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ASSESSMENT OF LENDING INTEREST RATE ON THE GROWTH OF MANUFACTURING SECTOR IN NIGERIA: 1986 - 2015

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Abstract

Over the years Nigeria Economy has been on growing path with the largest GDP in Africa. But the contribution of manufacturing sector is little due to some lingering challenges such as poor and decayed infrastructure, corruption, insecurity, government policies, and high interest rate. This study examines effect of lending interest rate on the growth of manufacturing sector in Nigeria from 1986 - 2015 using Autoregressive Distributive Lag Model (ARDL). The result illustrate negative and significant relationship between lending interest rate and the growth of manufacturing sector in Nigeria. Based on this findings, the researcher recommends that central Bank of Nigeria (CBN) should maintain the monetary policy rate at a level low than the current 11 percent enough to bring down the rate at which deposit money banks lend to their client and fixed decay infrastructure to economic growth and development.

***KEYWORDS**: lending interest rate, growth of manufacturing sector, Nigeria and ARDL*

INTRODUCTION

Over the past two decades the average investment rate in Africa has hovered around 18 per cent, which is well below the 25 per cent threshold. Therefore, it is not surprising that the continent has not achieved the 7 per cent average growth rate required to make significant progress in economic development. It is a simple logic in economics that interest rate plays a vital role and a major economic indicator used to boost investment. Keynesian theory postulates that low interest rate as a component of cost administered is detrimental to increase savings and hence investment demand (Keynes, 1936). Thus, a fall in interest rates should

decrease the cost of investment relative to the potential yield and as result planned capital investment projects on the margin may become worthwhile. Interest rate has been found to be higher in Africa, Latin America and the Caribbean countries than in the Organisation of European Countries Development (Chirwa and Mlachila, 2004).

In the last decades, the Nigerian economy has witnessed a number of economic reforms in terms of regulated and deregulated interest rate regimes. These were largely due to low investment in manufacturing sector, encourage domestic investment and seeking of external finance to argument home economy. Despite the emphasis placed on monetary policy in the management of the economy, the manufacturing sector is yet to come on the path of sound growth and development owing largely to high interest rate (Tomola, Adedisi, and Olawale 2012).

Okwori, Ochinyabo, and **Sule** (2014), that at the high interest rate in Nigeria might be owing to high inflation that remained at double digits and other macroeconomic factors like the instability in the Nigeria currency, even the increased sub-national government spending and government high expenditure. For instance, interest rate is too high and when one compares the lending rates with rates of fixed deposits, the disparity is conspicuous. When one borrows, the rate is as high as 24% but the deposit rate is as low as about 7.5%. As such, investment cannot thrive under high lending interest rate.

Nigeria though, has enormous potential in manufacturing sector given that country has large market with her population of about 174million rich in oil, mineral and agricultural products, there has been problem of capacity utilization. Statistics from the study of Okwori , Ochinyabo, and Sule (2014) shows that in 1986, the capacity utilization was just 38.8%. This continued up till 1990 where it reach a pick of 40.3% and further dropped to 36.1% in 2000 and rose again to 58.9% in 2009 55.82% in 2010, 56.49% in 2011, 58.92% in 2012, 58.1% in 2013, 59.88% in 2014, 54.9% in 2015, and 53.7% in January 2016 respectively.

The above scenario shows that manufacturing sector never reached 100% of its production capacity owing to reasons high interest rate and poor infrastructural facilities like electricity. However, lending interest rate which is cost of loanable fund stood at 12% in 1986, this continue to increase at an increase rate where it reach a peak of 36.09% 1993 and further dropped to 21.55% in 2000. Since then, it hovered around 18.36% and 23.06% in 2007 and 2012 respectively.

This work is aimed at ascertaining the effect of lending rate on the growth of the Manufacturing sector in Nigeria and the following research questions are raised. At what extent has Lending Interest Rate affect the growth of Manufacturing Sector in Nigeria? Does

Electricity to Manufacturing Sector, Credit to Core Private Sector, Consumer Price Index, and Monetary Policy Rate determine the growth of Manufacturing sector in Nigeria? Although lot of studies were carried out in this area, such as (Olanrewaju, and et al 2015), (Andabai, 2014), (Charles, 2012), and (Muhammed, 1990) but most of them focused on the impact of fiscal policy on economic growth and manufacturing sector with little recourse to certain fundamentals and transmission mechanism like efficiency of electricity to manufacturing sector, credit to core private sector and monetary policy rate. Most of studies used descriptive statistics, OLS multiple regression, and ECM. This study however, uses Autoregressive Distributive Lag Model (ARDL) framework to examine the effect of lending interest rate on the growth of manufacturing sector performance in Nigeria. The study is divided into six sections. Section two after the introduction is overview of Nigeria manufacturing sector, section three empirical review, section four methodology, section five recommendations and conclusions and section six References.

