate for this study due to the fact that the dependent variable is continuous. The data used for this study were taken from the world Bank living standard measurement survey available on the world Bank data base. The results obtained are shown in table 3.

Table 3: Regression Results with educational inequality as Dependent Variable

Variable	Coefficients
IncIeq	.0923965***
	(.0049688)
Popage	-.0022183***
	(.0001418)
Industry	.0121722***
	(.0051877)
Urbanization	-.0242777***
	(-.0242777)
Hhsize	.0067374***
	(.0067374)
EdAtt	-.0094381***
	(.0004399)
Lngdpcp	-.0084644***
	(.0026647)
lncome	-.0296131***
	(.0062672)
cons.	.5207815***
	(.036348)
Observations	4,979
R-squared	0.2639

NOTE: Robust standard errors in parentheses, *** indicates significance at the 1% level.

The result shows a strong negative relationship between the level of educational attainment and the educational inequality. The coef? cient on educational attainment is statistically signi? cant at 1% level as shown in Table 3. Educational attainment plays a prominent role in curving down inequality and appears robust to the inclusion of additional variables. The income per capita and income inequality which are both indicators of income distribution are all statistically significant with the expected sign. The coef? cient on income inequality (IncIeq) is signi? cant and positive. This implies that the lower the income inequality, the lower the educational inequality. The most likely explanation is that poor people do not have the chance to send and

support their wards to school, as such; a further increase in income inequality may lead to a self-perpetuating poverty trap that may in turn increase the population share excluded from certain levels of schooling (Rodriguez-Pose & Tselios 2011). Thus, rich people have higher educational opportunities than the poor people do.

The impacts of income per capita and that of GDP per capita on educational inequality are negative and statistically signi? cant at the 1% level. The negative coef? cients indicate that an increase in the income per capita of both individual households will raise the level of educational attainment of the populace implying, in most cases, greater educational equality. This result goes in line with the hypothesis that higher income per-capita begets higher rate of taxation, thus the greater the expenditure on public education programmes, and, therefore, the greater the educational opportunities of the lowest strata (Rodríguez-Pose & Tselios, 2011). Although public education programmes in Nigeria constitute the major portion of the education system, it does not seem to be suf? ciently effective to ameliorate the inequality in educational enrolment and attainment.

The paper also tested for the role of population ageing (Popage), household size (hhsize), industry and urbanization. The impact of population ageing and urbanization on educational inequality is negative as shown on Table 3. The results suggest that population ageing decreases educational inequality. Thus, states with very young population tend to have lower rate of participation in the labour force and high human capital inequalities. Areas with less young population tend to have lower inequality, because the people do not face credit constraints that prevent them from increasing their level of education (Dur, Teulings & Van Rens, 2004). The variable of urbanization is also found to be reducing educational inequality. This is not surprising because educational opportunities are more in urban areas than in the rural area. The ? ndings on household size show, as expected, a positive relationship with educational inequality. This supports the view that a country's family structure plays a signi? cant role in educational inequality (Berthoud & Iacovou 2004). Large household size is associated with inequality. The coef? cient on industry is also positive and statistically signi? cant at the 1% level. It suggests that educational inequality is higher in areas where the majority of the households are in to agriculture. In Nigeria, majority of those that are in to agriculture are subsistence farmers who prefer more the services of their children on the farm rather than to send them to school.

CONCLUSION AND RECOMMENDATIONS

This paper investigated the factors that determine educational inequality in Nigeria, with emphasis on the effect of educational attainment and income as well as its distribution. Additionally, various factors were considered pertaining to the household characteristics and level of economic conditions proxied by GDP per

capita. Relying on household data and by calculating the average years of schooling (AYS) and the Education Theil Index, the empirical analysis revealed a rich set of ? ndings. As a whole, the results are in line with the theoretical literature and also provide useful insights for policy intervention in the country. The findings of the study suggest that improving access to education at all levels and for all is likely to curb the increase in educational inequality in the country. Thus, increasing educational attainment may not be sufficient without complementary measures on the households' wellbeing. Therefore, efforts towards microeconomic changes in household characteristics are key in addressing the issue of educational distribution in Nigeria.

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AN ASSESSMENT OF THE IMPACT OF LAND REEGISTRATION ON TENURE SECURITY AND INVESTMENT IN KANO STATE, NIGERIA

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ABSTRACT
The paper assesses the impact of recent land registration system on tenure security and investment in Kano State, Nigeria. Land right-investment-return modified framework of Feder et al., 1988 by Hugos, 2012 has been adopted in the paper. A sample of 395 was drawn from Tarauni local government area and data was collected using semi-structured questionnaire, while binary choice model was employed in the analysis. It was found that about 96% of the land owners covered by the Systematic Land Titling and Registration (SLTR) intervention are secured of any unexpected change of land holding either by administrative action or other shocks. As such, investment will increase by 57% if all land owners collect their Certificate of Occupancy (C of Os). The programme raises the awareness of land title holders on the changing value of land which will increase activities in the land market by 16.9%. With the rising value of land, investment will be geared towards land and landed property in the State leading to more increase in the volume of demand for land. The growing demand will then influence more activities in the land market further. Moreover, the study showed that investment in the overall appearance of the titled buildings and quality walls trigger the volume of the demand. The paper recommends that the State government should tactfully pin-down its empowerment support to the Systematic Land Title and Registration (SLTR) certificates.

Keywords: Tenure security, Land investment, Land registration, Sporadic Land registration, Systematic Land Titling and Registration

INTRODUCTION

There has been global recognition that land registration leads to increase in tenure security; better access to formal and informal credit; higher land values; rise in land transferability, increased business environment/wellbeing, higher investments in land, and higher output/income (Feder and Nishio, 1999; Tsauni, 2018). Kano State becomes increasingly overpopulated and urbanized resulting to exponential growth in commercial undertakings on landed property transactions. Thus, issues of land tenure and property rights in the context of residential and commercial building construction, investments in transportation and utility infrastructure become increasingly important drivers of economic growth and poverty reduction.

Land scarcity developed in Kano as a result of rapid population growth and increased commercialization of land and housing as well as high level of influx of migrants from within and outside Nigeria. The increasing land scarcity and growing land

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values therefore, led to increasing uncertainty about land rights (costly) strategic moves to claim new lands and/or to protect customary access. Multiplication of land disputes and rising search or litigation costs and growing demand for (more specific and more secure) property rights in land necessitates the quest for an efficient and cost effective land system. It was evident that, millions of people in Kano live without adequate security of tenure or property rights and the desired poverty reduction effect of land have not been significantly achieved. The titling and registration is to help regularize and plan urban settlements, provide security of tenure to increase investment in housing and building assets, and enable appropriate taxation systems to increase public coffers for undertaking infrastructure and public service delivery. It was against that background that the Presidential Technical Committee on Land Reform of 2015 was created to reform the land and property rights issues in Nigeria. The committee carried out pilot study in 2007 in Kano and Ogun States. The reform serves as the basis for the Department of Foreign and International Development (DFID) funded programme Growth and Employment of States 3 (GEMS3) resolve to intervene by introducing Systematic Land Titling and Registration (SLTR) in line with the best practices to replace the sporadic system. The SLTR programme by the state was to enhance land security, reduce public expenditure on court litigation and enhance investment. It is on this note that this paper has attempted to examine the impact of the land registration on tenure security and investment in Kano. In doing so, the paper has been divided into five sections. Section one is the introduction while section two is literature review. Sections three, four and five are devoted to methodology, discussion of results and conclusion/recommendations respectively.

LITERATURE REVIEW

Conceptual Issues

Concepts of Land and Land Registration

Land is part of earth's surface that is not covered by water. Land comprises real property, real estate, immoveable property (all things affixed or attached to the land such as buildings, trees, e.t.c). Land is the place of all shelter, both in villages and towns/cities. It serves as major source of food, materials for construction and manufacture, minerals such as coal, gas and oil as well as springs and rivers and other essentials for life. Land is indestructible, immovable and a foundation for all human activity as houses and factories; forests and farms; rivers, roads, railways, mines, quarries and reservoirs are all fashioned from land. It offers endless opportunities for development and discovery and ultimately, it is a major source of wealth (Brickdale, 2013). For nations to unlock such wealth requires effective systems of land registration. Good land registration promotes an active land market and productive land use. It makes possible the security of tenure and the development of a mortgage market on which a functioning economy depends.

Registration connotes the action or process of being registered in an official list or record. Land registration is the process of official recording of rights in the land through deeds or title (on properties). It means that there is an official record (the land register) of right on land or deed concerning changes in the legal situation or defined units of land. It gives an answer to the question "who" and "how" (Zevenbergen, 2004). Land registration is the process of initially recording legally valid rights to land (Tsauni, 2018).

An effective land registration system has the following benefits to the key stake holders (the Federal, State, Local government and the citizenry):

a) Land registration helps in administration, taxation, economic development and market information at the Federal and State levels;
b) It assists in planning, land valuation, land use, land management and land information at the local level;
c) It helps in security of rights, access to loans, market opportunities and potential for development to companies and entrepreneurs;
d) It also facilitates social stability, access to housing through mortgage finance, mobility and property transfer and improvement to citizens.

Land tenure security refers to the right of individuals and groups of people to effective protection by their government against forcible evictions. Tenure refers to the status of individuals or groups in relation to property (Scherer, 2009). Land tenure security is therefore, an element of property rights: the right to remain on one's land and make use of and profit from that land in ways the individual or groups value; so long as they do not harm others (United Nations Human Settlement Programme, 2007). An investment is an asset or item acquired with the aim of generating income or appreciation. It is the purchase of goods that are not for immediate consumption but for future wealth creation. It may refer to any mechanism used for generating future income which includes the purchase of real estate. Additionally, purchase of landed property for farming or other economic activities are considered as investment. The paper also considers investment as value added to the property such as (wall, roof, appearance, restructuring, completion, new structures and erecting of shops among others (Tsauni, 2016).

Sporadic Land Registration

The sporadic system has, indeed, cumbersome procedures where a property owner in Kano State, for instance, starts by making application in the Ministry of Land and Physical Planning (MLPP). A file will then be opened after paying certain fees, followed by other procedures. The other procedures include: developing site plan, putting request for confirmation of the genuine owner of the property from the Local Government Authority, the village head, ward head and neighbours. The confirmation reports are sent back to the MLPP for further processing. Then, 10% of the cost of the land is paid to the local government and 5% to the MLPP. A shadow file

will then be opened for the property in the Kano State Urban and Physical Development Authority (KNUPDA).

Payments are needed to be made for the shadow file opening and some charges for inspection to be conducted by KNUPDA. The plan of the property will then be recommended by the authority and letter of grant issued to the owner. To produce the survey plan including chatting of the file number in the plan of the area, the applicant has to engage either a government or private surveyor. The survey plan will then be signed by the surveyor general making the certificate ready. However, the property owner has to, yet make certain payments for the bill-balance i.e. expenses incurred in the process. The certificate is then sent to the governor for signing which is normally done in batches and may take some time. After signing, the property owner then gets his Certificate of Occupancy.

Systematic Land Titling and Registration (SLTR)

The SLTR is a process by which most rights to land in a particular area are ascertained and then documented in an official register of land titles. The SLTR process seeks to ascertain all legal rights and interests, including encumbrances and restrictions, which are already documented and registered; minor interests (such as profits and licenses) not already documented or registered which may not be overlooked and left off the title document (SLTR Standard Operating Procedures Manual, 2016).

The document issued as a result of SLTR is a Certificate of Occupancy (Cof O) and the register is the current land title deeds registry operating according to the land (instrument) registration laws of every State. The Cof O is issued by a State Governor or Commissioner in accordance with the Land Use Act of 1978 and its documentary evidence of a right of occupancy.

The legality of SLTR is derived from the Land Use Act (LUA) because the Act recognizes land rights created or acquired and existing in 1978, which are commonly called 'deemed' rights; and provided the Governor is satisfied that these rights are genuine, a CoF O may be issued to a person as evidence of the right. A land occupier makes an application for a CoF O by submitting a claim for land in the SLTR exercise. In order that the Governor may be 'satisfied' that the person claiming the land is rightfully entitled and has a 'deemed' right, the SLTR ascertains or discovers what land rights exist; this is often called 'adjudication'. Adjudication means deciding on something, and in this case, deciding on who owns rights to what land.

The SLTR is considered superior in view of its one-point process that requires filling a form, sketching the property using satellite imagery and seeking for confirmation of ownership from ward heads and neighbours concurrently. Instantly, the ward

heads certify the genuine owners of properties in their areas after which public display of all the properties in the area takes place to resolve disputes and entertain complaints. When all complaints are addressed, the certificates are then signed by the governor electronically. Owners are then required to make the payments of N5, 000 for residential and N10,000 for commercial property. The SLTR process works with general boundary which makes it simpler as against the sporadic system that uses fixed boundary, although the latter demarcates the points sharply.

The conceptual framework on the impact of land registration on tenure security and land related investment shows three fundamental issues. Thus: (i) land titles have positive effect on land tenure security and provide investment incentives for owners to undertake land-related investments; (ii) land titling reduces the transaction costs in land markets thus helping decrease cost and increase allocative efficiency; and (iii) formal land titles improve access to institutional credit by creating collateral value for land.

It is widely accepted in the literature that land registration provides greater tenure

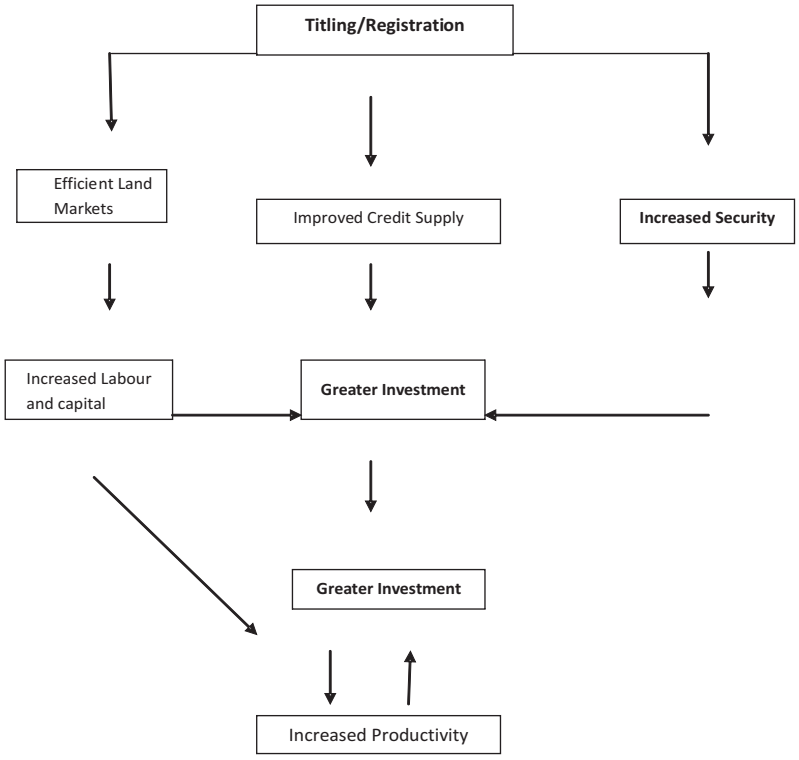

Figure 1: Conceptual framework

Source: Modified version of Feder, Onchan, Chamlamwong and Honglandarom, 1988 by Hugos, F. 2012

security leading to increasing levels of investment (Feder et al., 1986; Feder et al ., 1988) and the positive impact has been buttressed (Binswanger, 1996;Deininger and Chamorro, 2004). On the contrary, there exists evidence of insignificant impact of land registration on investment (Atwood, 1990; Mighot-Adholla et al., 1991; Carter et al., 1991; Roth et al., 1994; and Place & Mighot-Adholla 1998).

Empirical Review

Property rights to land that are secured and easily transferable have long been identified as a key element to bring about higher levels of investment and access to credit, facilitate reallocation of production factors to maximize allocative efficiency in resource use, and allow the development of an economy. Land is a catalyst for poverty reduction and development when properly registered. The significance of land registration or a well-defined property right in ensuring tenure security and galvanizing access to credit and investment is well acknowledged in literature (De Soto, 2000). Several channels through which property rights achieve this exist. For instance, property rights more generally and secured land tenure allow households to collateralize loans and thus obtain financing for investments. The proceeds of the investments can propel more investment and has been found to trigger employment generation, labour productivity and income (Field & Torero, 2005).

The study on land registration and land investment: the case of Tigray region, Northern Ethiopia by Hagos (2012) explored whether land titling fostered tenure security and, thereby, increased investment on land improvement. The study assessed the determinants of the probability and intensity of investment by using random effects and modified random effects probit and truncated regression models on 437 randomly selected households operating 1696 plots from eighteen selected communities located in the five zones of the Tigray Region.

Findings indicated that registration enhanced holders' feeling of tenure security; significant increase in probability and composition of investments, and increased private initiatives. The likelihood and the intensity of conservation were low on land lost in the last redistribution or taken away by the public for different purposes. Length of tenure, initial investment, and access to food-for-work positively influenced the likelihood and intensity of conservation. Households with more livestock, land holding and adult male labor (although significant only in the random effects probit and at 10 percent level) were found to be more likely to make investments on land.

Moreover, the intensity of investment was significantly influenced by the years of registration. Finally, households operating rented-in land were found to be less likely to and invested less indicating that tenants commit fewer resources to long term investments because they strive to maximize immediate benefits. There were various

time invariant household and plot level characteristics that influenced the probability and intensity of conservation. This calls for policy makers to minimize the potential sources of insecurity such as threats of future land redistribution and land taking without proper land compensation. Moreover, land registration/certification is vital for creating tenure security; this has to out scale throughout the country.

Field (2005) compares the change in housing investment before and after the programme among participating households to the change in investment among two samples of nonparticipants. Findings of the study indicate that strengthening property rights in urban slums has a significant effect on residential investment: the rate of housing renovation rises by more than two-thirds of the baseline. The bulk of the increase is financed without the use of credit, indicating that changes over time reflect an increase in investment incentives related to the lower threat of eviction.

The role of property rights in resource allocation has been one of the predominant topics in development economics. There exist extensive theoretical arguments that property rights in land are closely associated with the productive efficiency of agricultural resources as well as investment decisions in developing countries. De Soto (2010) in his book, "the Mysteries of Capital", argued the failure of developing economies to establish well defined system of land rights is responsible for their weak economic performance. However, empirical findings have not been conclusive (Kassa, 2014).

According to Tsegaye and Dessalegn (2017), more than 91% of the respondents in a study on the role of rural land registration and certification programme for land tenure security in Hulet Eju Enese District, Amhara National Regional State, Northwest Ethiopia confirmed that, the programme increases their security right over their holdings. Generally, the literature on the issue of tenure security and investment in Africa has yielded inconclusive results. In fact, a large number of studies which often equated tenure security with possession of formal title found little impact on either credit access or investment (Migot-Adholla et al. 1994). Moreover, there is evidence suggesting that the causality may run the other way, i.e. that investment may be undertaken to enhance tenure security rather than as a response to higher levels of tenure security (Besley 1995; Sjaastad and Bromley 1997). Descriptive evidence seems to be consistent with this hypothesis (Gray and Kevane 2001; platteau 1996). In Burkina Faso, land-related investment appears to be undertaken, primarily to increase tenure security rather than as a consequence of more secure rights (Brasselle et al. 2002). Sequel to the introduction of a well-established land registration system in Kano, the paper assesses its impact on tenure security and investment.