Overview of Nigeria Manufacturing Sector

The Nigerian Industries are concentrated in light consumer goods; there is hardly any production of capital and intermediate goods. Another feature of the manufacturing sector is its over-dependence on imports for the supply of raw materials and spare parts. There is no single industrial product in which the country is entirely self-sufficient with its import bill dominated by the cost of raw materials and spare parts for industries. Many factories as a result of this reduced their scale of operations completely and even some had to close down completely with increase in our unemployment rates which hovered between 2.8 and 3.5 percent between 1996 and 1998. From 1999 till date the unemployment rate has not gone below 11.0 percent, achieving its highest peak in 2011 with percentage of 23.9. (Obadan 1997, CBN, 2011).

So many literatures confirmed the insignificant nature of the Nigerian manufacturing industries in terms of its contribution to economic development. Akinlo (1996) confirmed this by stressing that the industrial sector of the Nigerian economy was relatively insignificant even starting from independence in terms of its contribution to the gross domestic product (GDP) which ranges from 4.8% in 1960 to 8.3% in 1980 and decline to 8.2% in 1990 and 6.88% in 1995, 6.2 % in 1998 respectively (CBN, 2003). Most of the earliest manufacturing industries, established by the colonial trading companies and a handful of other international firms, concentrated on the production of light industrial commodities

such as detergents soft drinks, leather work, textiles and confectionery (Olukoshi 1991). He further pointed out that the pre-owned post-colonial production policy occasioned distortions in the sector, which was as a result of neglecting research and an excessive reliance on foreign input. The manufacturing subsector is still characterized by distortions despite the adjustment programmes. This needs to be eliminated according to him if the sector is to experience substantial growth.

According to the 2010 Annual report of the Manufacturing Association of Nigeria (MAN) presented during the 39th Annual General Meeting of the Association, the Nigerian manufacturing sector only contributed 4.1 percent to the GDP in 2010, compared to 4.21 in 2009. The decline also manifested in the capacity utilization of industries in the country. According to the report, average manufacturing capacity utilization dropped from 47 percent in 2009 to 45 percent in 2010. Production output declined from N183.8 billion in the first half of 2009 to N165.7 billion in the same period of 2010. Investment profile in the first half of 2010 had a sharp decline from N1 trillion in the first half of 2009 to N360 billion in the corresponding period of 2010. Employment figures in the first half of 2010 dropped from 998,086 in January-June 2009 to 996,395 in the corresponding period of 2010. Business unplanned inventory increased from N5.15 billion in the first half of 2009 to N11.4 billion in the same period of 2010.

The linkage between interest rate and manufacturing sector is recognized in the literature on growth can be traced to the Keynesian investment theory (1936) and Mackinnon (1973) and Shaw (1973) saving and investment hypothesis cited in the work of Okwori and et al (2014). It on this note, that Keynesian theory and Mckinnon and Shaw advocated for high real interest rate which tend to encourage depositor to save their money for onward lending to the borrowers at a low lending interest rate geared towards propelling the manufacturing sector. The researcher hereby utilizes these theories as the main theoretical framework of this research analysis.

EMPIRICAL REVIEW

Olanrewaju, Aremo, and Aiyegbusi (2015) investigated empirically the effect of banking sector reforms on the output of manufacturing sector in the Nigerian economy between 1970 and 2011 using Cointegration and Error Correction Mechanism (ECM), the results showed that the effects of Bank assets, Lending rate, Exchange rate and real rate of interest on manufacturing output were positively significant but with very low impact. Andabai, (2014) examined the determinants of public policies and the manufacturing sector

in Nigeria between1997-2013 using the Ordinary Least Square (OLS) and found that, there is a negative significant relationship between excise duty, and capacity utilization and positive significant relationship between lending rate and capacity utilization. Okwori and et al (2014) evaluates the role of interest rate on manufacturing sector performance in Nigeria 1986-2012 employing Ordinary Least Square (OLS) multiple regression model. It was found that the major factors that influence the level of manufacturing sector performance are electricity supply, inflation and lending interest rate. Other factor includes, inadequate tax relief, enabling environment, political will, obsolete technology, preference for foreign goods, among others. Charles (2012) investigated the performance of monetary policy on manufacturing sector in Nigeria, using econometrics test procedures. The result indicates that money supply positively affect manufacturing index performance while company lending rate, income tax rate, inflation rate and exchange rate negatively affect the performance of manufacturing sector.