METHODOLOGY

Data and Sampling

Primary data, obtained using questionnaire, was used in the study. A systematic random sampling was employed with the aid of the list of registered land certificate holders in Tarauni local government, under the SLTR exercise. Tarauni serves as the SLTR pilot LGA in Kano where lands are titled and CofOs provided. The sample frame constitutes of 17,926 property owners covered by the social data survey as at October, 2016 in Tarauni. The sample size contains a total of 395 respondents, where 377 were drawn from property owners using Krejcie and Morgan (1970) table based on 47 intervals and 18from land dealers/brokers targeted.

Techniques of Data Analysis

Binary choice model was employed in assessing the impact of land registration on tenure security and investment in Kano. The choice of the model was informed by the dichotomous nature of the dependent variable. Dichotomous variables are nominal variables which have only two categories or levels. Dummy variables – one that takes the value 0 or 1 - are used to represent dichotomous variables. Prior to that, basic features of the data and other characteristics of the respondents were provided.

Model Specification

The traditional view emphasizes security from seizure. Individuals under invest if others may seize the fruits of their investments. It is hypothesized that SLTR certification has significant impact on perceived level of tenure security. The perceived level of tenure model is presented as follows:

$$Y_i = b_o + b_1 X_{it} + \mu_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Where:

Y_i is satisfaction with the SLTR certificate (SatSltr) and is a dummy variable taking one if the land owner is satisfied with the certificate, zero if otherwise. X it represents Perceived level of Tenure Security (PTS) and is a dummy variable that takes the value of 1 if the landowner expects an increase in its holding due to the SLTR intervention in the next 5 years, 0 if otherwise while μi represents the error term.
The study specifies the land-related investment model as:

$$LINV = \beta_0 + \beta_1 INV + \beta_2 WALL + \beta_3 HAPR + \mu \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Where: LINV stands for land-related investment and is a dummy variable that takes the value of 1 if the land owner made some changes in the landed property during the past 12 monthsμiNV stands for investment which is a dummy that takes the value of 1 if landowner expects to improve his certified landed property, 0 if otherwise. WALL means changes made on the wall of the land owner's building in the last one year that

takes the value of 1, 0 if otherwise. HAPR signifies physical appearance of the property owner's building which takes the value of one if the land owner made some changes on the housing appearance of the building during the last one year, zero if otherwise and μ_i denotes the error term.

RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Respondents

About ninety percent (90%) of the respondents were male while barely ten percent (10%) were female, implying that male dominate the scene even though the choice was made using systematic random sampling. The youthful age of 16 – 45 years (52.1%) dominates the survey lending hope to land investment and the usage of the potentials of land certification.

The probability of this segment of land holders to secure loan and invest in Tarauni is significantly high. However, the low level of education portrayed by less than 30% land holders completing tertiary education is likely to be disincentive to the much expected outcome. Additionally, only 1.5% of land owners had completed skills training. The figure is so low to turn around Tarauni in terms of trades and entrepreneurial activities. Considering the mentioned deficiencies, the objective of job creation and doing business could only be achieved with special intervention.

Impact of SLTR on Perceived Level of Tenure Security

Tenure security is difficult to measure directly so indirect measures have been used in other studies (Place and Migot-Adholla 1998; Brasselle et al. 2002). Palmer (1996) noted that quantity of property-related litigation, property values, and the manner in which financial institutions treated the property could all be used to indicate the level of security of tenure. Another research measured market activity as a surrogate for tenure security after land titling and registration in Peru. Formal security can be denoted by the existence of legal documentation and formal registration like that of the SLTR. Besides ensuring formal security, the informal tenure security was equally employed for the purpose of analysis denoted by perceptions of security expected by the land holders. Thus, responses to direct queries on perceptions of security of tenure put to the land users were used as measures of tenure security.

The findings of the study revealed that about 96% of the land owners covered by the SLTR intervention feel secured of any unexpected change of land holding either by administrative action or other shocks. For any meaningful economic impact of land to be realised, the right of ownership is a key requirement and that was buttressed by the level of satisfaction showed by over 93% of property owners. Land-secured credit has the potential of increasing investment in the area of concern by almost 4%. This is, indeed, more appealing to the commercial property owners who might access facilities from credit institutions to expand their investment. Investigation has shown

that the risk of challenges to ownership is expected to be reduced significantly, particularly due to the transparent and inclusive nature of the SLTR procedure.

The satisfaction shown by most beneficiaries buttressed the confidence reposed in the programme and its acceptability. Therefore, the involvement of traditional rulers and other stakeholders in the land reform process has the potential of scaling the possibility of curtailing to the barest minimum, uncertainties and information asymmetry in land ownership and deals. Meanwhile, the land registration has the likelihood of reducing the risk of incurring costs in defending one's possession of land through litigations, enhancing incentives to invest and increasing land productivity. Thus, increases in investment, employment, and income and revenue generation are foreseen as the potential induced multiplier effects of tenure security. The predicted probability of being satisfied with the SLTR titling and registration process that gives property owners in Tarauni local government access to their Cof Os is 0.33. The satisfaction land holders get when their properties are certified is about 33% and tenure security was found to be statistically significant at 5% level in the output the marginal effect after mlogit.

Impact of SLTR on Land-Related Investment

Land titles affect the incentives to invest in housing construction through several channels. Conventionally, the emphasis is on security from seizure. Individuals fail to invest if others may seize the fruits of their investments. Land titles can also encourage investment by improving the transferability of the parcels. Even if there were no risk of expropriation, investments in untitled parcels would be highly illiquid, whereas titling reduces the cost of alienation of the assets. A third channel is through the credit market. Transferability might allow the use of the land as collateral, diminishing the funding constraints on investment. Finally, a fourth channel is that land titles provide poor households with a valuable savings tool. Poor households, especially in unstable macroeconomic environments, lack appropriate savings instruments. Land titles allow households to substitute present consumption and leisure into long-term savings in real property. Land certification is expected to augment land-related investments significantly (Hugos, 2012).

In table 1, first was the iteration log, indicating how quickly the model converged.

Table 1: Estimates of Land Related Investment (LINV)

Explanatory Variables	**Odd ratios (standard error)**	**z-statistics**	**Probability** (P>|z)
WALL	1.500 (0.525)	1.16	0.246
HAPR	1.968 (0.969)	1.38	0.169
INV	5.687 (2.009)*	4.92	0.000
Number of Observations = 311, Log likelihood = -180.7059, LR $chi^2(3)$ = 32.15 Pseudo R^2 = 0.0817, P-Value = 0.000, standard errors in parenthesis			

Notes: * Indicates statistical significant at 5% level.

Source: computed using Stata version 11.

The log likelihood (-180.7059) can be used in comparisons of nested models. It could also be seen that about 311 observations in the data set were used in the analysis in view of the missing values in some variables. The likelihood ratio (LR) chi-square of 32.15 (which is analogous to F-statistics in multiple regression) with a p-value of 0.0000 implies that the model as a whole fits significantly better than an intercept model.

The odds ratios, their standard errors, the z-statistic, associated p-values, and the 95% confidence interval of the coefficients were presented. The results showed that land related investment in Tarauni is characterized by physical changes in the overall appearance of certified buildings and significant likelihood for further improvements. Positive changes in terms of investment in walls of good quality (23%), overall housing appearance (25%), roof (8%), uncompleted building (6%) among others were recorded following the SLTR certification. Land owners are conscious of adding value to their properties when titled which will go a long way in ensuring welfare improvement and land transferability in terms of sales or rentage. The land related investment is highly expected as it is statistically significant indicating that for every one unit change in expected investment, the log odds of land related investment in Tarauni local government increases by 5.7. Impliedly, land related investment in the area of concern is expected to increase, all things being equal, by about 57% when land owners possess Cof Os. The likelihood of high land investment is not unconnected with the rising value of landed property in the area which superseded non-certified area and as attested to by 80.8% of the respondents and the cost effectiveness of the exercise (87.3%).

CONCLUSION/RECOMMENDATIONS

The paper found that about 96% of the land owners covered by the SLTR intervention are secured of any unexpected change of land holding either by administrative action or other shocks. As such, investment will increase by 57% if all land owners collect their Cof Os. Evidence has shown that a lot of property owners have not collected their certificates. The programme rouses the awareness of land title holders on the changing value of land which will increase activities in the land market by 16.9%. With the rising value of land, investment will be geared towards land and landed property in the State leading to more increase in the volume of demand for land. The growing demand will then influence more activities in the land market further. Moreover, the study showed that investment in the overall appearance of the titled buildings and quality walls trigger the volume of the demand.

The State government should tactfully pin-down its empowerment support to the SLTR certificates. Empowerment of youth and women so as to enhance investment in the state requires support from the government and other bodies since certificate of occupancy is considered as a collateral for accessing credit facilities.

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AN IMPACT ANALYSIS OF THE RELATIONSHIP BETWEEN MONEY SUPPLY AND INTEREST RATE IN NIGERIA

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ABSTRACT

The study examines the relationship between money supply and interest rate in Nigeria for the period 2000-2016. The study utilizes the simple linear regression model, using the ordinary least squares (OLS) technique. The pairwise Granger causality test was used to determine the causal relationship between money supply and interest rate, and result shows that a uni-directional causality runs from money supply to interest rate but not from interest rate to money supply. The Augmented Dickey-Fuller (ADF) unit root test method was applied to test for the stationarity of the time series variables, and results show that the variables were stationary at level. The OLS regression results show that money supply positively and significantly impacted on interest rate during the period investigated and that the regression model has a good fit as the coefficient of determination shows that 85% of the variation in interest rate was explained by money supply. Based on these findings, the study recommends that there should be a time-to-time moderate increase in money supply into the economy which will consequently reduce interest rate, increase investment and boost economic growth in the country; and that the Central Bank of Nigeria should pay special attention on broad money supply by regulating instruments like the liquidity ratio, reserve ratio, among others which directly affect broad money supply.

Keywords: *Interest Rate, Money Supply, Monetary Policy, Nigeria*

JEL Classification: E43, E51

INTRODUCTION

Money supply plays a crucial role in the determination of general price level and interest rate. Although the importance of money in the transmission mechanism of monetary policy cannot be denied, there exists a wide divergent views on the influence of changes in money supply on interest rate among academics and policy makers (Aslam & Lebbe, 2015). Money supply is a very sensitive variable; its size determines the pace of an economic activity. Apart from being a potent instrument of monetary policy, its expansion or contraction dictates the growth in investment and output of any economy. According to the Monetarist school of economic thought, changes in the amount of money in circulation are the sources of other economic changes. To them, changes in the size of money supply have a number of implications on the macroeconomic variables like interest rate. Hence, a relationship exists between money supply and interest rate (Paun, 2013).

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The nexus between money supply and interest rate is in two ways. First, if money supply increases, interest rate decreases. The decrease in interest rate encourages investment by both households and businesses. In other words, falling interest rates increases the demand for investment whereby business enterprises take advantage of the reduction in opportunity costs by engaging in additional investment. Thus, as investment increases, aggregate demand also increases at a given price level. Second, in the event of a decrease in the money supply, interest rates would increase and demand for money decreases causing investment demand to decrease (Ahmed & Suleiman, 2011).

Since money supply is a vital monetary aggregate and given the nature of the relationship between money supply and interest rate, the stance of monetary policy in most central banks around the world is commonly summarized and announced in terms of a target for a short-run nominal interest rate. According to Woodford (2003), the supply of money can thus be viewed to be relevant only if the central bank adjusts the instruments under its direct control so as to implement its interest-rate operating targets. In many instances, monetary policy in both developed and developing economies have been summarized by simple interest rate feedback rules, such as the well-known Taylor Rule where short-run nominal interest rates serve as an operating target for most central banks around the world, while money supply acts as the policy instrument that implements certain interest rate targets (Lucas, 2000). In accordance with this approach, monetary policy thus acts as contingent money supply that implements a sequence of nominal interest rates satisfying a particular target (rule).

In Nigeria, the overriding objective of monetary policy is price and exchange rate stability. Interest rate is one of the prices that monetary policy aims at stabilizing while money supply is one of the monetary policy instruments of the Central Bank of Nigeria (CBN). Because targeting money supply growth is considered as an appropriate method of targeting price stability in the Nigerian economy, the CBN chooses a monetary targeting policy framework to achieve its objective of price stability (CBN, 2015). With the broad measure of money supply (M2) as the intermediate target, and the monetary base as the operating target, the CBN utilizes a mix of indirect (market-determined) instruments to achieve its monetary objectives. Evidence from statistical data showed that there has been a significant growth of money supply over the period 2000–2016 while interest rate has in the same period increased at a decreasing rate. For example, M2 averaged N7939691.37 million from 2000 to 2016, reaching an all-time high of N20727909.47 million in April 2009 and a record low of N648506.60 million in January 2000. On the other hand, interest rate averaged 10.10 percent between 2007 and 2016, reaching an all-time high of 13 percent in November 2014 and a record low of 6 percent in July 2009 (CBN, 2017; Wuyah & Amwe, 2016).

The Fisher's proposition effect of money and interest rate nexus propounded by Irvin Fisher (1896) and Monetarist theory of money and interest rate propounded by Milton Friedman (1956) offered two seemingly contradictory views of the relationship between money supply and interest rate. The Monetarist view, which follows from the interaction of money demand and supply, is that money and interest rates are negatively related, meaning that increasing interest rates, for example, requires a decrease in the stock of money. According to this view, money supply is a decreasing function of the nominal interest rate because the interest rate is the opportunity cost of holding cash (liquidity). So a decrease in the supply of money must cause interest rates to increase in order to keep the money market in equilibrium. This is called the liquidity effect view (Ahmed & Suleiman, 2011).

Another view, which follows from the Fisher's proposition effect, argues that money and interest rates are positively related, implies that increasing interest rates requires an increase in the rate of money growth. The Fisher's proposition effect states that the nominal interest rate equals the real interest rate plus the expected rate of inflation (Fisher, 1896). If monetary policy does not affect the real interest rate (and errors in inflation expectations are ignored), then the Fisher's proposition effect implies that higher nominal interest rates are associated with higher rates of inflation. Since in the long run, high inflation rates are associated with high money growth rates; the Fisher equation suggests that an increase in interest rates requires an increase in the money growth rate (Ahmed & Suleiman, 2011). The Fisher's proposition effect is sometimes called the Fisher equation view. These two views provide seemingly conflicting answers to the question of how a central bank should translate its interest rate targets into actual changes in the money supply. One view implies that interest rates move in the opposite direction as the money supply while the other suggests that they move in the same direction.

Questions that emanate from the foregoing are: What nature of relationship exists between money supply and interest rate in Nigeria? Does any causality hold between money supply and interest rate in Nigeria? The objective of the study is therefore to examine the nature of relationship and causality between money supply and interest rate in Nigeria. The study is guided by the following hypotheses which are stated in null form:

H_{0_1} : There is no relationship between money supply and interest rate in Nigeria.

H_{0_2} : There is no causality between money supply and interest rate in Nigeria.

The rest of this paper is organized as follows. Section two is the literature review while section three presents the methodology. Section four consists of results and discussion, while section five comprises of conclusion and recommendations.

LITERATURE REVIEW

Conceptual Review

The definition of money supply has been conceptualized differently by several scholars. According to Anyanwu (1993), money supply is the total amount of money (e.g., currency and demand deposits) in circulation in a country at any given time. Currency in circulation is made up of coins and notes, while demand deposits or current account are those obligations which are not related with any interest payment and accepted by the public as means of exchange drawn without notice by means of cheque. There are two criteria employed in measuring money supply; the first criterion defines the stock of narrow money (usually denoted by M1) as currencies and coins in circulation in the hands of the non-banking public and the demand deposit (of the non-banking public) with commercial bank (Ajakaiye, 2002). This definition is synonymous with that given by Anyanwu (1993). The second criterion defines money stock (denoted by M2) as M1 plus time and savings (fixed) deposit. Thus, economists use the stock of money to mean narrow money since savings and time deposit are not usually a medium of exchange. The component of narrow money is usually called the stock of high-powered money. In summary, money supply refers to the total amount of monetary assets available in an economy at a specific time. It consists of currency with the public, the demand and time deposits of the public (Aslam & Lebbe, 2015).

Interest rate is the price of money; that is, the amount of interest paid per unit of time expressed as a percentage of the amount borrowed. In other words, interest rate is the cost of borrowing money, measured in naira, per year per naira borrowed. According to Keynes (1936), interest rate is a measure of reluctance to part with money in liquid form and, at the same time, as the price which brings into balance the desire to hold wealth in the form of cash with the supply of cash. In other words, Keynes also sees interest rate as a compensation for parting with liquidity or as a reward for not-hoarding. Adebiyi (2002) defines interest rate as the return or yield on equity or opportunity cost of deferring current consumption into the future. Some examples of interest rate include the saving rate, lending rate, and the discount rate.

Theoretical Review

Several theoretical perspectives on the link between money supply and interest rate exist in extant literature. Important among them includes the Classical theory and the Monetarist theory. The study adopts the Monetarist theory as the theoretical framework given its suitability to the present study. The classical economists' view of the impact of money supply on interest rate is based on Fisher's effect proposition propounded by Irvin Fisher in 1896. The Fisher's effect proposition contends that money and interest rates are positively related, that is, increasing interest rates requires an increase in the rate of money growth. The Fisher equation states that the nominal interest rate equals the real interest rate plus the expected rate of inflation (Fisher, 1896). Symbolically, it is expressed as:

$$i = r + \pi^e \quad (1)$$

where i is nominal interest rate; r is real interest rate; and π^e is expected inflation. According to the classical theory, if monetary policy does not affect the real interest rate (and errors in inflation expectations are ignored), then the Fisher equation implies that higher nominal interest rates are associated with higher rates of inflation. Since in the long-run, high inflation rates are associated with high money growth rates; the Fisher equation suggests that an increase in nominal interest rates requires an increase in the money supply growth rate.

Monetarist school led by Milton Friedman (1956) developed a subtler and relevant version of the quantity theory of money. Milton Friedman emphasized on the supply of money as the key factor affecting the well-being of the economy and as well, accepted the need for an effective monetary policy to stabilize an economy. He also posited that, in order to promote steady growth rate, money supply should grow at a fixed rate, instead of being regulated and altered by the monetary authority. Milton Friedman equally argued that since money supply might be demanded for reasons other than anticipated transaction, it can be held in different forms such as money, bonds, equities, physical goods and human capital. Each form of this wealth has a unique characteristic of its own and a different yield. These effects will ultimately increase aggregate money demand and expand output. The Monetarists acknowledge that the economy may not always be operating at the full employment level of real gross domestic product (GDP). Thus, in the short-run, monetarists argue that expansionary monetary policies may increase the level of real GDP by increasing aggregate demand. However, in the long-run, when the economy is operating at the full employment level, they argue that the quantity theory remains a good approximation of the link between the supply of money, price level, and the real GDP. Also, in the long-run expansionary monetary policy only leads to inflation and does not affect the level of real GDP. In summary, the Monetarist argues that monetary policy actions affect interest rates, where monetary authorities change their monetary policy stance to influence the level of money supply as they try to manage the economy and control inflation.

Empirical Review

The relationship between money supply and interest rate has been empirically researched by many scholars in both developed and developing economies. Few of these studies are reviewed in this section. Kaplan and Gungor (2017) examined the relationship between money supply, interest rate and inflation rate in Turkey for post-2008 global financial crisis period. Utilizing monthly data and vector autoregression (VAR) model, the Variance Decomposition results revealed that given changes in inflation (i.e., changes in money supply), interest rate changes by 85%. Hagedorn (2009) studied money, interest rates and strong liquidity effects in Germany. Utilizing the standard cash and credit monetary model, he found that the

quantitative performance of the model is explained through substantial liquidity effects. In other words, the liquidity effects imply that money supply is a decreasing function of the nominal interest rate because interest rate is the opportunity cost of holding cash (liquidity). So a decrease in the supply of money must cause interest rates to increase in order to keep the money market in equilibrium. Urbanovsky (2016) examined the interconnection of interest rate, prices, money supply and real GDP in Czech Republic. Utilizing VAR-Granger causality test method, results showed that causality does not run between interest rate and money supply.

Wuyah and Amwe (2016) examined the implication of money supply on interest rate in Nigeria for the period 2000-2015. Using the ordinary least squares method to estimate the multiple regression model, result showed that money supply had negative impact on interest rate during the period investigated.

Obasaju and Bowale (2015) examined the relationship between nominal interest rate, nominal money supply, prices and real output using quarterly data on these variables from 1980:1 to 2012:4. The study adopted a vector error-correction mechanism (VECM) to test for the short - and long-run relationships and found that nominal money supply has no contemporaneous effect on real output in Nigeria but does have significant impact on the latter in the long-run thereby refuting the money neutrality hypothesis.

Muhammad and Mubarak (2013) examined the relationship between money supply, interest rate, income growth and inflation rate in Nigeria for the period 1980-2010. They study employed a co-integration method and Granger causality test and found that there is no long run relationship among the variables. The Granger causality test showed that no causal relationship exists between money supply and interest rate in Nigeria.

METHODOLOGY

This study employed causal research design to examine the relationship between money supply and interest rate in Nigeria. The study covered the period 2000 to 2016, which is a total of 17 years. The data for this study were collected from the Central Bank of Nigeria (CBN) statistical bulletin. Since the data are time series in nature, they were tested for stationarity using the Augmented Dickey-Fuller (ADF) test method to check whether the time series variables have unit root or not. A time series with a unit root is said to be non-stationary. The reason for the stationarity test is to avoid the problem of spurious regression that occurs when non-stationary time series variables are used for regression analysis (Dickey & Fuller, 1981). The ordinary least squares (OLS) method is used to analyse the specified regression model for the study.

To establish the nature of relationship between money supply and interest rate, and to determine the extent to which money supply impacted on interest rate during the period under consideration, the regression model for the study is specified as:

$$INT_t = \beta_0 + \beta_1 MNS_t + \varepsilon_t \qquad (2)$$

where: INT is the nominal interest rate, MNS is the broad money supply, β_0 is the constant term, β_1 is the slope parameter, ε is the error term, and *t* is time. In line with economic theories, it is expected that the relationship between money supply and interest could be positive or negative. This a priori expectation is mathematically expressed as:

$$\beta_1 < 0 \text{ or } \beta_1 > 0$$

In order to establish the nature of causality between money supply and interest rate, the pairwise Granger causality test method is utilized since only two time series are involved. The pairwise Granger causality test is based on vector autoregression (VAR) modelling framework. For this study, a bi-variate (or 2-dimension) vector autoregression (VAR) model of order (p) is specified as:

$$MNS_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} MNS_{t-i} + \sum_{j=1}^{p} \alpha_{2j} INT_{t-j} + \varepsilon_{1t} \qquad (3)$$

$$INT_t = \delta_0 + \sum_{i=1}^{p} \delta_{1i} INT_{t-i} + \sum_{j=1}^{p} \delta_{2j} MNS_{t-j} + \varepsilon_{2t} \qquad (4)$$

Where: α_0 and δ_0 are constants; *p* is the maximum lag length to be determined using the VAR-based optimal lag selection criteria; $\alpha_{1i}, \alpha_{2j}, \delta_{1i}$ and δ_{2j} are slope parameters; ε_{1t} and ε_{2t} are vectors of white noise process; *MNS* and *INT* are time series variables; and t is time. Equation (3) postulates that the current money supply (MNS_t) is related to its immediate past values and the past values of *INT,* while equation (4) indicates a similar behaviour for *INT.*

The F-statistic is used to test whether the coefficients of lagged variables in the above specified bi-variate vector autoregression (VAR) model are jointly statistically equal to zero as follows:

$$\alpha_{1i} = \alpha_{2j} = 0$$

$$\delta_{1i} = \delta_{2j} = 0$$

The rejection of the null hypothesis in each case implies causality. The null hypotheses imply that money supply does not Granger-cause interest rate in the first equation; and that interest rate does not Granger-cause money supply in the second equation.

RESULTS AND DISCUSSION

This section presents the empirical results of the study, ranging from descriptive (summary) statistics, stationarity test results, and regression results to Granger causality results.

Table 1: Descriptive Statistics

Statistics	INT	MNS
Mean	20.57438	4264162
Median	21.00500	5067575
Maximum	23.55000	10375746
Minimum	17.45000	109800.0
Std. Dev.	2.016294	3668629
Skewness	-0.120872	0.083614
Kurtosis	1.633034	1.518275
Jarque-Bera	1.284691	1.482316
Probability	0.526057	0.476562
Sum	329.1900	68226598
Sum Sq. Dev.	60.98159	2.02E+14
Observations	17	17

Source: Computed using E-Views 9 Software.

The summary of descriptive statistics of relevant variables of study is as reported in table 1. The mean, median, standard deviation as well as the skewness and kurtosis measures of our variables of interest are as reported in table 1. The mean values of INT and MNS are 20.57438 and 4264162 respectively while their respective standard deviations are 2.016294 and 3668629. This shows that MNS is more volatile than INT as evidenced from the deviation of MNS from its mean value. In other words, INT was more stable than MNS in the period under consideration.

The Jarque-Bera statistic is used to test the normality of the variables. Since the probability values associated with MNS and INT were respectively greater than 0.05 (i.e., 5% level of significance), it means that the variables are normally distributed. Also in support of the normality of the variables are the skewness and kurtosis statistic values. The decision rule for normality of the variables under the skewness and kurtosis statistics is that their values should be less than threshold of 3. From table 1, it is evident that the variables are normally distributed.

Table 2: Unit Root Test Results

Variables	ADF Statistics			Remark
	Level	First Difference	Second Difference	
INT	-2.930039**	-	-	*I*(0)
MNS	-3.202828**	-	-	*I*(0)

Note: Superscript ** denotes rejection of the null hypothesis of existence of unit root at 5% significance levels respectively.
Source: Computed using E-Views 9 Software.

The ADF unit root test result in table 2 shows that MNS and INT are stationary at level. This means that their order of integration is zero. The results therefore satisfied the application of the Granger causality test which requires that the time series that enter the vector autoregression (VAR) must be stationary at level if the Granger causality test results are to valid.

Table 3: Regression Results
Dependent Variable: **INT**

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	19.96231	0.786912	25.36789	0.0000
MNS	6.65834	1.65233	4.02967	0.0008
R^2= 0.85				F-Stat= 10.24783
Adj. R^2= 0.83				Prob=0.000003
DW= 2.02				

Source: Computed using E-Views 9 Software.

From the regression results, it can be observed that the coefficients of the explanatory variables (MNS) are positive; indicating that a unit change in broad money supply, on average, increased interest rate by 6.65834 units. The low probability value of MNS (i.e., $p<0.05$) implies that broad money supply impacted significantly on interest rate during the period investigated. In essence, money supply positively and significantly impacted on interest rate during the period investigated.

The calculated F-statistic value is = 10.24783 while the critical value is F_t ($v_1 = 2, v_2 = 15$) = 3.68. Since the calculated value of the F-statistic (F_c) is greater than the critical value (F_t) at 5% level of significance, we reject the null hypothesis that the parameters are jointly equal to zero and conclude that the parameters are jointly statistically significant at 5% level of significance. The coefficient of determination (R^2) shows that about 85% of the variation in INT was explained by the changes in MNS. This suggests that the estimated model has a good

fit. The value of the Durbin-Watson (d) statistic (i.e., d=2.02) suggests the absence of first-order autocorrelation. This implies that the estimated model is reliable and not spurious.

Table 4: Pairwise Granger Causality Test Results
The pairwise Granger causality test results in table 4 were based on the optimal lag length of 1. The optimally selected lag length was determined using the VAR-based lag selection criteria.

Pairwise Granger Causality Tests
Sample: 2000 2016
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
MNS does not Granger Cause INT	17	31.6427	0.0000
INT does not Granger Cause MNS		3.52999	0.1798

Source: Computed using E-Views 9 Software.

Based on the probability values at 5% level of significance, the Granger causality results show that MNS Granger-caused INT while INT does not Granger-cause MNS. Hence, we can safely conclude within the context of these findings that during the reference period of study, money supply Granger-caused interest rate, but interest rate did not Granger-caused money supply.

CONCLUSION AND RECOMMENDATIONS

The study examined the relationship between money supply and interest rate in Nigeria. The period 2000-2016 was covered. The simple linear regression model estimated using the ordinary least squares method while the pairwise Granger causality test technique was used to determine the causality between money supply and interest rate. Unit root test for stationarity of the time series variables was carried out using the Augmented Dickey-Fuller (ADF) unit root test method. Findings from the unit root test showed that the variables were stationary at level. The OLS regression results showed that money supply positively and significantly impacted on interest rate, with a goodness of fit of 85%. The Granger causality results revealed that causality only runs from money supply to interest rate and not the other way round. In line with these findings, the study recommends that there should be a time-to-time moderate increase in money supply into the economy which will consequently reduce interest rate, increase investment and boost economic growth in the country. In addition, the Central Bank of Nigeria should keenly focus its attention on broad money supply by regulating monetary policy instruments like the liquidity ratio, reserve ratio, among others which directly affect broad money supply.

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APPENDICES

Appendix I: ADF Unit Root Test Results using EViews 9 Software

ADF Unit Root Test on INT at First Difference

Null Hypothesis INT has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.930039	0.0041
Test critical values:	1% level	-3.711457	
	5% level	-2.901038	
	10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INT)
Method: Least Squares
Date: 03/30/18 Time: 10:14
Sample: 2000 2016
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT(-1)	-4.636611	1.582440	-2.930039	0.0041
D(INT(-1))	-3.626504	0.712504	-5.089802	0.0001
D(INT(-2))	-3.872681	0.747257	-5.182532	0.0001
C	306959.2	109759.3	2.796658	0.0136

R-squared	0.903510	Mean dependent var	537695.7
Adjusted R-squared	0.839183	S.D. dependent var	1004481.
S.E. of regression	402817.5	Akaike info criterion	28.94646
Sum squared resid	2.43E+12	Schwarz criterion	29.47873
Log likelihood	-365.3040	Hannan-Quinn criter.	29.09974
F-statistic	14.04559	Durbin-Watson stat	1.647922
Prob(F-statistic)	0.000007		

ADF Unit Root Test on MNS at Level

Null Hypothesis: MNS has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.202828	0.0012
Test critical values:	1% level	-3.711457	
	5% level	-2.901038	
	10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MNS)
Method: Least Squares
Date: 03/30/18 Time: 10:23
Sample: 2000 2016
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MNS(-1)	-3.688598	1.151669	-3.202828	0.0012
D(MNS(-1))	0.468403	0.183114	2.557980	0.0156
D(MNS(-2))	-0.967381	0.336321	-2.876365	0.0072
C	-38.67009	16.15973	-2.392990	0.0230

R-squared	0.717018	Mean dependent var	39.70571
Adjusted R-squared	0.689632	S.D. dependent var	68.26111
S.E. of regression	38.02872	Akaike info criterion	10.22177
Sum squared resid	44831.69	Schwarz criterion	10.39953
Log likelihood	-174.8810	Hannan-Quinn criter.	10.28313
F-statistic	26.18248	Durbin-Watson stat	1.731284
Prob(F-statistic)	0.000000		

Appendix II: Regression Output using EViews 9 Software

Dependent Variable: INT
Method: Least Squares
Date: 03/30/18 Time: 11:16
Sample: 2000 2016
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19.96231	0.786912	25.36789	0.0000
MNS	6.65834	1.65233	4.02967	0.0008

R-squared	0.854050	Mean dependent var	187076.4
Adjusted R-squared	0.829195	S.D. dependent var	553593.5
S.E. of regression	390589.4	Akaike info criterion	28.70298
Sum squared resid	6.56E+12	Schwarz criterion	28.93463
Log likelihood	-697.2230	F-statistic	10.24783
Durbin-Watson stat	2.023585	Prob(F-statistic)	0.000003

Appendix III: Granger Causality Test Output using EViews 9 Software

Pairwise Granger Causality Tests
Sample: 2000 2016
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
MNS does not Granger Cause INT	17	31.6427	0.0000
INT does not Granger Cause MNS		3.52999	0.1798

EFFECTS OF AUTOMATED TELLER MACHINE SERVICE ON INTERMEDIATION EFFICIENCY IN THE NIGERIAN BANKING INDUSTRY

Dr. Hashimu Bulus[1], Dr. Clement Adewole[2] & Akintunde Ayeni[3]

ABSTRACT
The deployment and use of electronic banking mechanisms and products have the potential of determining the amount of deposits available in banks for intermediation purposes. This study was carried out to investigate the effect of Automated Teller Machine (ATM) adoption on intermediation efficiency in the Nigerian banking industry, taking interest rate and cash reserve ratio (CRR) into cognizance as other factors that limit banks' intermediation. The study considered the period 2007-2016 for all deposit money banks (DMBs) in Nigeria. Regression analysis and Vector Auto Correlation were employed to explore these relationships. The study found that ATM adoption has a negative significant impact on intermediation efficiency in Nigeria. It also revealed that the interaction between ATM, CRR and interest rate negatively influences intermediation efficiency in Nigeria. In light of this discovery, the study recommends among others, that the Central Bank of Nigeria (CBN) should carry out enlightenment programmes that will educate customers on the numerous benefits accruable to using ATM for making transactions such as, withdrawing cash. If customers effortlessly key into this, cash withdrawals will reduce via the ATM, which could possibly make more money retained inside banks for intermediation purposes.
KEYWORDS: ATM service, Intermediation efficiency, Interest rate, Cash Reserve Ratio, Nigerian banking industry.
JEL Classification: N7, O32, E5

INTRODUCTION

The adoption of information and communication technology in the banking sector is generally referred to as Electronic banking (E-banking). The application of its concepts, techniques, policies, and implementation strategies to banking services has become a subject of fundamental importance and concerns to all banks and indeed a pre-requisite for local and global competitiveness because it directly affects management decisions, plan as well as products and services to be offered by banks. Electronic banking is the conduct of banking business electronically and this involves the use of information communication technology to drive banking business for immediate and future goals (Okoro, 2012).

One major component of electronic banking in Nigeria is the Automated Teller Machine (ATM). According to Komal (2009), ATM services enhance operations and customer satisfaction in terms of flexibility of time, add value in terms of speedy handling of voluminous transactions which traditional services were

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unable to handle efficiently and expediently. The machine can enable customers transfer cash at more convenient time and places than during banking hours at branch (Muhammad & Dada, 2014).

The adoption of the ATM as an electronic banking component might have an impact on the intermediation efficiency of Deposit Money Banks (DMBs). The deployment and use of electronic banking mechanisms and products have the potential of determining the amount of deposits available in banks for intermediation purposes. Financial intermediation refers to the process performed by banks of taking in funds from a depositor and then lending them out to a borrower (Kamau, 2011). The banking business thrives on the financial intermediation abilities of financial institutions that allow them lend out money at relatively high rates of interest while receiving money on deposit at relatively low rates of interest. In this regard, financial intermediation has a lot to do with the cyclical fluctuations in the economy. It has been argued that several factors affect the intermediation efficiency in the economy (Oluloyo, 2011; Malade, 2014; Olusanya & Oyebo, Ohadebere, 2012). Common factors in most literature are interest rate and cash reserve ratio.

Researchers have provided mixed evidences related to the impact of electronic banking on banks' intermediation efficiency. Aduda and Kingoo (2012) argued that while the speedy growth of information technology has made some banking responsibilities more efficient and cheaper, such technological investments are also taking a larger share of banks' resources. Currently, apart from personnel costs, technology is usually the biggest item in the budget of a bank, and the fastest growing one. Ali and Emenike (2016) stressed that though researchers agree on the importance of ATMs for the development of the banking industry, some of these researches have also found lack of proportionality between increase in the scale of technology utilization and banks efficiency. In contrast, Akinlo (2007) argued that ATM adoption has positively and significantly improved the performance of banks in Nigeria, and in effect enhanced their intermediation capabilities. ATMs, apart from suitability and safety also have a significant number of economic benefits which include mobilising savings and ensuring most of the cash are available in the country, which hitherto have been in possession of customers, are with banks (Okoro, 2013).

Apparently, there seems to be divided opinions on whether ATM service affects banks' intermediation efficiency or not. Consequently, an empirical investigation on the influence of electronic banking on banks' intermediation efficiency is of utmost relevance for academic and policy formulation purposes. This is intended to appraise the relevance of payment innovations in the banking business and also provide directions to subsequent policy actions by the Central Bank of Nigeria (CBN). Other associated determinants such as interest rate and Cash reserve ratio as observed by Malade (2014), who argued that these are the two major factors that affect bank lending, are taken into consideration as control variables of interest. These variables are sensitive and they affect banks' ability to intermediate efficiently. For the purpose of clarity, the paper is divided into six sections namely introduction (which includes

statement of the problem, research questions and objectives), literature review, methodology, results, discussion of findings and conclusion/recommendations.

Statement of the Problem

The Central Bank of Nigeria noted in 2009 that the flow of credit to the private sector did not meet the prescribed targets and failed to impact positively on investment, output and domestic price level (CBN, 2009). Business news (2016) reported that banking sector credit (net) to the Government fell by 23.5 per cent to N2.893 trillion and private sector credit has been fluctuating. Credit by banks has been shaky and as a consequence, affected businesses that require short-term and long-term funds. This has reduced investment in the country as investors find it difficult to borrow from banks. Certainly, these insights have evoked certain questions bothering on the intermediation efficiency in the Nigerian economy. Several factors have been identified in literature as impediments to banks' ability to efficiently channel credit (Oni, 2016; Berger & Bouwman, 2009; Olokoyo, 2011 & Malade, 2014). Common factors acknowledged in these studies include interest rate and cash reserve ratio. High reserve requirements impose additional costs on banks, since they have to pay a market interest rate to depositors but have to hold a fraction of these deposits in the Central Bank. High interest rate also affects borrowers because it reduces the capacity of borrowers to seek loans and advances.