Tomola and et al (2012) determine the link between bank lending, economic growth and manufacturing sector in Nigeria using co-integration test and vector error correction model (VECM) the finding revealed that manufacturing capacity utilization and bank lending rates significantly affect manufacturing output in Nigeria. Obamuyi and et al (2010) investigates the effect of bank lending and economic growth on the manufacturing output in Nigeria. Times series data covering a period of 36 years (1973-2009) using cointegration and vector error correction model (VECM) and found that manufacturing capacity utilization and bank lending rates significantly affect manufacturing output in Nigeria. Rina and et al (2010) examined the impact of fiscal and monetary policy on industry and growth of economy in Indonesian using the computable general equilibrium (CGE) mode and found that fiscal and monetary policy have a positive impact on Indonesian macroeconomic performance in terms of change in GDP. Majed and Ahmad (2010) investigated the impact of interest rate on investment in Jordan between 1990 and 2005 using co integration technique and found that real interest rate has a negative impact on investment. Muhammad (1990) empirically investigates the impact of interest rates and other macro-economic factors on the manufacturing performance in Nigeria using co-integration and Error correction mechanism (ECM) with annual time series and found that the interest rate spread and government deficit financing which has a negative impact on the growth of manufacturing sector in Nigeria.

METHODOLOGY

The study is designed to obtain data mainly from secondary source, namely Central Bank of Nigeria, Annual Statistical Bulletin, Nigeria Bureau of Statistics Annual Abstract of Statistics, World bank indicator report on Nigeria. The study then make use of Autoregressive Distributive Lag analytical method to analyse data from these sources. Furthermore, other econometric diagnostic tools like stationary test to guard against obtaining spurious results, bounds test and co-integration test, and lag selection. The results were presented in a logical flowing sequence to address the objectives of the study.

MGR = Annual growth of manufacturing sector (%)

ELECT = Electricity to Manufacturing Sector (%)

CCPS = Credit to Core Private Sector (‘B)

LINT = Lending Interest Rate (%)

CPI = Consumer Price Index (%)

MPR = Monetary Policy Rate (%)

Model Specification

The study aims at examining the effect of lending interest rate on the growth of manufacturing sector in Nigeria. In this study, a model was adapt from the work of Okwori and et al (2014) who takes cue from Adebiyi and Babatope (2004).

$CU = b_0 + b_1ELECT + b_2 RGDP + b_3 CPI + b_4LINT + \mu$……..1

Where:

CU = Capacity Utilization (%)

ELECT = Electricity to Manufacturing Sector (%)

RGDP = Real Gross Domestic Product (%)

CPI = Consumer Price Index (%)

LINT = Lending Interest Rate (%)

The study however, modify the above models to fit the stated objectives and to ensure that a valid result is obtained.

MGR = F (ELECT, CCPS, CPI, LINT, MPR)……..2

The Mathematical form is

$MGR = b_0 + b_1ELECT + b_2 CCPS + b_3 CPI + b_4LINT + b_5MPR + \mu$…….3

Where:

MGR = Growth of manufacturing sector (%)

ELECT = Electricity to Manufacturing Sector (%)

CCPS	=	Credit to Core Private Sector (log)
CPI	=	Consumer Price Index (%)
LINT	=	Lending Interest Rate (%)
MPR	=	Monetary Policy Rate (%)
U_t	=	Error Term
b	=	Intercept of the Regression equation
b_1, b_2, b_3, b_4	=	Regression Coefficients

Apriori Expectation

Symbolically;

$b_1, b_2, > 0$, and $b_3, b_4, b_5, < 0$

Justification of Variables

In order to investigate the effect of lending interest rate on the growth of manufacturing sector in Nigeria and the control variables are discussed below:

Growth of Manufacturing sector

Fabayo (1982) coined capacity utilization as a as a measure of manufacturing sector fitness. In an advanced economy, the manufacturing sector is a leading sector in many respects. Since it is used as measure to determine the efficiency of industries, it therefore prompted the inclusion in the model.