Abaenewe, Ogbulu and Ndugbu (2013) further conveyed that the introduction of electronic banking has brought major challenges to the banking industry in terms of risk exposure. The prevalent adoption of ATM is expected to affect the mixture of financial services produced by banks, the manner in which banks produce these services and the resulting financial performances of these banks. Whether or not this extreme view proves correct and whether banks take advantage of this new technology will depend on a critical assessment of the effect of ATM adoption on banks' intermediation efficiency which is the focus of this paper.

Research Questions

The following research questions have been proposed based on the problem of the study.

I. What is the effect of ATM service on intermediation efficiency in Nigeria?
II. What effect does the interaction between ATM service and interest rate have on intermediation efficiency?
III. What effect does the interaction between ATM service and Cash Reserve Ratio (CRR) have on intermediation efficiency?

Objectives

Based on the research questions, this study seeks to achieve the following objectives.

I. Assess the effect of ATM service on intermediation efficiency in Nigeria.
II. Evaluate the effect of interaction between ATM adoption and interest rate on intermediation efficiency in Nigeria.

III. Examine the effect of interaction between ATM adoption and cash reserve ratio on intermediation efficiency in Nigeria.

LITERATURE REVIEW

Concepts of ATM Service and Intermediation Efficiency

An Automated Teller Machine (ATM) is a device that offers the clients of financial institutions access to money transactions in a public space without coming in-contact with bank cashiers or workers (Nuthan, Nagarathna, Sumana & Vidya, 2015; Sowunmi, Amoo, Olaleye & Salako, 2014). It enables the customers to perform several banking operations (such as to withdraw cash and make deposits) without the help of a teller.

Intermediation efficiency on the other hand, refers to efficient allocation of resources to productive units in the economy (Kamau, 2011). Financial intermediaries channel funds from people who have extra money or surplus (savers) to those who do not have enough money to carry out a desired activity. There is sufficient evidence to show that countries that have relished or are relishing economic prosperity have been linked with an efficient mechanism for mobilising financial resources and allocating same for productive investment (Sanusi, 2002; Nzotta, 2004; Kamau, 2011; Ehimare, 2013). In literature, the intermediation efficiency indicator is measured by the ratio of currency outside banks to broad money supply (Okereke, 2011; Okoro, 2013; Al-Jarrah, Al-Zu'bi, Jaara & Alshurideh, 2012; Nzotta & Okereke, 2009; Ewubare & Tuaneh, 2016).

Theoretical Framework

The credit channel theory best explains the relationship between ATM service and intermediation efficiency in Nigeria.The credit channel theory holds that a Central Bank's policy affects the amount of credit that banks issue to firms and consumers for purchases, which in turn affects the real economy. The theory was propounded by Friedman and Schwarz in a Nobel Prize–winning book written in 1963. They used historical time series and economic analysis to argue the then novel proposition that changes in the money supply profoundly influenced the United States of America's economy, especially the behaviour of economic fluctuations (Friedman & Schwarz, 1963). The implication is that monetary policy should control the money supply and banks' ability to channel credit. Economic historians see it as one of the most influential economics books of the century. Monetary policy can have an impact on the supply of intermediated credit, which in most countries is predominantly provided by banks. A bank is a financial intermediary that participates in the payment system and finances entities in financial deficit, generally the public sector, firms and some households, using the funds of entities in financial surplus, typically households. Relating this theory to this study, the introduction of the ATM is a monetary policy of the CBN, which has implications for intermediation efficiency of banks.

Empirical Review

There exists a plethora of studies on the implication of ATM service and banks efficiency. The bulk of these studies focused on its impact on the performance of banks. Nevertheless, varied results are evident in the findings of these studies. A study by Gichungu and Oloko (2015) focused on the effect of mobile phone banking, ATM banking, online banking and agency banking on the financial performance of commercial banks in Kenya using the 43 commercial banks as sample. The study established that the identified bank innovations, precisely ATM banking service positively impacted on the financial performance of commercial banks in Kenya.

Relatedly, Makur (2014) assessed the effect of financial innovation on commercial bank's financial performance over a period of 5 years in South Sudan. The study used a casual research methodology and studied 16 commercial Banks registered with the Central Bank of South Sudan for January 2009- December 2013. The average number of daily transactions using ATM for the commercial banks during the study period was 156,547 with standard deviation of 20.51. The findings indicated that the adoption of ATM resulted in strong financial results of commercial banks in South Sudan.

Mahdi and Mehrdad (2010) studied the emergence of e-banking in Iran using Chi square. Their findings reveal that ATMs in banking sector cause cash circulation to decrease, the efficiency of banking sector to increase, as client banking costs decrease. Kamau and Oluoch (2016) used correlation research design to examine the causal effect of innovation on commercial banks' performance from 2012 to 2015. The correlation analysis showed that ATM banking service had the highest influence on commercial banks' performance with the recommendation that more ATMs should be available for bank services.

The claim that ATM service has improved banks' performance has not gone unchallenged. Kondo (2010) used regression analysis to investigate the influence of ATM service on bank profitability in Japan. The study found that ATMs do not have any influence on the return on assets of Japanese banks, which includes the overall profits of bank transactions. Sathe and Sathe (2017) also found that ATM service has a significant negative effect on the production efficiency of banks in India using data envelopment analysis (DEA).

In the context of Nigeria as an emerging economy, findings of the sparse literature between ATM service and intermediation efficiency of the banking industry are also mixed. Jegede (2016) explored the effects of ATM on the performance of Nigerian banks. Chi-square was used to analyse responses of a questionnaire administration from a convenience sample of 125 employees of five selected banks in Lagos State with Interswitch network. The results indicate that less than the benefits, the deployment of ATMs terminals have averagely improved the performance of Nigerian banks because of the alarming rate of ATM fraud. Sowunmi et al. (2014) examined the effects of Automated Teller Machine (ATM) on the demand for money. Primary data were analysed using difference of means and probit analyses. The study

revealed that ATM has reduced queues in the banking hall significantly. The result showed that the frequency of demand for money to meet transitionary and precautionary motives is significantly greater through ATM while average amount withdrawn is smaller compared to teller.

Okoro (2013) examined the effect of electronic banking instruments on the intermediation efficiency of the Nigerian economy using multiple regression technique on time series data of 2006 – 2011. The study reported that there is a positive significant relationship between ATM service and intermediation efficiency in the Nigerian banking industry. Ewubare and Tuaneh (2016) supported this position by investigating the impact of electronic banking instruments on monetary policy efficiency in Nigeria. Data used for the study were generated from the Central Bank of Nigeria quarterly reports and briefs between 2008 and 2011. The results showed that ATM service has impacted greatly on the monetary efficiency of Nigeria.

Contrastingly, Ibenta and Anyanwu (2017) studied the impact of financial innovation on efficiency ratio of deposit money banks in Nigeria from 2006 to 2014. Secondary data covering the period of the study were sourced from the Central Bank of Nigeria statistical bulletin. The finding revealed that the value of transaction on Automated Teller Machine (ATM) service is negatively related with efficiency ratio of deposit money banks. Okonkwo, Obinozie and Echekoba (2015) empirically examined the impact of information and communication technology and financial innovation on the performance of commercial banks in Nigeria, using conveniently selected eleven commercial banks in the country. The study used the banks' annual data and Central Bank of Nigeria facts book over the period 2001 to 2013. The study applied ordinary least square (OLS) in its analysis to ascertain the impact of ATM on the performance of commercial banks in Nigeria. The findings of the study indicate that the adoption of ATMs does not really improve banks' performance.

The inconsistency inherent in these studies lay credence to the need to further re-examine this relationship. In addition, these studies ignored the interaction of interest rate and cash reserve ratio.

METHODOLOGY

Data

Data were collected from 2007 to 2016 on monthly bases from the Central Bank of Nigeria (CBN) for the variables; intermediation efficiency, interest rate, cash reserve ratio and Automated Teller Machine service for all commercial banks in Nigeria. The objectives are to examine the effect of ATM adoption on intermediation efficiency in Nigeria, evaluate the effect of interaction between ATM adoption and interest rate on intermediation efficiency in Nigeria and examine the effect of interaction between ATM adoption and cash reserve ratio on intermediation efficiency in Nigeria. In this study, linear Vector Auto Regression models were formulated to achieve the stated objectives.

Model Specification

The model for this study is adopted from Okoro (2013) with few modification in the dependent variable and the inclusion of interaction variables such as Interest rate (INT) and cash reserve ratio (CRR). The functional relationship for the study is stated as:

$Y_t = f(X_{1t}, X_{2t}, X_{3t})$.

This functional model is specified as a stochastic model thus:

$Y=IE_t$; $X_{1t} = ATM_t$; $X_{2t} = ATM*INT_t$ and $X_{3t} = ATM*CRR_t$

Hence:

$IE_t = \beta_0 + \beta_1 ATM_t + \beta_2 ATM*INT_t + \beta 3\ ATM*CRR_t + U_t$

Where:

IE_t = Intermediation efficiency in Nigeria in period t.

ATM_t = Automated Teller Machine (ATM) service value in period t

$ATM*INT_t$ = Interaction effect of Automated Teller Machine (ATM) service value and interest rate in period t

$ATM*CRR_t$ = interaction effect of Automated Teller Machine (ATM) service value and cash reserve ratio in period t.

$ATM*CRR_t$ = interaction effect of Automated Teller Machine (ATM) service value and cash reserve ratio in period t.

β_0 = constant intercept

β_1, β_2 and β_3 = coefficient of the explanatory variables

U_t = error term

A priori expectation: β_1, β_2 and $\beta_3 < 0$

1. RESULTS

Table 1: ADF Unit Root Test

Variables	Stationarity at level with (P-value)	Stationarity@ 1st diff with (P-value)	Remark
IE_t	*I*(0) -2.94 (0.1525)	*I*(1) -13.04 (0.0000)	Stationary at first difference
ATM_t	*I*(0) -2.13 (0.5228)	*I*(1) -14.13 (0.0000)	Stationary at first difference
$ATM*INT_t$	*I*(0) -0.168 (0.9931)	*I*(1) – 14.93 (0.0000)	Stationary at first difference
$ATM*CRR_t$	*I*(0) - 0.943 (0.9467)	*I*(1) -14.19 (0.0000)	Stationary at first difference

Source: E views 10

Table 1, shows the unit root result of the variables used for this study. This study adopted the Augmented-Dickey-Fuller (ADF) method because, it adds lagged value of disturbance term to take care of serial correlation. It revealed that the non-stationary data was transformed by differencing each of the variables. The result of the first difference for all the variables under ADF method indicated stationarity. This is because the p-values for each of the variables are (0.0000) less than the level

of significance of 0.05. It is therefore, concluded that all the variables are stationary at first difference and integrated of order 1, i.e I(1).

Table 2: Co-integration Result

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
r=0 r = 1	0.231872	47.85613	44.67576	0.0165
r ≤1 r = 2	0.132080	20.67007	29.79707	0.3785
r ≤2 r = 3	0.054900	7.779408	15.49471	0.4893
r≤3 r = 4	0.028607	2.641161	3.841466	0.1041

Source: Eviews 10

Table 2 shows that P-value is significant (less than 0.05) for rank (r) = 0, thus null hypothesis of no cointegration is rejected. For rank (r) = 1, the P-value is significant (less than 0.05); thus, null hypothesis of no cointegration is rejected. The cointegration rank test results based on Trace statistic shows that there is no variable in the sample that has no cointegration. The result stated that there is the presence of one cointegration equation at 5% level which depicts that long run relationship exists among the variables. Based on this result, it has been proved by Johansen cointegration test that when one cointegration equation exists, it shows that use of VAR model is not a good strategy. Therefore, VECM was a better option rather than VAR to investigate the long run and short run relationship of intermediation efficiency, ATM, ATM*CRR and ATM*INT.

Table 3: Lag length Estimation

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-1327.786	NA	2.16e+08	30.54059	30.99101*	30.72205*
2	-1311.207	30.14363	2.13e+08*	30.52743	31.42828	30.89036
3	-1297.937	22.92089	2.28e+08	30.58947	31.94075	31.13387
4	-1287.289	17.42346	2.60e+08	30.71112	32.51282	31.43698
5	-1262.147	38.85644*	2.15e+08	30.50333*	32.75546	31.41066
6	-1252.849	13.52353	2.56e+08	30.65567	33.35821	31.74445
7	-1245.109	10.55449	3.20e+08	30.84339	33.99637	32.11365
8	-1238.316	8.645467	4.14e+08	31.05265	34.65605	32.50437

Source: Eviews 10

Table 3 shows the result of the lag length estimated for this study. The justification for determining lag length in a study show the limit at which previous period/year influence current year. The result revealed that the maximum lag length for the models is 1. This is seen from the values of the indicators; Schwarz information criteria (SC) and Hannon-Quinn information criteria (HQ).

VECM Model

$$\Delta(IE)t = \beta_0 + \beta_1\Delta(ATM)_t + \beta_2\Delta(ATM*INT)_t + \beta_3\Delta(ATM*CRR)_t + \varphi z_{t-1} + U_t$$

Where:
Δ = difference factor
φzt-1 = Error correction coefficient

TABLE 4: The Vector Error Correction Model (VECM)

Cointegrating Eq:	CointEq1			
IE(-1)	1.000000			
ATM(-1)	-0.000307			
	(4.39E-05)			
	[-6.987852]			
ATM_CRR(-1)	-1.52E-05			
	(3.50E-06)			
	[-4.352305]			
ATM_INT(-1)	-1.28E-05			
	(1.74E-06)			
	[-7.308384]			
C	0.124486			
Error Correction:	D(IE)	D(ATM)	D(ATM_CR R)	D(ATM_INT)
CointEq1	-0.134352	-785.8173	-24880.57	-19366.62
	(0.05729)	(204.338)	(5939.17)	(5415.41)
	[-2.34505]	[-3.84567]	[-4.18923]	[-3.57620]

Table 4 shows the result of the Vector Error Correction Model (VECM). The VECM was estimated in two steps: In the first step, the cointegrating relation was estimated by Johansen procedure while in second step, error correction term was calculated by estimated cointegration relation and VAR in first difference, including error correction term (ECT) that was estimated from the first step (denoted cointEq1). The results of cointegrating equation and error correction have been presented in Table 4.
Estimated cointegration equation (cointEq1) is:
IE - 0.000307ATM--1.52E-05ATM*CRR-1.28E-05ATM*INT+0.124486 = 0
which can be written as:
IE = -0.000307ATM -1.52E-05ATM*CRR-1.28E-05ATM*INT+0.124486

Coefficient of cointegration equations represents the long run relationship among variables while coefficient of that term in VECM shows how deviations from that long run relationship affect the changes in the variable in the next period. In the long run, the coefficient of Automated Teller Machine (ATM) which is $\beta = -0.000307$ and P-value = 0.000 indicate that a negative and significant effect at 5% significant level exists between ATM and intermediation efficiency (IE). The coefficient value of ATM does meet the a priori expectation which is expected to be negative. Therefore, holding the other explanatory variables other than ATM constant, a 1% increase in ATM, brought about a decrease in the level of intermediation efficiency by 0.0307%. This means that the contribution of the ATM adoption to Intermediation Efficiency in Nigeria is negative and as low as 0.0307%.

Consequently, the interaction effect of Automated Teller Machine and cash reserve ratio (ATM*CRR) which has a coefficient value of $\beta = -0.0000152$ and P-value = 0.000, indicate that there is a negative and significant interaction effect of ATM*CRR on IE, resulting in the reduction in the intermediation efficiency of the banking sector. The coefficient value of ATM*CRR does meet the a priori expectation which is expected to be negative.

Lastly, the coefficient value of the interaction between automated teller machine and interest rate (ATM*INT) is -1.28E-05 given that the p-value is 0.000. This entails that the interaction of ATM and credit policy variable (interest rate) negatively impact on intermediation efficiency with a significant impact since the p-value is less than the level of significance of 0.05. This coefficient value of ATM*INT also met the a priori expectation which is expected to be negative.

The results of error correction have been presented in Table 4. The value of error correction term should lie between (0, 1). If it has negative sign, it shows convergence and, evaluates the speed of adjustment towards equilibrium; but if positive, it shows divergent towards equilibrium. The results indicate that error correction term for all the variables have the right sign (negative sign) and values'

lines without range 0 and -1, except that for intermediation efficiency. This shows the convergence towards equilibrium level. The main feature of error term is its capability to correct for any disequilibrium that may occur due to shock in the system from time to time. If disequilibrium exists in the system, then error correction term corrects such disequilibrium and provides guidance to variables of the system to come back towards equilibrium. It can be seen that correction of 13.43%, of disequilibrium was "corrected" each month by changes in intermediation efficiency, ATM, ATM*CRR and ATM*INT.

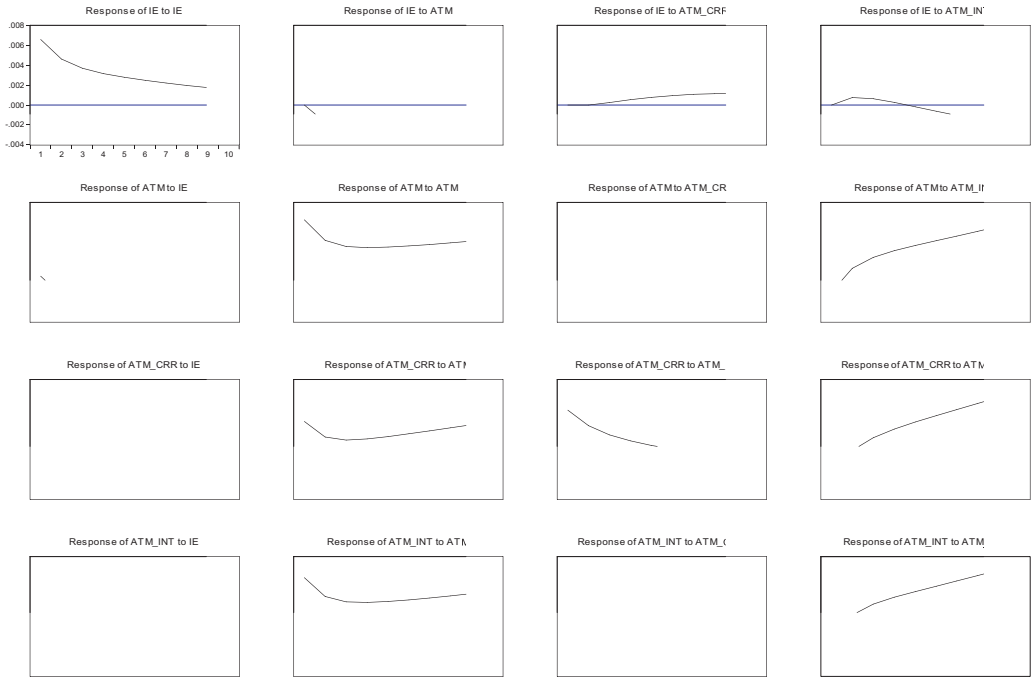

Figure 1: Impulse Response Function (IRF) with Interaction

From the first row in figure 1, a shock in intermediation efficiency (IE) brought about a positive but decreasing effect to intermediation (IE) itself. This means that IE became positive and remained so, till the tenth month even though it was decreasing. Furthermore, a one-unit shock in ATM brought a negative effect on intermediation efficiency (IE). Also, a unit shock in ATM*CRR, caused a positive effect on intermediation efficiency. This result is found to be inconsistent with the VECM model; this could be attributed to the different methods applied. The VECM model held other variables constant, while the impulse response method allowed all variables to vary simultaneously. However, the shock in ATM*INT triggered a significant positive effect in intermediation efficiency (IE) from the first to the fifth month but suddenly IE became negative even to the tenth month.

DISCUSSION OF FINDINGS

Findings of the study revealed that there is a negative significant relationship between ATM adoption and intermediation efficiency in Nigeria. The result of this study is inconsistent with the study of Okoro (2013), who studied the impact of selected e-payment instruments on the intermediation efficiency of the Nigerian economy. The study found that there is a positive significant relationship between ATM and the intermediation efficiency of the Nigerian economy. The finding conforms to the opinion of Ali & Emenike (2016)that there is lack of proportionality between increase in electronic banking adoption and banks efficiency.

In addition, the result is inconsistent with that of Oyelami and Yinusa (2013) who investigated the implication of the alternative payment systems on currency demand and monetary policy using monthly data between 2008 and 2010. Their findings reveal that ATM impacts positively on bank performance. The finding of this research suggests that the adoption of ATM reduces banks' efficiency in intermediation. The implication of this is that the adoption of ATM as an electronic banking component does not necessarily translate into efficiency in intermediation. The continuous usage of ATM has the potential to reduce banks' ability to channel credit to the economy. This could be attributed to the fact that the usage of ATM, though widely accepted by bank customers, still ensures that cash is still available with them. This might affect bank deposits and in effect, their ability to intermediate efficiently. This reality negates the assertion of Abubakar et al (2015) who are of the opinion that electronic banking instruments ensure that the stock of currency held outside the banking system, which constitutes a potential source of unproductive economic resources because they are not available for credit expansion, is integrated into it thereby expanding the deposit base of the money system.

Also, the interaction effect of ATM with interest rate and cash reserve ratio negatively affects intermediation efficiency.This implies that there is a critical link between the efficiency of banks' intermediation and credit policies that affect banks. Corb (2012) argued that more efficient banking system benefits the real economy by allowing higher expected returns for savers with a financial surplus, and lowers borrowing costs for investing in new projects that need external finance.

CONCLUSION AND RECOMMENDATIONS

The study concludes that ATM adoption has a negative significant impact on intermediation efficiency in Nigeria. It also reviles that the interaction between ATM, CRR and interest rate negatively influences intermediation efficiency in Nigeria. In light of this discovery, the study recommends that the CBN should carry out enlightenment programmes that will educate customers on the numerous benefits accruable to using ATM for making transactions, other than withdrawing cash. If customers effortlessly key into this, cash withdrawals will reduce via the

ATM, which could possible make more money retained inside banks for intermediation purposes.

In addition, efforts should be made by the government to encourage policies that will lessen interest rate and cash reserve ratio burden on banks. This will enable them to carry out their core function of intermediation efficiently.

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EMPIRICAL ASSESSMENT OF THE RELATIONSHIP BETWEEN CAPITAL EXPENDITURE ON SOCIAL SECTOR AND PUBLIC REVENUE IN KADUNA STATE, NIGERIA (1988 - 2016)

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ABSTRACT

This study examined the empirical relationship between capital expenditure on the social sector and public revenue of Kaduna State (made up of federal statutory allocations to states on the one hand and internally generated revenue on the other). Data for the study which covers the period 1988 to 2016, were sourced from Kaduna State Government reports. Unit root tests were conducted using Augmented DickeyFuller(ADF) and Philips-Peron (PP) tests. All the data series were found to be stationary at I(1). Co-Integration test was also conducted to ascertain the existence of a long run relationship between the explanatory variables and the dependent variable. Vector Error Correction Mechanism (VECM) was thereafter employed for the analysis using E-views 8.0. The major findings of the study revealed among others, that in the long run, internally generated revenue (IGR) maintained a statistically significant relationship with capital expenditure on social sector, while federal statutory allocation and inflation were not significantly related to the expenditure on social sector. The results also revealed that in the short run, only inflation maintained a significant relationship with expenditure on social sector while internally generated revenue and federal statutory allocations did not, at five percent level of significance. Based on this, the study concludes that internally generated revenue played a modest role in financing social sector development in Kaduna State. The study therefore recommends the widening and deepening of IGR collection in order to promote further growth in the social sector.

Keywords: Public Capital Expenditure, Economic Sector, Internally Generated Revenue, Federal Statutory Allocation

INTRODUCTION

In order to execute development projects, governments all over the world, require additional resources through revenue generation. Otubala (2011) opined that revenue generation refers to the inflow of financial resources into government treasury for the purpose of expenditure in various economic units or sectors. Expenditure has been used by federal governments and their functional equivalents throughout history, to carry out many functions of government such as economic infrastructure, social services, and for the operation of government itself. All these play crucial roles in the process of economic activities (Charles, 2014). Increase in government funds normally results in increased government expenditure which in

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turn directly impacts key development sectors, especially the social, economic and regional sectors of the economy. The provision of water, education, health, security, youth empowerment, roads and many other development projects are cases in point (Olowolaju, Ajibola, Ishola & Falayi 2014). For these reasons, governments at all levels exert full authority in maintaining multiple channels of revenue generation through which adequate funds are made available for the achievement of set goals and objectives (Samuel & Tyokoso, 2014). The Nigerian economy experienced severe financial constraints in recent years owing to dwindling fortunes from the oil sector. This dearth of revenue has not been limited to the federal government alone, it also affected the states and local governments adversely.

The periodic crash of international crude oil prices, expectedly have led to acute shortage of foreign exchange, rapid depreciation of the local currency and ultimately, spiral inflation. It thus became imperative for governments at all levels, to diversify their sources of revenue. On the other hand, the revenue sources available to states and local governments in Nigeria are both internal and external, but are broadly categorized as federal statutory allocations (FSA) and internally generated revenue (IGR). Other sources which are not always readily available, include loans and grants (Obidike, 2013).

From available records, the total capital expenditure for all the development sectors of Kaduna State for the period 2011 to 2014, stood at N112.4 billion as compared with 119.6 billion spent on overhead (Accountant General Report, 2015). This implies that Kaduna state government had spent more on recurrent costs than on capital expenditure. The state's Accountant General's Report, (2016) indicates that between 2006 and 2016, the state received about N658.9 billion from federal statutory allocations; N44.2 billion as grants and N304.5 billion as loans, while internally generated revenue (IGR) stood at N161.2 billion. On the other hand, the liability on loans, both internal and external as at the end of 2015, stood at about N72.5 billion and by the end of 2016 it rose to about N98.9 billion. This has become a highly pervasive problem for most of the states in Nigeria, with the exception of Lagos State whose internally generated revenue (IGR) stood at N302.42billion in 2016, while its annual salary bill was N72billion. The balance was thus injected into capital projects (Nurudden, 2018).

The gap between the budgeted revenue and capital expenditure in kaduna state still remains wide. The adverse financial situation is further aggravated by the prevailing inflationary situation in the country which erodes the value of money. However, whenever federal allocations and internally generated revenue (IGR) expand, expenditure patterns may change in favour of some sectors relative to others (Abdallah, 2014).

The relationship between public revenue and government capital expenditure in all the development sectors is therefore an important subject for research and debate

(Mitchel & Sunday, 2013). However, the critical questions are: will capital expenditure in the social sector steadily increase the long-run growth of the state economy? What is the nature of the relationship between capital expenditure in the social sector and public revenue (from both federal statutory allocations and internally generated revenue) in Kaduna State? To what extent does inflation affect this relationship?

It is on the basis of these insights that this paper has attempted to establish a relatively simple functional relationship between public capital expenditure and public revenue in Kaduna State. In doing so, the paper has been divided into six sections namely; introduction, literature review, methodology, presentation/analysis of results, discussion of findings and conclusion/recommendations.

LITERATURE REVIEW

Conceptual Clarification

Government expenditure has been conceptualized differently in different studies. Gimba and Yakubu (2016) defined government expenditure as the expenses incurred by the government of a state or nation, in running its affairs. It can also be viewed as the expenditure government incurs on the development sectors of the economy based on the revenue generated. For the purpose of this study however, capital expenditure refers to monies spent on the financing of durable assets and projects in health, education, information and several other social projects.

Satheesh (2016) defined the social sector as a sector that includes health, education, employment benefit/employment guarantee schemes and sanitation. Kaduna State index of economic activities (2010) defines social sector as a development sector which includes health, education, information as well as youth and social development. This study has adopted the latter as its working definition. On the other hand, internally generated revenue (IGR) is defined in this study as those revenues that are derived from within the state, from various sources such as Pay as You Earn (PAYE), Direct Assessment Tax, Withholding Tax, Capital Gains Tax, Property Tax, rent on government properties and interest earned on bank deposits as well as dividends on government investments. It also includes licenses, fines and fees (Adebayo and Rowland, 1974). Internally generated revenue is the primary source of funds needed for the sustenance of states and local governments. This is because it is the only source that states and local governments have control over.

Federal government statutory allocations (FSA) as defined by Edward (2016) is the programme in which the federal government provides funds to the states and local governments without specifying the use to which the funds must be put into. Kaduna State Accountant General's Report (2015) defines federal statutory allocations as revenue collected by states and local governments on a monthly basis, which represents their share from the Federation Account. This study has adopted the

Accountant General's definition of the term. Melberg (1992) and Onwukwe (2003) define inflation as a significant and sustained rise in the general price level or a declining value of the monetary unit. Ribdi (2014) views inflation as the persistent rise in the general price level of a broad spectrum of goods and services in a country, over a period of time. This view is consistent with the working definition employed in this study.

Government revenue refers to funds available to the government for financing its activities and other development projects. States derive their revenue based on the opportunities and resources available to them (Anyafo, 1996; Adam, 2010). For the purpose of this study, government revenue refers to federal statutory allocations and internally generated revenue.

Theoretical Issues

Adolf Wagner's theory suggests that the share of public sector in the economy will rise as the economy grows (Wagner, 1883). Wagner contended that there is a functional relationship between the growth of an economy and the growth of government activities such that the government sector grows faster than the economy. Wagner justified this view of increasing public expenditure with the growing role of state activities by showing that at the initial stage, state activities were limited to only defence, justice, law and order; but with increased per capita income, government found it necessary to expand its activities. Wagner also attributed the tendency of increasing government expenditure to the increase in population density and urbanization (Gyong, 2014). He argued that urbanization implies a much larger per capita expenditure on civil amenities and crime control. In addition, incidental services like traffic, road, water, energy, health among others, have to be provided. The Peacock Wiseman hypothesis (Peacock & Wiseman 1961) confirmed Wagner's theory, but with a proviso that there are three conditions that must be met in order to understand the tax-expenditure-income relationship. Bearing in mind that the main focus of their hypothesis is that the pattern of public expenditure does not follow a smooth or continuous trend, they posited that changes in public expenditure will take place in jerks or steps. On the other hand, Keynes is still given credit for providing a theoretical link between public expenditure and economic growth. He posited that public expenditure is an exogenous factor and a public instrument for increasing national income. Keynes was of the view that increase in government expenditure on infrastructure for example, will lead to higher economic growth (Keynes, 1936). This Keynesian view is consistent with the broad objective of this study.

Empirical Review

Christopher (2015) examined the causal relationship between government spending and economic growth for the Namibian economy by using general government (final) consumption expenditure and real gross domestic product (GDP) data for the

period 1980 to 2012. The study employed the pair wise Granger causality test, co-integration test and vector error correction model (VECM). The results showed that there is a uni-directional relationship between the two variables. The outcome of the study suggests that government spending had a significant and positive impact on economic growth in Namibia.

Aigbokhan (1996) explored the impact of government size on economic growth in Nigeria, for the period 1960 to 1993. The study employed a bi-directional causality approach using the Engle Granger two-step procedure and the standard causality test to analyse the results. The study discovered that public spending and real income were not co-integrated, implying the absence of a long term relationship between the variables. In addition, causality tests applied on the model reveal that public expenditure did not cause growth in real income. In a similar study, Suleiman (2012) examined the empirical relationship between government revenue and government expenditure in Nigeria. The study tested for the stationarity properties of the time series (public finance data) for the period 1979 to 2008 using the Augmented Dickey-Fuller (ADF) test. Johnsen's co-integration test was also carried out in order to determine whether there was evidence of a long term relationship or otherwise between the series. The study's findings reveal that growth in both real gross domestic product and government revenue caused growth in government expenditure. The study made a case for more efforts towards diversifying the revenue base.

Chude and Chude, (2013) investigated the effect of public expenditure in education on economic growth in Nigeria, over the period 1977 to 2012, with particular focus on disaggregated sectoral expenditure analysis. The study employed the error correction model (ECM) and the results indicated that total expenditure on education is positively related to economic growth and the relationship is statistically significant and positive. Torruam, Chaiwa and Abur (2014) examined the impact of public expenditure on tertiary education and economic growth in Nigeria using time series data for the period 1990 – 2011. The econometric methods employed are co-integration and error correction techniques. The findings reveal that public expenditure on tertiary education had a positive impact on economic growth in Nigeria. Michael and Sunday (2013) assessed the effects of internally generated revenue on infrastructural development in Akwa Ibom State. The study specifically sought to ascertain the extent to which internally generated revenue (IGR) contributed to the provision of such infrastructures as water, electricity, and roads. An ex-post facto research design was adopted and the data used were obtained from secondary sources. The data were analysed with simple percentage statistics, while simple regression statistics were used in testing the hypotheses. The findings reveal that IGR contributed significantly and positively to the provision of water, electricity and roads. In another development, Olowolaju and Ajibola; Ishola and Falayi (2014) conducted a study on federal government's statutory funds allocations to states in Nigeria. The study focused on the relationship between such allocations and the

performance of Ekiti state economy as a case study. Multiple regression was used for the analysis in which internally generated revenue and statutory allocations were the independent variables while the gross domestic product was the dependent variable. The findings reveal that only statutory allocations had a significant positive effect on the gross domestic product, while the contribution of IGR was insignificant.

METHODOLOGY

Data and Model Specification

In line with Keynes (1936) theoretical views on the relationship between government spending and economic growth, together with the related literature reviewed above, the relationship between public capital expenditure and public revenue in Kaduna State is expressed as:

$$Y = f(X), \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

n n n

Where:
Y = Dependent variable
f(X) = Explanatory variables
Based on equation 1, the econometric VECM model may be formulated as:

$$\Delta\ln(SOS)t = \beta_0 + \sum_{i=1}^{n}\beta_1\Delta\ln(IGR)_{t-1} + \sum_{i=1}^{n}\beta_2\Delta\ln(FSA)_{t-1} + \sum_{i=1}^{n}\beta_3\Delta \ln(INF)_{t-1} + \delta ECT_{t-1} + ?t \ldots\ldots(2)$$

Where:
SOS = expenditure on social sector
IGR = internally generated revenue
FSA = federal statutory allocation
INF = inflation rate
β_0 = constant factor or intercept
$\beta_1 \ldots \beta_3$ = coefficients of IGR, FSA and INF respectively
ECT = error correction term
δ = error correction coefficient for the model
? = error term
Σ = summation
n =number of years
The a priory expectations are $\beta_1, \beta_2 > 0$; $\beta_3 < 0$.

The intercept (β_0) is the value of the dependent variable when the independent variable is equal to zero, while the slope of the regression line (β1, β2 and β3) represents the coefficients of the independent variables. The statistical tests for estimation and measurements include the co-efficient of determination R2, F-test., and the DW- statistic. The level of significance at which the hypotheses are accepted is generally 5 percent.

PRESENTATION AND ANALYSIS OF RESULTS

Unit Root Test: Augmented Dickey Fuller and Philips-Peron test statistics

The time series data for all the variables (SOS, IGR, FSA and INF) in the model were tested for stationarity for the period 1988-2016, using Augmented Dickey Fuller (ADF) and Philips-Peron (PP) test statistics. The Barlett-Kernel test was also used to support the ADF test in establishing the stationarity of the data and order of integration.

Table 1 presents a summary of the unit root test on all the variables in the model. The ADF and PP tests were carried out at first difference.

Table 1 : Unit Root Test Summary

	ADF Test			PP test		
Variables	**ADF Test at 1st Difference**	**95% ADF* Critical Level**	**Order of Integration**	**PP Test at 1st Difference**	**95% PP* Critical Level**	**Order of Integration**
LNSOS	-3.537557	-2.991878	I(1)	-6.904178	- 2.976263	I(1)
LNIGR	-4.036382	-2.986225	I(1)	-6.670257	-2.976263	I(1)
LNFSA	-4.940976	-3.644963	I(1)	-4.760689	-3.976263	I(1)
LNINF	-4.891000	-2.976263	I(1)	-5.554838	-2.976263	I(1)

* means significant both at 5% and 10% level

Source: Authors' Eviews Computation (2018)

Table 1 shows that the results from the two tests confirm that all the series are stationary at first difference. In other words, LNSOS, LNIGR, LNFSA and LNINF are integrated at 1(I) at the 5 percent level of significance. It is clear from the result that the null hypotheses which state that the 'series have a unit root but are not stationary' are rejected since the ADF and PP test statistic values are less than the critical value of 5 percent. Therefore, the data used are said to be stationary and statistically significant. This is an indication that long run relationships exist between the variables under consideration.

Table 2: Lag Selection Criteria for Social Sector

VAR Lag Order Selection
Criteria
Endogenous variables: LNSOS LNIGR LNFSA
LNINF

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-100.5610	NA	0.050466	8.364882	8.559902	8.418972
1	-34.35294	105.9329	0.000929	4.348235	5.323336*	4.618687
2	-12.12421	28.45278*	0.000632*	3.809937*	5.605118	4.336749*
3	4.405105	15.86814	0.001255	2.219940	6.755201	4.510776

Source: Authors' Computation (2018) usingE-views

Using a correct model specification is a precondition for arriving at good and acceptable results from time series studies involving dynamic structures such as VAR and VECM. Selecting an optimum lag length is therefore critical in the choice of a correct model specification. Based on the test results summarized in table 2, four out of the five criteria for lag length suggest a lag length of 2 and therefore, the study has adopted the conclusion.

Table 3: Johenson Co-Integration test for the Social Sector

Series: LNSOS LNIGR LNFSA LNINF
Lags interval (in first differences): 1 to 2
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.753334	71.26575	47.85613	0.0001
At most 1 *	0.513377	33.47330	29.79707	0.0180
At most 2	0.247146	14.02611	15.49471	0.0822
At most 3 *	0.209904	6.361238	3.841466	0.0117

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.753334	37.79245	27.58434	0.0017
At most 1	0.513377	19.44719	21.13162	0.0846
At most 2	0.247146	7.664867	14.26460	0.4138
At most 3 *	0.209904	6.361238	3.841466	0.0117

Max-eigenvalue test indicates 1 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: Authors' Computation (2018) using E-views

The result of the co-integration test for the social sector (SOS) and other independent variables as shown in table 3 reveal that for the Trace statistic, there are at most 2 co-integrating equations while the Maximum Eigenvalue shows at most 1 co-integrating equation at the 5 percent level of significance. Since a long-run relationship exists between the variables, the use of a VECM is justified.