Lending Interest Rate

The lending activity is made possible only if the banks can mobilize enough funds from their customers. Since commercial banks depend on depositor‟s money as a source of funds, it means that there are some relationships between the ability of the banks to mobilize deposits and the amount of credit granted to the customers (Tomola 2013). As total deposit increase the total advance and loan increases proportionally (Ajayi 2002). An increase in deposit of a bank improves its ability to lend more funds to its customers. We expected inverse relationship between lending interest rate and the growth of manufacturing sector, because the higher the lending interest the lower the loanable fund will borrow by investor.

Monetary Policy Rate

In addition to this, monetary policy rate, through a prime rate (Central Bank‟s rate) has a transmission mechanism on interest rates in the financial market (Borio and Fritz, 1995). Therefore, if central bank reduces the rate, banks become reluctant to provide loan to firms and vice versa McKinnon (2009). The relationship expected is negative

Consumer Price Index

Consumer Price Index proxy for Inflation rate is expected to have a negative sign and a high t-value. The inclusion of these variables is to examine the effect of institutional framework. CPI, Broad Money Supply and Real Effective Exchange Rate are part of the core independent variables of the model, being the main targets of CBN's monetary policy focus. In Nigeria inflation is a common phenomenon with rates always almost in double digits.

Credit to Core Private Sector

The Inter Bank Rate and Credit to Core Private Sector are influenced by CBN's monetary policy rate which determines the rate of interest charged by banks and consequently the amount of credit availed to customers. This is a key determinant of investment in the economy. Measure in logarithms and we expected positive relationship. Since is logged the result would be divided by 100.

Electricity to Manufacturing Sector

Electricity is an important factor of production and crucial for industrialization and economic growth. Economists like Alam (2006) in his work on economic growth with energy was of the opinion that not only does energy serve as a factor of production; it also acts as a booster to the growth of a nation. Abundance of energy is a pre-requisite of manufacturing. As such there is need to examine its efficiency within the study period.

Test of Stationarity

The test of stationarity is important because time series data may not be stationary, if that is the case, the classical t-student value and the f-statistic will be inappropriate, and the problem of spurious regression will arise (Granger and Newbold, 1974).

Unit root test is a pre-test for stationary of the variables used in the model. Null Hypothesis: the variable has unit root and Alternative Hypothesis: the variable does not have unit root. We conducted the Augmented Dicky-Fuller (ADF) unit root test, to test the stated hypotheses and the results for all the variables are shown in table below:

Table one Augmented Dicky-Fuller unit root test

Variables	ADF-Statistic	Critical values		Order of integration
MGR	-7.951339 (0.0000)	1% level	-3.699871	I(1)
		5% level	-2.976263	
		10% level	-2.627420	
LINTR	-4.261977 (0.0024)	1% level	-3.679322	I(0)
		5% level	-2.967767	
		10% level	-2.622989	
ELECT	-5.581192	1% level	-3.699871	I(1)

	(0.0001)	5% level	-2.976263	
		10% level	-2.627420	
CPI	-3.886758	1% level	-3.689194	
	(0.0062)	5% level	-2.971853	
		10% level	-2.625121	I(0)
MPR	-4.449677	1% level	-3.788030	
	(0.0024)	5% level	-3.012363	
		10% level	-2.646119	I(1)
LCCPS	-3.700787	1% level	-3.689194	
	(0.0097)	5% level	-2.971853	
		10% level	-2.625121	I(1)

The table one summarised Augmented Dicky Fuller (ADF) test and constant. The parentheses are probability values. The unit root test results show that LINTR and CPI are stationary at level. MGR, ELECT, MPR, and LCCPS are stationary at first difference. Therefore, the variables are all stationary now and we reject null hypothesis and accept alternative and conclude that the variables does not have unit root.

Cointegration Test

This is a pre-test to know whether variables has long run association or relationship. This can be done using different statistical apparatus but for this research we make use of Johanson test and later bounds test to valid the below outcome. If the residual is stationary at level the variables in the model are cointegrated or have long run relationship or equilibrium I.e. The model is long run model and β_2 Coefficient will be long run coefficient.

The Johansen Tests for co-integration was conducted and the table below summarised the results

Table two Johansen cointegration test

Variables	ADF-Statistic	Critical values		Order of integration	Prob.
		1% level	-3.737853		0.0060
		5% level	-2.991878		
U	-3.959962	10% level	-2.635542	Stationary at level	

The above table shows that unit root test result indicates that U is stationary at level and at 1%, 5% and 10% critical value is significance. Therefore, since the variables are now stationary and is co-integrated we estimate Autoregressive Distributive Lag Model.