Vector Error Correction Model

The summary of the results for the long and short run estimates are reflected in Tables 4a and 4b respectively.

Table 4a Summary of the Long Run Estimate

Dependent Variable	Social Sector		
	Independent Variables	Coefficient	t-statistics
	C	15.73116	
	IGR	0.208666	2.84003
	FSA	5.365146	1.79183
	INF	-2.792838	-1.50319

Source: Author E-views 8.0 Computation (2018)

The result of the regression analysis and the accompanying significance tests for the social sector are presented in the following form:

$\Delta ln(SOS) = 15.73116 + 0.208666^* \Delta ln(IGR) + 5.365146^* \Delta ln(FSA) - 2.792838^* \Delta ln(INF)$

R – Square = 0.481390 Prob.F-stat = 0.018306

F- Statistic = 1.650188 Durbin-Watson = 1.777446

Analysis of the Long Run Estimate

Table 4a displays the summary of the long-run estimate of the model. The value of R_2 has been established as 0.481390. This indicates that the model accounts for 48.14 percent of the variations in the capital expenditure on social sector as a result of a unit change in the independent variables. On the other hand, the F- statistic is found to be 1.650188 and the corresponding p-value is found to be 0.018306, and this is less than the critical value of 0.05, which implies that the variables in the model are jointly significant at the 5 percent level ($\alpha = 0.05$). The Durbin-Watson Statistic which measures the existence of autocorrelation is found to be 1.777446. Given that the D-W statistic lies between 0 and 4, indicates absence of autocorrelation. Any value above 2 indicates negative autocorrelation. Based on the results, it is concluded that there is a slight incidence of positive autocorrelation because the D-W statistic is

slightly less than 2.

The β coefficients on the variables internally generated revenue (IGR), federal statutory allocation (FSA) and inflation (INF) are 0.208666, 5.365146 and -2.792838 respectively. The t-statistics on the explanatory variables are 2.84003, 1.79183 and 1.50319 at their absolute values, for internally generated revenue (IGR), federal statutory allocation (FSA) and inflation (INF) respectively. This

Table 4b Summary of the Short Run Estimate

Dependent Variable	Social Sector		
	Independent Variables	**Coefficient**	**t-statistics**
	C	0.280918	0.81517
	IGR	0.172346	-0.22858
	FSA	0.344898	0.43396
	INF	-0.793707	-2.27860
CointEq1		-0.09272o	-1.48126

CointEq1 means the short run Error Correction Mechanism

Source: Authors' Computation (2018)using E-views

The analysis of the short run estimate begins with a very important explanation. In the first instance, it should be noted that the VEC output presentation using e-views 8.0, follows a two-part procedure. The first part is based on the use of unrestricted VAR to generate the long-run VEC relationship. The second part which employs the restricted VAR, presents the short- run estimates, the error correction coefficient (CoinEq1) and the summary statistics (E-views User Guide, 2019). Based on this, the summary statistics are the same with those for the long run estimates. In other words, the analysis for the long run summary statistics equally applies to the short-run estimate.

The t-statistics reveal that internally generated revenue (IGR), federal statutory allocations (FSA) and inflation (INF) in their absolute values, are 0.22858, 0.43396 and 2.27860 respectively. This indicates that in the short-run, only inflation (INF) has a statistically significant relationship with the dependent variable (capital expenditure in the social sector) while IGR and FSA do not, at the 5 percent level of significance. The value of the error correction coefficient is rather low at 0.093, but it has the expected negative sign. This implies that deviations from the equilibrium value of the dependent variable will be corrected at the rate of 9.3 percent per annum.

DISCUSSION OF FINDINGS

The findings in this study are corroborated by that of Olowolaju, (2014), who used the same explanatory variables as those used in this study, though he used a growth variable (GDP) as the dependent variable. He discovered that both IGR and FSA maintained a positive and statistically significant relationship with GDP growth in Ekiti state. This study is also corroborated by Gimba and Yakubu (2016) who sought to establish the empirical evidence of the relationship between public expenditure and public revenue in Nigeria. Overall, this study has confirmed the a priori expectation on the relationship between public capital expenditure and public revenue in Kaduna state, Nigeria. Based on the foregoing, it is evident that government capital expenditure on social sector is largely determined by factors other than only internally generated revenue (IGR) and federal statutory allocations (FSA) in Kaduna state.

CONCLUSION AND RECOMMENDATIONS

This study has, to a very large extent, established the existence and nature of the relationship between public capital expenditure on the social sector and public revenue in Kaduna state. The social sector consists of a group of sub-sectors which include health, education, information, security and youth/ social development among others. Also important is the fact that the findings are similar to a few in separate studies. The study has also established that in the long run internally generated revenue played a modest, positive and significant role in promoting the growth of the social sector of Kaduna state. Surprisingly, federal statutory allocations to the state did not play a significant role in the relationship. However, the variable maintained a positive relationship with expenditure on the social sector. The major policy implication points to the diversification of the state's economy so as to raise IGR due to its positive impact on the state.

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BANK CREDIT AND MANUFACTURING SECTOR OUTPUT IN NIGERIA: A NONLINEAR DYNAMICS AND STRUCTURAL BREAKS ANALYSIS

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ABSTRACT

The manufacturing sector in Nigeria epitomizes a platform in government plan to reorganize the economy and diversify its productivity base. It is recognized as one of the leading sectors in an emerging economy such as Nigeria. In recognition of these potential roles of the sector, successive governments in Nigeria have continued to articulate policy measures and programmes to achieve industrial growth incentive and adequate finance. In spite of all attempts in developing the manufacturing sector, the situation of the sector reveals that it has not improved appreciably as its contribution to Gross Domestic Product (GDP) has remained low. Using nonlinear dynamics and structural breaks, this study examined the nexus between bank credit and manufacturing sector output in Nigeria from 1986 to 2017. It was discovered that there exists a unique long-run equilibrium relationship between bank credit and manufacturing sector output (MSO). The findings showed that bank credit is an important determinant of manufacturing sector output in Nigeria. In addition, the empirical results revealed that bank credits have a significant impact on manufacturing sector output. The causality result supported the view that causality runs from bank credit to manufacturing sector output, implying that the supply-leading hypothesis prevails in Nigeria. The study recommends that that there is the need for monetary authorities to employ a direct monetary policy strategy where specific sectors (such as the manufacturing sector) can be given timely and effective interventions so as to enhance their growth and performance.

Keywords: Bank Credit, Manufacturing sector output, Causality and Non-linear ARDL

JEL Classification: L60, E44, E43, E42 and C11

INTRODUCTION

The manufacturing sector in Nigeria epitomizes a major plan in government plan to reorganize the economy and diversify its productivity base. The manufacturing sector is one of the leading sectors in an emerging economy such as Nigeria. It serves as an avenue for increasing productivity in relation to import replacement and export expansion, creating foreign exchange earning capacity, rising employment and per capita income, which causes unique consumption patterns (Kehinde & Adejuwon, 2011). Furthermore, manufacturing sector creates investment capital at a faster rate than any other sector of the economy while promoting wider and more effective linkages among different sectors. In terms of contribution to the Gross Domestic

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Product (GDP), the manufacturing sector is dominant and it has overtaken the services sector in a number of Organization for Economic Co-operation and Development (OECD) countries (Anyanwu, 2010). In recognition of these potential roles, successive governments in Nigeria have continued to articulate policy measures and programmes to achieve industrial growth incentive and adequate finance (Orji, 2012).

The role of bank credits in the efficient and effective performance of the real sector cannot be overemphasized. The deposit money banks play the role of financial intermediary as they collect savings of the house hold and then efficiently channel to entrepreneurs for productive use. They provide structures for monetary management and the basis for managing liquidity in the system. These objectives are not achievable without significant levels of resources from the financial sector being mobilized and deployed to credit business expansion and growth. Banks, thus have to be effective intermediaries for mobilizing and channelling deposits to the productive sector of the economy especially the manufacturing sector. From 1986 to 1992, the value of bank credit to manufacturing was below ? 10 billion. However, there was a significant increase from ? 10 billion to ? 15 billion from 1991 to 1992 which accounts for 50% increase. From 1999, the value has been on a significant increase and reached its peak in the year 2016 and 2017 of about ? 2066.5 billion and ? 2230.7 billion respectively (Central Bank of Nigeria; CBN, 2017).

Despite attempts in developing the manufacturing sector, the situations of manufacturing sector in Nigeria reveal that manufacturing sector has not improved appreciably. Manufacturers' Association of Nigeria (MAN, 2015) observed that the manufacturing sector in Nigeria has been experiencing stunted growth and its contribution to Gross Domestic Product (GDP) has remained low. The manufacturing sector contributed 34.94% to gross domestic product in 1986 after the structural adjustment programme; but by 1990 and 1995 it declined to 22.84% and 10.17% respectively. The contribution of the Nigerian manufacturing sector to Gross domestic product remained very insignificant between 1996 and 2015. The year 2000, 2005, 2012 and 2015 recorded 6.97%, 2.80%, 1.88% and 2.92 respectively (CBN, 2015). Available statistics further showed that the number of registered manufacturing firms with the Manufacturers' Association of Nigeria (MAN) dropped from 4850 in 1980s to 2000 in 2010. Capacity utilization which was 70.1% in 1980, dropped to 52.8% in 2005 and 48.0% in 2009. Similarly, direct manufacturing employment declined over the years; 2,752,832 people were engaged by manufacturing sector in 2001, 1,043,982 in 2005 and 1,026,305 in 2008 (Mike, 2010). On the other hand, credit to the real sector has experienced significant growth over the years; in 2001, N764.9 billion was channelled to the real sector, in 2006 and 2010, credit to the real sector was N2, 2941.4billion and N10, 157.02billion respectively; by 2015 it has increased to N22, 414.3 billion (CBN 2016). In spite of

the growth in credit supply to the real sector, the contribution of manufacturing sector to the Nigerian economy appears to be insignificant especially, when compared to the oil and the agricultural sectors. It is in view of the above situations, that this study seeks to empirically examine the nexus between bank credit and the output growth of the manufacturing sector in Nigeria from 1986-2017. In doing so, the paper has been divided into six sections namely; introduction, literature review, methodology, results and discussion, discussion of findings as well as conclusion and recommendations.

LITERATURE REVIEW

Theoretical Review

Supply Leading Hypothesis: This hypothesis was first put forth by Schumpeter (1912) and later supported by the works of McKinnon (1973). The conventional view of the supply-leading hypothesis postulates that financial depth causes economic growth. The theory posits that a well-developed financial sector provides critical services to reduce transaction, information and monitoring costs and increase the efficiency of intermediation. It mobilizes savings, identifies and funds good business projects, monitors the performance of managers, facilitates trading and the diversification of risks, and fosters exchange of goods and services. These services lead to efficient allocation of resources; more rapid accumulation of physical and human capital; and faster technological innovation. This eventually results into faster and long-term economic growth (Schumpeter, 1912).

Endogenous Theory of Growth: Bencivenga and Smith (1991); and Levine (1991) were among the first to propose endogenous growth models to identify the channels through which financial markets affect long-run economic growth. With the emergence of the endogenous growth theory, the direct and indirect influence of financial markets on economic growth drew considerable attention, particularly with regard to sound development strategies. The endogenous growth models focus on the relationship between financial development and long-run economic growth emphasizing that productivity growth is most likely due to the channel of transmission of financial development to economic growth. The argument is that financial markets activities and operations raise saving, investment and hence the growth rates. This theory assumes that long-run economic growth rate is determined by internal forces in the system. This is measured by the growth rate of output per person and depends on the growth rate of total factor productivity (TFP) which is determined in turn by the rate of technological progress.

This study is hinged on supply leading hypothesis. The choice of the supply leading hypothesis is due to the fact that a well-developed financial sector provides critical services to reduce transaction, information and monitoring costs and increase the efficiency of intermediation.

Empirical Literature

Ebi and Nathan (2014) investigated the impact of commercial bank credit on Nigeria industrial subsectors between 1972 and 2012 using the Error Correction Model (ECM). They found that commercial bank credits impacted positively and significantly on the manufacturing sub-sector in Nigeria in the long-run. In addition, commercial bank credits to mining and quarry is a positive and significant determinant of the current year Mining and Quarry output in Nigeria; previous year's bank credits to real estate and construction is a positive determinant of the current year real estate and construction output. Bank credits to manufacturing, mining and quarry as well as bank credits to real estate and construction correlated positively with aggregate industrial output with bank credits to real estate and construction having greater and significant impact on industrial output. Interest rate was not an important determinant of industrial sector and industrial sub-sectors outputs, exchange rate had a negative and significant determinant of industrial sector's output in Nigeria. These results point to the conclusion that, increased bank credits to industrial sector is indispensable in stimulating industrial sector growth in Nigeria.

Chinweoke, Egwu, and Nwabeke, (2015), investigated the impact of commercial banks' loans and advances on the agricultural and manufacturing sectors on the economic growth in Nigeria for the periods, 1994 - 2013 using ordinary least square technique. The result showed that banks' loans and advances to agricultural and manufacturing sectors have statistically significant impact on economic growth. Ogar, Nkamene and Effiong (2014) investigated the impact of commercial banks' loans, on manufacturing sectors. Secondary data, such as manufacturing output, commercial banks' loans, and commercial banks' interest rate were variables used for the study. Ordinary least square of multiple regression was used on the models to determine the relationship between dependent variables and independent variables.Their findings revealed that commercial banks' credits had a significant relationship with the manufacturing sector. Closely related to this, is a study by Dabwor and Umejiaku (2015) on the effectiveness of monetary policy transmission routes on Nigeria's manufacturing output. Employing error correction analysis, the study found out that the credit channel impacted negatively on manufacturing output in Nigeria.

In a more recent study on financial deepening, Karimo and Ogbonna (2017) investigated the direction of causality between financial deepening and economic growth in Nigeria for the period 1970–2013. Their study adopted the Toda–Yamamoto augmented Granger causality method of analysis. Results showed that the growth-financial deepening nexus in Nigeria follows the supply-leading hypothesis; thus, indicating that it is financial deepening that leads to growth and not growth leading to financial deepening. Based on their findings, they recommended that policy efforts should be geared towards removing obstacles that undermine the growth of credit to the private sector, so as to restore investors' confidence in the stock market operations. From the studies reviewed, none employed the NARDL to

model the impact of bank credit on manufacturing sector outputs which is the gap this study has attempted to fill. In addition, the extension of the study period to 2017 (1986-2017) is also a gap.

METHODOLOGY

To address the objectives of the study, the paper considers: the non-linear autoregressive distributive lag (NARDL) approach of Shin and Greenwood-Nimmo (2014) and the Toda and Yamamoto (1995) granger causality approach.

NARDL Approach

The NARDL approach was used to examine the relationship between bank credit and manufacturing sector output. Van-Hoang, Lahiani and Heller (2016) highlighted some of the advantages of using the NARDL approach as follows:

i. First, it allows modelling the cointegration relation that could exist between the dependent and independent variables.

ii. Second, it distinguishes between the short- and long-run effects from the independent variable to the dependent variable. Of course, these advantages may also be valid for nonlinear threshold Vector Error Correction Models (VECM) or smooth transition models; however, these models may suffer from the convergence problem due to the proliferation of the number of parameters. This is not the case with the NARDL model.

iii. Third, unlike other error correction models where the order of integration of the considered time series should be the same, the NARDL model relaxes this restriction and allows combining data series having different integration orders for all the series in the model. A conventional time series regression model contains constant parameters and assumes that a change in explanatory variable has the same effect over time which may not be appropriate. Estimating a relationship which possibly has asymmetry with symmetric techniques seems unfair and may lead to inappropriate policy conclusions (Enders, 2014). Therefore, NARDL appears less computationally intensive compared to other asymmetric models.

The simple Ordinary Least Square (OLS) of bank credit and manufacturing sector output take the form: $MSO = \varphi_0 + \varphi_1 BC + \varsigma_t$ (1)

Where: MSO = manufacturing sector output, BC= Bank credit, φ_1 = slope coefficient of bank credit, φ_0=intercept and ς_t= white noise error term.

To capture the possible asymmetric effects of bank credits on manufacturing sector output, NARDL technique decomposes the bank credit series into two parts: (1) partial sum of positive change in bank credit denoted by BC^+ and; (2) partial sum of negative change in bank credit denoted by BC^- and including both of them as separate regressors in the model, the model becomes:

$$MSO_t = \varphi_0 + \varphi_1 BC^+ + \varphi_2 BC^- + \varsigma_t \qquad (2)$$

Where, this is now a three-variable Ordinary Least Square (OLS) model. The study now represents this equation (that is equation 2) in (linear or symmetric) ARDL model proposed by Pesaran, Shin and Smith (2001); and it takes the NARDL form of Shin et al. (2014) as:

$$\Delta MSO_t = \varphi_0 + \varphi_1 MSO_{t-1} + \varphi_2 BC^+_{t-1} + \sum_{i-1}^{m} \psi \Delta MSO_{t-j} + \sum_{j=0}^{n} \left(\pi^+_j \Delta BC^+_{t-j} + \pi^-_j BC^-_{t-j} \right) + \varsigma_t \quad (3)$$

In equation (3), the bank credit variable (BC_t) has now been decomposed into and BC^-_t denoting positive and negative changes of bank credit respectively BC_t. These decomposed bank credits are defined theoretically as:

$$BC^+_t = \sum_{j=1}^{t} \Delta BC^+_j = \sum_{j=1}^{t} \max\left(\Delta BC_j, 0\right) - - - - - (3A)$$

$$BC^-_t = \sum_{j=1}^{t} \Delta BC^-_j = \sum_{j=1}^{t} \min\left(\Delta BC_j, 0\right) - - - - - (3B)$$

Equations (3) can be extended to include endogenous structural breaks. The breaks obtained are included in the regression model to capture any possible shift that may bias the model (Olofin & Afeez, 2017). The model is thus specified as:

$$\Delta MSO_t = \varphi_0 + \varphi_1 MSO_{t-1} + \varphi_2 BC^+_{t-1} + \varphi_3 BC^-_{t-1} + \sum_{i-1}^{m} \psi \Delta MSO_{t-j} + \sum_{j=0}^{n} \left(\pi^+_j \Delta BC^+_{t-j} + \pi^-_j BC^-_{t-j} \right) + \sum_{r=1}^{k} \tau_t D_{it} + \varsigma_t \quad (4)$$

As shown in equation (4), the breaks are captured with the inclusion of $\sum_{r=1}^{k} \tau_{rit} D$ where D_{it} is a dummy variable for each of the breaks defined as $D_{it} = 1$ for $t \geq T_{Di}$ otherwise $D_{it} = 0$ The time period is represented by $t; T_{Di}$ are the structural break dates; where $r = 1,2,3,..., k$ and τ_r is the coefficient of the break dummy. All the other parameters have been previously defined.

We can re-specify equation (4) to include an error correction term thus:

$$\Delta MSO_t = \upsilon \delta_{t-1} + \sum_{i=1}^{N1} \psi_i \Delta MSO_{t-i} + \sum_{j=0}^{N2} \left(\pi^+_j \Delta BC^+_{t-j} + \pi^-_j BC^-_{t-j} \right) + \sum_{r=1}^{k} \Delta \tau_t D_{it} + \zeta_t \quad (5)$$

In equation (5), the error-correction term that captures the long run equilibrium in the NARDL is represented as δ_{t-1} while its associated parameter (υ) (the speed of adjustment) measures how long it takes the system to adjust to its long run when there is a shock. The error correction term can be expressed as: $\delta_{t-1} = MSO_{t-1} - \theta_0 - \theta_1 BC^+_{t-1} - \theta BC^-_{t-1}$ where in the parameters $\theta_1 \left(= -\frac{\varphi_2}{\varphi_1} \right)$ and $\theta_2 \left(= -\frac{\varphi_3}{\varphi_1} \right)$ represent the long run parameters for positive and negative changes in bank credits respectively while the short run parameters are: π^+_j and π^-_j.

It is important to note here that, just like the linear (or symmetric) ARDL, the long run is estimated only if there is presence of cointegration. Thus, pre-testing for

cointegration is necessary even under NARDL. Since the variables in first differences can accommodate more than one lag, determining the optimal lag combination for the NARDL becomes necessary. The optimal lag length can be selected using Akaike Information Criterion (AIC), Hannan-Quinn Information Criterion (HIC) or Schwartz Information Criterion (SIC). The lag combination with the least value of the chosen criterion is considered the optimal lag. Consequently, the preferred NARDL model is used to test for long run relationship in the model. This approach of testing for cointegration is referred to as Bounds testing as it involves the upper and lower bounds. The test follows an F distribution and therefore, if the calculated F-statistic is greater than the upper bound, there is cointegration; if it is less than the lower bound, there is no cointegration and if it lies in between the two bounds, then, the test is considered inconclusive.

The Wald test is used to test for the joint significance of structural breaks. That is, we test $\sum_{r=1}^{k}\tau_r = 0$ against $\sum_{r=1}^{k}\tau_r \neq 0$. The non-rejection of the null implies that structural breaks do not matter in the model, while the rejection suggests the adoption of equation (5), implying that the breaks are important and should be included in the model.

Granger Causality Approach

Granger causality test was conducted to establish the causal link or relationship between bank credit and manufacturing sector output. This causal relationship between bank credit and manufacturing sector output in Nigeria was tested using Granger causality/Wald test approach suggested by Toda and Yamamoto (1995). The approach compute statistics that asymptotically follow the chi square (χ^2) distribution irrespective of the order of integration of the variables. The Toda–Yamamoto approach fits a standard vector auto-regression model on levels of the variables and therefore makes allowance for the long-run information often ignored in systems that require first differencing and pre-whitening (Clarke & Mirza, 2006). The study tested the causality between bank credit and manufacturing sector output in Nigeria using the following bi-variate auto-regression:

$$MSO_t = \beta_0 + \sum_{t=1}^{n}\beta_{1t}MSO_{t-1} + \sum_{t-1}^{m}\beta_{2t}BC_{t-1} + \varepsilon_t \qquad (6)$$

$$BC_t = \varphi_0 + \sum_{t=1}^{0}\alpha_{1t}BC_{t-1} + \sum_{t-1}^{p}\alpha_{2t}MSO_{t-1} + \varepsilon_t \qquad (7)$$

Thus, the following hypotheses were tested for equations (6) and (7)
The null hypothesis is given as: $H_0 : \sum_{j=1}^{p} A_{ni}^{j} = 0$

This implies that bank credit does not granger cause manufacturing sector output; while the alternative hypothesis is: $H_1 : \sum_{j=1}^{p} A_{ni}^{j} \neq 0$: which implies that bank credit Granger cause manufacturing sector output. Thus, the rejection of the null hypothesis in each case implies causality.

RESULTS AND DISCUSSION

Correlation Result

Table 1: Covariance matrix for MSO and BC

	MSO	BC
MSO	1	------
BC	0.971047	1

Source: Authors Computation, 2018 (Eviews-10)

From the covariance matrix result, the degree of correlation between manufacturing sector output and bank credit is strong and positive. This was captured by the correlation coefficient value of 0.971047. It thus shows that, as bank credit increases by one percent, the manufacturing sector output increases by 9.71%.

Unit Root Test Result

Table 2: Perron (2006) Unit root Test Results (with structural breaks)

Innovational Outlier Model				Additive Outlier Model			
Variable	t-statistics	Break dates	*I*(d)	Variable	t-statistics	Break dates	*I*(d)
MSO	-0.972872(-5.175710)	1995	nil	MSO	-5.417431(-5.175710)**	2004	*I*(0)
? MSO	-10.28994(-5.719131)*	2008	*I*(1)	? MSO	-5.122906(-5.175710)**	2004	*I*(1)
BC	-2.630548(-5.175710)	2004	nil	BC	-7.735756(-5.719131)*	2004	*I*(0)
? BC	-5.150979(-4.893950)**	2004	*I*(1)	? BC	-13.89354(5.719131)*	2004	*I*(1)

Note: *, ** and *** indicate asymptoti c critical values of Vogelsang and Perron (1998) test at 1%, 5% and 10% levels respectively. The break specification is trend and intercept

Source: Authors Computation, 2018 (Eviews-10)

From Table 2, the Innovational Outlier Model revealed that MSO was found stationary at first difference and with the break date occurring in 2008. However, the Additive Outlier Model indicates that the null hypothesis of a unit root is rejected for MSO at level with the break dates occurring in 2004. In addition, from Table 2, the Innovational Outlier Model revealed that BC was found stationary at first difference, and with a break point date occurring in 2004. But from the Additive Outlier Model, the BC was found stationary at levels and with the break point dates also occurring in 2004. The paper thus adopted a break point date of 2004 which captures the period when major restructuring of the economy and financial sector reforms were carried out. These includes economic policy reforms of National Economic Empowerment and Development Strategy (NEEDS) policy of 2004 and the banking sector reforms (or bank consolidation policy) of 2004. The break point dummy variable accounted for economic/financial sector reform shifts in Nigeria. DUM = 0 from 1986 to 2003; and 1 from 2004 to 2017.

Cointegration Test (Bound Test Approach) Results

Table 3: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-432.775	NA	2.10E+10	32.2796	32.42359	32.32242
1	-340.822	156.6594	45260777	26.13499	26.71092	26.30625
2	-321.692	28.34101	22016590	25.38461	26.39248	25.6843
3	-313.7	10.0639	25560064	25.45928	26.8991	25.88742
4	-279.919	35.03302*	4735208.*	23.62359*	25.49535*	24.18016*

Note: * 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
Source: Authors Computation, 2018 (Eviews-10)

Table 4 captures the result of NARDL bounds test for Co-integration. Using the recommended lag by AIC, the study utilized lag 4 in estimating the NARDL bound test results captured in Table 4. The selection of this lag length is appropriate for whitening the errors in the model.

Table 4: Result of NARDL Bounds Test f or Co-integration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	97.21962	10%	2.37	3.20
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: Authors Computation, 2018 (Eviews-10)

The co-integration test result shows that the F-statistic value of 97.21 is greater than the lower (I(0)) and upper bound (I(1)) critical values of 2.79 and 3.67 respectively at the 5% significance level. Thus, the null hypothesis of no long-run relationship is rejected at the 5% significance level. It can therefore be inferred that the variables are co-integrated, and as such, there was a long-run equilibrium relationship between bank credit and manufacturing sector output between 1986 and 2017.

Table 5: Results of Estimation of NARDL Error Correction

Dep. Var: MSO			
Variable	Coefficient	t-Statistic	Prob.
D(MSO(-1))	0.827122	30.66425	0.0000
D(BC_POS)	0.263953	2.339106	0.0414
D(BC_POS(-1))	-4.68666	-29.1619	0.0000
D(BC_POS(-2))	-3.29178	-13.3965	0.0000
D(BC_POS(-3))	2.696288	5.103408	0.0005
D(BC_NEG)	59.8685	3.538104	0.0054
D(BC_NEG(-1))	413.8389	10.83942	0.0000
D(BC_NEG(-2))	212.6212	19.68823	0.0000
D(DUM)	-236.641	-5.22203	0.0004
D(DUM(-1))	34.12733	0.8643	0.4077
D(DUM(-2))	-149.477	-3.20993	0.0093
ECT(-1)*	-0.65752	-26.0871	0.0000
R-squared	0.916006		
Adjusted R-squared	0.882868		
Durbin-Watson stat	1.505678		

Notes: ***, ** and * indicate statistical significance at 10%, 5% and 1% levels, respectively. Figures in square brackets are probability values.

Source: Authors Computation, 2018 (Eviews-10)

The coefficient of the error correction term (ECT), -0.65752 was found to be negative, less than unity and statistically significant at 5% level (that is, it met the three a priori expectations). This further supports cointegration and suggests the existence of long-run steady-state equilibrium between bank credit and manufacturing sector output. This supports the assertion of Adenuga and Evbuomwan (2012) that a significant error correction mechanism supports cointegration and indicate long-run convergence of the model to equilibrium; as well as explains the proportion and the time it takes for the disequilibrium to be corrected during each period in order to return the disturbed system to equilibrium. Thus, at -0.6575[2], the magnitude of the error correction coefficient implied a high speed of convergence of output to its long run equilibrium as about 65.75 per cent of disequilibrium in manufacturing sector output is corrected within a year.

The adjusted coefficient of determination (R-Bar-square), which was used to measure the goodness of fit of the estimated model, indicates that the model is reasonably fit in prediction. It showed that 88.28% changes in manufacturing sector output were collectively due to positive and negative impact of bank credit and financial reforms (captured by break point dummies) while 11.72% unaccounted variations were captured by the (white noise) error term. It thus showed that positive and negative increase of bank credit and break point dummy had strong significant impact on manufacturing sector output within the period under study.

The Wald statistic and the associated probability value (PV) were used as the test statistic. The Wald test computes a test statistic based on the unrestricted regression and tests for the joint significance of the bank credit coefficients and break point dummy. The decision rule is that if the probability value (PV) is less than 5% or 0.05 (that is, PV < 0.05), it implies that bank credit is jointly statistically significant at 5% level (that is, reject H_0); otherwise, it is not significant at that level.

Table 6: Results of Wald Test on Variables of Bank Credit Impact on Manufacturing Sector Output in Nigeria

Variable	Wald Test (F -statistic) Value	Degree of Freedom (DF)	Probability
BC_POS	65.28663*	(4, 10)	0.0000
BC_NEG	44.86825*	(3,10)	0.0000
DUM	66.15991*	(3, 10)	0.0000

Notes: ***, ** and * indicate statistical significance at 10%, 5% and 1% levels, respectively.
Figures in square brackets are probability values.
Source: Authors Computation, 2018 (Eviews-10)

The Wald-test result in Table 6 indicated that the calculated Wald statistic value for positive impact of bank credit (BC_POS) on Manufacturing Sector Output in Nigeria is 65.29 and its probability value is 0.000. Since the probability value is less than 0.05(at 5% level of significance), it thus falls in the rejection region. Hence, the result showed that bank credit has positive (BC_POS) and significant impact on Manufacturing Sector Output in Nigeria.

Also, from Table 6, it could be observed that Wald statistic value for negative impact of bank credit (BC_NEG) on manufacturing output in Nigeria is 44.86 with an associated probability value of 0.000. This also showed that bank credit has a negative significant impact on Manufacturing Sector Output as indicated by the probability of the F-value of 0.000 found to be less than 0.05. Overall, the positive impact outweighs the negative impact by 20.42 per cent. This implies that even though bank credit at times harms the growth of manufacturing output in Nigeria, its positive contributions to the sector is significantly higher.

In addition, the Wald test was conducted for the break point dummies to see if accounting for breaks in the regression was necessary. Ignoring structural breaks in a model when they exist may produce biased results (Salisu & Oloko, 2015). Consequently, the Wald test was used to test for the joint significance of the endogenously identified structural breaks of 2004. From Table 6, it could be observed that the inclusion of breaks (that is break point dummy) in the NARDL model is relevant and would not create bias results. This was captured by the Wald statistic value of 66.15 found to be highly significant at 1%. Hence, reject the null hypothesis which states that the breaks are jointly insignificant.

Granger Causality Test

Table 7: VEC Granger Causality/Block Exogeneity Wald Tests Result of Bank Credit and Manufacturing Sector Output in Nigeria

Dependent variable: D(BC)			
Excluded	Chi-sq	Df	Prob.
D(MSO)	3.275	1	0.4113
All	3.275	1	0.4113
Dependent variable: D(MSO)			
Excluded	Chi-sq	Df	Prob.
D(BC)	25.84759	1	0.0000
All	25.84759	1	0.0000

Source: Authors Computation, 2018 (Eviews-10)

At a 5% level of significance, the augmented Granger causality test result (in Table 7) reveals that all the bank credit has a causal relationship with manufacturing sector output. This was captured by chi square(χ^2) values of: 25.84759 (with an associated PV of 0.0000) for BC model. However, there is no evidence of feedback, which means that MSO does not Granger-cause bank credit as MSO was not significant at the 5% level in the model with BC variable as the dependent variable. This was captured by the chi square(χ^2) values of: 3.275 (with an associated PV of 0.4113).

Robustness Test Results (Post-Estimation Results)

Table 8: Post Estimation Diagnostic Test Results on bank Credit and Manufacturing Sector Output in Nigeria

Tests		Null Hypothesis	Outcomes	
			Coefficient	Probability
Breusch-Godfrey-Serial(LM)-Correlation Test	F-stat.	No serial correlation	0.376513	0.6978
	Obs*R-squared		2.236791	0.3268
Normality Test	Jarque-Bera	There is a normal distribution	0.722154	0.6969
Heteroscedasticity-Breusch-Pagan-Godfrey Test	F-stat.	No conditional heteroscedasticity	0.620567	0.8045
	Obs*R-squared		12.53444	0.9999

Source: Authors Computation, 2018 (Eviews-10)

From the result of the diagnostic tests presented in Table 8, serial correlation and heteroskedasticity results show that there is no evidence of the presence of heteroskedasticity, since their p-values of 0.6978 and 0.8045 are in excess of 0.05. Furthermore, Jarque-bera test for normal distribution revealed that the result attained a normal distribution with a bell shaped symmetrical distribution at 5percent significance level. This was captured by the probability value of 0.6969, which was found to be greater than 0.05.

DISCUSSION OF FINDINGS

Based on the bound test result, it was discovered that there exists a long-run equilibrium relationship between bank credit and manufacturing sector output (MSO). It showed that bank credit is an important long-run determinant of manufacturing sector output in Nigeria. This is in agreement with the work of Ebi and Ethan (2014) which showed that bank credit has a long-run sustainable impact on the manufacturing sub-sector in Nigeria. Also, the result is in agreement with the work of Dabwor and Umejiaku (2015) who found credit channel of monetary policy transmission route to have a significant inverse relationship with manufacturing output in Nigeria.

The causality result exhibited that causality runs from bank credit to manufacturing sector output. A uni-directional relationship exists between bank credits and manufacturing sector output; this shows that supply-leading hypothesis prevails in Nigeria. This agreed with the findings of Karimo and Ogbonna (2017) whose causality result showed that the growth-financial deepening nexus in Nigeria followed the supply-leading hypothesis. Their results signified that it is financial deepening that leads to real sector growth and not real sector growth leading to financial deepening.

CONCLUSION AND RECOMMENDATIONS

Given the various findings in the study, it can be concluded that bank credit has a significant and sustainable impact on the growth of manufacturing sector. It showed that components of bank credit are important and determinant factors to the growth of manufacturing sector in Nigeria. The significant causality relationship showed that a well-developed financial sector provides a critical service link to manufacturing sector growth; and this will eventually result into faster and long-term economic growth. Based on these findings, the study recommends that there is the need for monetary authorities to employ an effective monetary policy strategy where specific sectors (such as the manufacturing sector) can be given timely and effective interventions so as to enhance their growth and performance.

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IMPACT OF CRUDE OIL PRICE VOLATILITY ON SELECTED MACROECONOMIC VARIABLES IN NIGERIA (1980 TO 2016)

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ABSTRACT
This study examined the impact of crude oil price volatility on selected macroeconomic variables in Nigeria. These include exchange rate, inflation and unemployment. The Vector Autoregressive (VAR) modelling technique was employed using annual data for the period 1980 to 2016. The data were obtained from the Central Bank of Nigeria Statistical Bulletin and National Bureau of Statistics; the impulse response function was used in determining the interactions between the variables. The results reveal that all the variables were integrated of order one I(1) but no long-run relationship exists between them, which justified the adoption of the VAR approach. Overall, the study indicates that a shock on crude oil price has a positive impact on exchange rate and negative impact on both inflation and unemployment in Nigeria. The study recommends among others, the building of more oil refineries and a more vigorous diversification of the Nigerian economy in order to protect it from the vagaries of oil price volatility

Keywords: Oil Price Shocks, VAR Model, Unemployment, Exchange Rate, Impulse Response.

INTRODUCTION

Crude oil was first discovered in commercial quantities at Oloibiri jn Nigeria's Niger Delta region in 1956, but production did not commence until 1958 (Ayadi,2005). At the attainment of its independence in 1960, Nigeria was yet to fully factor in oil in the management of the macro-economy. Prior to the discovery of crude oil, export commodities were dominated by agricultural products. By the 1970s however, both government revenue as well as foreign exchange earnings had already become heavily dependent on the fortunes derived from oil exports. By the year 2015 for example, revenue derived from oil had already reached about 80 per cent of total federal government revenue (Obioma, 2015).

Kilian (2010) reported that shocks to the flow demand for oil associated with the global business cycle have been responsible for long swings in the real price of oil, and were most noticeable during the periods 1973/74, 1979/80 and 2003/2008. In addition, speculative demand shocks also played an important role during the periods 1979 - 1986, 1990/91 1997 - 2000 and late 2008. In 2011, oil price began to develop predictable seasonal swings. It rose in the spring as oil futures traders anticipated high demand for summer vacation driving.

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Nigeria was not immune to these developments due to its over-reliance on crude oil export as its main source of government revenue and foreign exchange earnings. Oil price volatility affected and continues to affect some key macroeconomic variables in the country. Equally important is the fact that the presence of a dominant and booming oil sector has exposed the Nigerian economy to vulnerability arising from externally induced shocks. For instance, within the period 1980 - 83, there was a slowdown of the economy due to external shocks arising from the oil embargo on Iran as well as the severed production due to Iran/Iraq war (Amadeo, 2018).

The trend persisted to its trough in 1986 when crude oil sold for an average of United States' Dollar (USD) 19.93 per barrel (Amadeo, 2018). However, by 1990 when the Gulf War began, crude price rose to an average of USD 23.73. It fell again to an average of USD 15.54 per barrel by 1994. These recurring cycles of upswings and downswings have persisted to this day. The reasons are many, but the major ones include the business cycles in the industrialized world, September 11 incident and Hurricane Katrina incident in the United States of America, and then the global financial meltdown in 2008/2009. The crash of oil prices from 2014 through 2016 saw the average price of crude falling from USD 97 per barrel to only USD 38 per barrel. As a result of this, the Nigerian economy was forced into a recession in 2016 (Ademola, 2017). This development had significant impact on most of the macroeconomic indices in Nigeria. It is thus necessary to investigate the volatility of oil price on macroeconmic variables in Nigeria which is the focus of this paper. In order to achieve this, the paper has been divided into five sections namely; introduction, literature review, methodology, results and discussion as well as conclusion and recommendations.

LITERATURE REVIEW

Conceptual Framework

Price is that value which determines the rate at which goods and services are exchanged (Anyaele, 2003). According to Bannock (1992) price is defined as what must be given in exchange for something else. Crude oil price volatility is defined as a percentage, and computed as the annualized standard deviation of the percentage change in the daily price of oil (Wilson, Ugwunta, Oliver and Eneje, 2014). Oil price fluctuations receive important attention for their potential impact on macroeconomic variables. For example, higher oil prices may reduce economic growth, generate stock exchange panics and produce inflation, which eventually leads to monetary and financial instability. It may also lead to higher interest rates and even plunge some economies into recession (McKillop, 2004). This scenario has played out in Nigeria very recently, when the country was plunged into a recession for five consecutive quarters.

According to Bannock (1992) exchange rate is the price for which one currency is exchanged for another currency. It has the role of maintaining international

competitiveness and serving as a nominal anchor to domestic price (Nwoba, Nwonu & Agbaeze, 2017). This study views exchange rate as the amount in local currency, required to secure one unit of foreign currency.
Schiller (2003) defined inflation as an increase in the average level of prices and not a change in any specific price. It is defined by Anyaele (2003) as a situation where there is a persistent increase in prices of commodities that are not commensurate with the levels of production. This study however views inflation as the general rise in the prices of goods and services in a particular country, resulting in a fall in the value of money.

In economics, unemployment refers to the condition and extent of joblessness within an economy, and it is measured by the unemployment rate, which is the number of unemployed workers divided by the total civilian labor force. Hence, unemployment is the condition of not having a job, often referred to as being "out of work", or unemployed (Richa, 2017).

Theoretical Review

Theoretically, when the price of crude oil rises in the importing country, it affects output negatively by increasing the cost of production inputs (Brown, 1999). Increase in oil price could also raise the price level which may create price/wage twists. In this study, two models of oil price volatility have been identified, and they include the linear or symmetric measure of oil price model and the resource curse theory.

Linear or symmetric measure of oil price model assumes that effects of oil price movements are equal in opposite directions, such that a rise in oil price is expected to have a negative impact on the level of economic activities in the oil importing countries. On the other hand, a fall in oil prices has a positive impact. However, in the case of Nigeria, which is an oil exporter and importer at the same time, the result is a double edged sword.

The resource curse theory otherwise known as the 'Dutch Disease theory, refers to the negative effects on the rest of the economy, of natural resource windfall that leads to the appreciation of exchange rates (John, 2010). Exchange rate appreciation from oil boom receipts can render the non-natural resource tradable sectors such as tourism, agricultural, and industrial sectors less competitive, thus generating macroeconomic instability and poverty. Some researchers have however, pointed out that rents from natural resources when properly appropriated by the government can ease common resource growth constraints such as savings, investment in non-oil sectors, foreign exchange and reduction of fiscal constraints (Blomstroom and Kokko, 2007; Gelb, 2008; & Wright and Gelusta, 2007). This model is adopted for this study because it reflects the real situation in Nigeria.

Empirical Review

Many studies have been carried out by different scholars on this research area. Hidhayathulla and Mahammad (2014) researched the effects of oil price on exchange rate of Indian rupee against the US dollar using time series data from 1972 to1973 and 2012 to 2013. Multiple linear regression models were used to analyze the data. The results of the study reveal that the import of crude oil continued to rise when crude oil futures price increased, which led to a substantial source of demand for the dollar in India's forex market. Fawad (2013) conducted a study on the effects of oil prices on unemployment, with evidence from Pakistan. The study used monthly data for the period 1999-2001 to 2010-2012, making 238 observations of each variable for analysis and employed Toda Yamamoto causality test. The results of the study suggest the existence of a significant effect of oil prices on unemployment. The study found no significant association between real interest rate and unemployment. Moh'd, Nor, Hussain and Hafizah (2013) studied the effects of oil price and exchange rate on unemployment in Malaysia. The study employed empirical analysis to examine the time series properties of the data. The Johansen VAR-based co-integration technique was applied to observe the long run relationship between exchange rate, oil price and unemployment and it was discovered that a long run relationship did exist among the variables. The vector error correction mechanism was applied in order to check for the short run dynamics. The outcome revealed that the short run dynamics were influenced by the estimated long run equilibrium. Following the application of Granger causality, it was discovered that oil price did not affect unemployment, but exchange rate had an influence on unemployment. Apere and Ijomah (2013) investigated the time-series relationship on the impact of oil price volatility on macroeconomic activity in Nigeria using exponential generalized autoregressive conditional heteroskedasticity (EGARCH), impulse response function and lag-augmented VAR (LA-VAR) models. They found that, there exists a unidirectional relationship between the interest rate, exchange rate and oil prices, with the direction moving from oil prices to both exchange rate and interest rate. However, a significant relationship between oil prices and real Gross Domestic Product (GDP) was not found.

Obioma and Eke (2015) investigated the interactions between crude oil price, consumer price level and exchange rate in Nigeria, using Vector Autoregression (VAR) for the analysis. Monthly data from January, 2007 to February, 2015, obtained from the Central Bank of Nigeria were used. The study showed among others, that all the variables were integrated of order one I(1) and no long-run relationship existed among them. The work also revealed that a shock in crude oil price had a negative impact on exchange rate. More so, variations in exchange rate were largely caused by changes in crude oil price. Furthermore, a shock on exchange rate was found to have a negative effect on the consumer price level

Eneji, Mai-Lafia, and Nnandi (2016) conducted a study on the impact of oil price volatility on macroeconomic variables and sustainable development in Nigeria. The

study used secondary time series data and employed the vector auto-regressive method of analysis. The results reveal that fluctuations in oil prices did substantially affect the real GDP, exchange rates, unemployment, balance of payments and interest rates in Nigeria. Negative shocks in the international oil market were found to have significant impact on oil price fluctuations. Due to increased imports in Nigeria, inflationary pressures were inevitable and pronounced. Government revenues and expenditures tended to decrease significantly.

METHODOLOGY

Nature and Sources of Data

For the purpose of this research, secondary data were sourced from the Central Bank of Nigeria and National Bureau of Statistics. The variables in the study include crude oil price (COP), exchange rate (EXR), Inflation (INF) and Unemployment (UEP). The data used for the study cover a period of 36 years: 1980 to 2016. The choice of the period was based on the several government policy changes that took place within the time frame. It was within these years that the government policy known as Structural Adjustment Program (SAP) was implemented in Nigeria.

The general form of the model is:

$Y = f(X)$,……..……..…..…….…….. (1)

Where $X = x_1, x_2, x_3, x_4$……...……..….... (2)

The functional relationship in equations 1 and 2 can be expressed in its econometric form as:

$Y = \alpha + \beta * X + U$……..……..……...……... (3)

If we substitute with the variables under study in equation 3, it can be expressed in log-linear form as:

$$\ln EXRt = \beta_0 + \beta_1 \sum_{i=1}^{n} \ln COP_{t-1} + \beta_2 \sum_{i=1}^{n} \ln INF_{t-1} + \beta_3 \sum_{i=1}^{n} t \ln UEP_{t-1} + U_t \ldots\ldots\ldots (4)$$

$$\ln INFt = \beta_0 + \beta_1 \sum_{i=1}^{n} \ln COP_{t-1} + \beta_2 \sum_{i=1}^{n} \ln EXR_{t-1} + \beta_3 \sum_{i=1}^{n} t \ln UEP_{t-1} + U_t \ldots\ldots\ldots (5)$$

$$\ln UEPt = \beta_0 + \beta_1 \sum_{i=1}^{n} \ln COP_{t-1} + \beta_2 \sum_{i=1}^{n} \ln UEP_{t-1} + \beta_3 \sum_{i=1}^{n} \ln EXR_{t-1} U_t \ldots\ldots\ldots (6)$$

Where:

lnCOP = natural log of percentage change in Crude Oil Price
lnEXR = natural log of Exchange Rate
lnINF = natural log of Inflation Rate
lnUEP = natural log of Unemployment
U = error term

n = number of years
Σ = summation
t = Current time
β_0, = Constant factor or intercept

The intercept β_0 is the value of the dependent variable when the independent variable is equal to zero, while the slope of the regression line (β_1 to β_3) represents the rate of interactions as the independent variables change. The statistical test for estimation and measurement include the co-efficient of determination R_2, F-test and David Watson (DW). The level of significance at which the hypotheses were accepted is 5% (0.05).

The transformed data were used to test for stationarity, using Augmented Dickey Fuller (ADF) at levels and first differences. Even though the variables were found to be stationary at level, there is no co-integration between them. Impulse response using the Vector Auto-Regression (VAR) technique was therefore applied.

RESULTS AND DISCUSSION

In time series analysis, stationarity of the series is examined by unit root test which is a pre-requisite for both granger causality and co-integration tests. These are necessary in order to avoid spurious regression results This study made use of Augmented Dickey Fuller test statistics (ADF) to establish the stationarity of the data series and order of integration. The Unit Root test on all the variables in the model are presented in table 1. The ADF test was carried out at levels and first difference

Table 1: Augmented Dickey Fuller Test Summary

Variables	ADF Start.	At Levels			
		1%	5%	10%	Order of Integration
LNLNCOP	- 0.640681	-2.626784	-2.945842	-2.611531	
LNEXR	-0.162658	-3.632900	-2.948404	-2.612874	
LNINF	-2.995577	-3.626784	-2.945842	-2.611531	
LNUEP	-2.706108	-3.622900	-2.948404	-2.612874	
Variables	**ADF Start.**	**At First Difference**			
LNLNCOP	-5.260219	-3.622900	-2.948404	-2.612874	I(1)
LNEXR	-3.186531	-3.622900	-2.948404	-2.612874	I(1)
LNINF	-7.539437	-3.646342	-2.954021	-2.961581	I(1)
.LNUEP	-4.52194	-3.639407	-2.951125	-2.614300	I(1)

** means significant at 1%, 5% and 10% levels
Source: Authors' Computation (2018)

The test for co-integration was carried out using Trace Statistic and Maximum-Eigen value Test using unrestricted Co-Integration Rank test and MacKinnon-Haug-Michelis (1999) P-values, in order to determine if the variables in the model are co-integrated. The results of the co-integration tests are presented in table 2.

Series: COP EXR INF UEP

Lags interval (in first differences): 1 to 2

Table 2: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.541212	44.99506	47.85613	0.0906
At most 1	0.341903	18.50336	29.79707	0.5291
At most 2	0.071027	4.277656	15.49471	0.8799
At most 3	0.050802	1.772703	3.841466	0.1830

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: E-view computation 8.0 (demo)

Maximum Eigenvalue Test

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**

From table 2, the results of the co-integration tests for both Trace Statistic and Max-Eigenvalue Test reveal that there is no co-integration among the variables in the model, which also justifies the decision to use the Vector Autoregressive (VAR) approach for the study.

Vector Auto - Regressive Model (VAR) Estimate

The Vector Autoregressive (VAR) model is a stochastic process model used to capture linear interdependencies among multiple time series (Wikipedia, 2018). It

generalizes the univariate autoregressive model (AR) by allowing for more than one evolving variable. VAR in this study is used to analyse the data. In addition, impulse response is used to assess the interaction and shocks within the four variables used. The summary of the results is displayed in table 3.

Table 3: Summary of the VAR Estimate

Dependent Variable	**Crude oil Price**			
	Independent Variables	**Coefficient**	**T-Statistic**	**P-Values**
	EXR	0.565346	1.629291	0.1153
	INF	0.013362	0.176383	0.8614
	UEP	0.201415	0.416645	0.6804
	C	0.095226	0.151649	0.8806

The result of the VAR Model is summarized at their First Differences in the following:

lnCOP = 0.961248 + 0.565346 *lnEXR + 0.013362 * lnINF + 0.201415 * lnUEP

R-Square	=	0.981908	F-stat. p- value =	0.000000
F-Stat.	=	176.3904	Durbin Watson=	1.920121

Analysis of the VAR Result

The coefficient of determination of the regression (R^2) reveals that the three explanatory variables explain 98 percent of the changes taking place in the dependent variable. The F-Stat p- value is 0.000000. This means that the overall model, with all the independent variables jointly, have fit the data well, and that the model is statistically significant at the 5 percent level. The Durbin Watson statistics value is 1.920121 or approximately 2. This shows that the model has not suffered from the problem of multi-collinearity or serial correlation. The t-statistic values on the coefficients of the independent variables are all statistically insignificant at the 5 percent level, which suggests that no significant long run relationship exists between exchange rate, inflation and unemployment with respect to a change in crude oil price (at the 5 percent level of significance).

The p- values from the results obtained are 0.1153, 0.8614 and 0.6804 for exchange rate, inflation and unemployment respectively. This shows that there is a short run significance between exchange rate, inflation and unemployment with respect to a change in crude oil price.

In the short run, the slope of the regression line for exchange rate, inflation and unemployment values are 0.565346, 0.013362 and -0.201415 respectively. This means that a unit change in crude oil price will affect the exchange rate by 56 percent. A unit variation in the price of crude will affect inflation by 1.3 percent. Furthermore, a unit change in the price of crude oil will affect unemployment by 20 percent. Since the results suggest that the model is only significant in the short run, the impulse response function was applied in order to observe the interactions between the variables under study.

Impulse Response Function (IRF)

Figure 1 presents the result of the impulse response function:

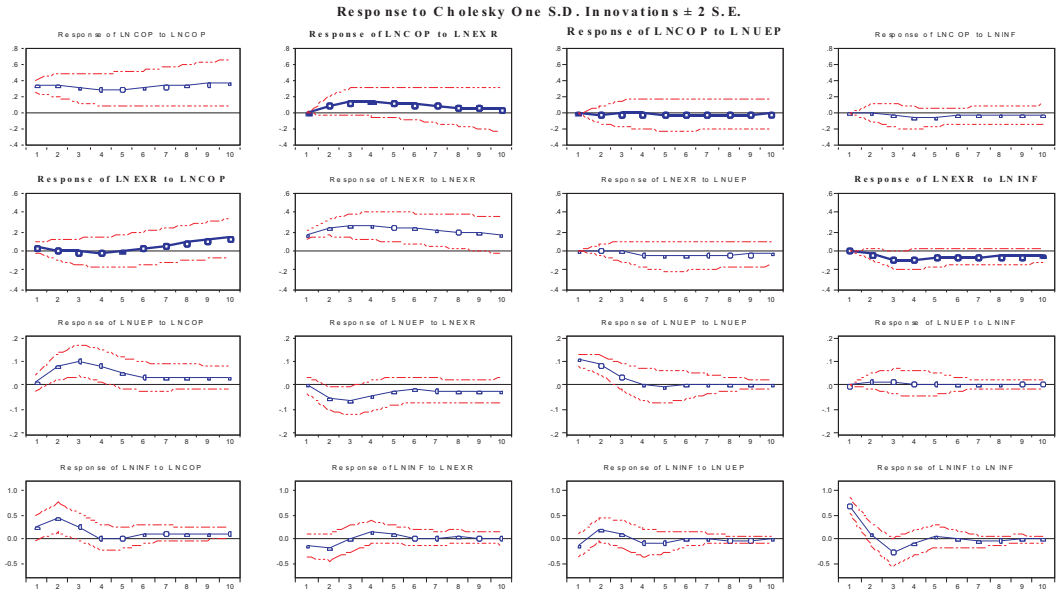

Figure 1: Impulse Response Graph

Source: Authors' Computation and E-view 8.0 Demo

Crude Oil Price to Exchange Rate

Figure 1 shows that crude oil price had an initial positive impact on exchange rate right from the first period when it continued to rise up to the sixth period, then started moving towards equilibrium and maintained its positive status continuously. This is attributed to the fact that in the event of any increase in the price of oil in the international market, Nigeria, being an oil exporting country, would be experiencing exchange rate appreciation. On the other hand, since Nigeria is an importer of refined oil, whenever the price of crude oil in the international market increases, it will have a direct effect on exchange rate due to increased demand for foreign exchange. The implication is that the value of Nigeria's currency will fall and inflation and unemployment will rise, thus establishing the fact that crude oil price volatility has a significant impact on exchange rate. This finding supports the resource curse theory

which suggests that exchange rate appreciation from oil boom receipts can render non-tradable sectors such as tourism, agriculture and industrial sectors less competitive. However, the findings are not consistent with those of Obioma and Charles (2015) who found that crude oil price volatility has a negative impact on exchange rate in Nigeria.

Crude Oil Price to Inflation

The impulse response from the figure 1 shows that inflation was steady at the first period up to the third period and started moving down up to the seventh period and then tended towards equilibrium but maintained a negative status continuously. This implies that crude oil price shock had no significant effect on inflation from the first to third period, then after some policy interventions it became negative and considerably rose towards equilibrium but still maintaining its negative status. The implication is that for the fourth to the seventh periods, changes in oil price had negative impact on inflation, implying greater inflow of foreign exchange as a result of changes in crude oil price. This finding is corroborated by the finding of Obioma and Charles (2016) that crude oil price volatility had a negative impact on inflation in Nigeria.

Crude Oil Price to Unemployment

The impulse response of crude oil price (LNCOP) to unemployment (LNUEP) shows that unemployment was at equilibrium at the first period then became slightly negative at the second to third periods, then went back to the equilibrium but slightly negative in the sixth to seventh periods and then negotiated back towards equilibrium and remained there. Looking at this trend, it may be concluded that crude oil price volatility has no pronounced effect on unemployment in Nigeria. At best, its impact was marginal and negative, implying that oil price changes had only led to a marginal reduction in the level of unemployment in the country. If the impact was more pronounced, it would have refuted the prediction of the resource curse theory which argues that most of the key macroeconomic variables would become unfavourable as a result of oil price volatility.

CONCLUSION AND RECOMMENDATIONS

This study investigated the impact of Crude oil price volatility on some key macro-economic variables in Nigeria from 1980 to 2016. The variables selected include; crude oil price, exchange rate, inflation and unemployment. The objective has been to observe how they interact with each other to affect the macro-economy of Nigeria. The study made use of the VAR method of analysis and the impulse response technique on the data covering the period 1980 to 2016. The study reveals among others, that the price of crude oil in the international market directly affected the naira exchange rate positively within the study period. Its impact on inflation and unemployment was minimal negative.

The findings from this study have revealed that crude oil price volatility has a pronounced and positive impact on the exchange rate and a less pronounced negative effect on inflation rate and unemployment.

This study has brought to bear some of the intractable problems (such as fluctuations in the nation's revenue with attendant consequences of deficit financing as a result of reliance on oil as well as large oil imports) the country has been trying to deal with since the advent of the oil boom in 1973/74. It is thus expedient for the nation to look inwards in the area of building and operating functional refineries if Nigeria is to utilize its earnings from oil in socio-economic transformation of the country. This is because building new refineries will go a long way in conserving the nation's scarce foreign exchange and thus release same for national development and possibly reduce the level of unemployment and poverty.

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