The basic form of an ARDL regression model is:

$Yt = b0 + b_1Y_{t-1} + b_2X_t + b_3X_{t-1} + U_t$…….4

$\Delta MGR_t = b_0 + b_1\Delta MGR_{t-1} + b2\Delta ELECT_t + b3\Delta ELECT_{t-1} + b4\Delta LCCPS_t + b_5\Delta LCCPS_{t-1} + \Delta CPI_t + b_7\Delta CPI_{t-1} + b8\Delta LINTR_t + b_9LINT_{t-1} + b10\Delta MPR_t + b_{11}\Delta MPR_{t-1} + \mu_t$…….5

$\Delta MGR_t = b_0 + b_1\Delta MGR_{t-1} + b2\Delta ELECT_t + b3\Delta ELECT_{t-1} + b4\Delta LCCPS_t + b_5\Delta LCCPS_{t-1} + \Delta CPI_t + b_7\Delta CPI_{t-1} + b8\Delta LINTR_t + b_9LINT_{t-1} + b10\Delta MPR_t + b_{11}\Delta MPR_{t-1} b12ECM_{t-1} + \mu_t$…….6

Where:

Δ = difference

t-1 = lag period for one year

ECMt-1 = the speed of adjustment

the equation five is the long run model while equation six is the short run model.

Optimal Number of Lags, bounds test and discussion of results

The ARDL model was estimated using Eviews 7, AIC and SC approaches was used to choose the optimal number of lags. Given the few observation available for estimation we set the maximum lag order of the various variables in the model equal to unity, i.e (1,1,1,1,1,1,). The results of a few diagnostic tests indicate that there is no serial correction, no heteroskedasticity, errors are normally distributed, and the model is stable (see appendix ii).

The last part of the regression without difference sign is the long run, which can be use for bounds test to ascertain whether there is long run association between the variables. Wald test was used to test for long run relationship. Null hypothesis: there is no long run relationship among the variables. Alternative hypothesis: there is long run relationship among the variables. If the F-statistics is greater than the pesaran critical value at 5% we reject the null hypothesis. The result shows that F-statistics is 6.51>4.85 upper bound value. Therefore, we reject null hypothesis and conclude that the variables has long run association or relationship. This has validate Johanson cointegration test conducted earlier.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-120.3808	40.22402	-2.992758	0.0135
LINTR(-1)	-0.692875	0.375733	-1.844061	0.0950
ELECT(-1)	2.372447	0.697614	3.400801	0.0068
CPI(-1)	-0.530008	0.106378	-4.982306	0.0006
MPR(-1)	3.211052	1.053925	3.046754	0.0123
LCCPS(-1)	19.04738	5.048609	3.772797	0.0036
R-squared	0.895572	Mean dependent var		0.659286
Adjusted R-squared	0.718043	S.D. dependent var		6.237937
S.E. of regression	3.312319	Akaike info criterion		5.489269
Sum squared resid	109.7146	Schwarz criterion		6.345686
Log likelihood	-58.84977	Hannan-Quinn criter.		5.751084
F-statistic	5.044671	Durbin-Watson stat		2.049048

The results above is in line with theoretical expectations except monetary policy rate. There is negative relationship between growth of manufacturing sector and the past value of the growth of manufacturing sector and statistically significant. This then mean, a unit change in the past value of the growth of manufacturing sector lead to an average of 1.9 units decrease in the growth of manufacturing sector performance in Nigeria. This goes to mean that it is not a yardstick to use the previous performance of manufacturing sector to judge or predict its future outcome because factors like crises, government policies just like what we are currently facing, political instability, bad climate and other factors which were not recorded in past period may be the order of the day now.

There is an inverse relationship between growth of manufacturing sector and lending interest rate, this is in line with a prior expectation but statistically insignificant at 5% but significant at 10%. This is in line with the finding of Muhammad (1990). A unit change in lending interest rate lead to an average of 0.69 units decrease in the growth of manufacturing sector in Nigeria. The long run multiplier effect is 0.69/1.90 = 0.36. in the long run, an increase of 1 unit in lending interest rate will lead to a decrease of 0.36 units in growth of manufacturing sector in Nigeria.

The result also reveals that electricity to manufacturing sector has positive relationship with growth of manufacturing sector and statistically significant. A unit increase in supply of electricity to manufacturing sector will bring about an average of 2.37 units increase in the growth of manufacturing sector in Nigeria. The long run multiplier effect is 0.69/2.37 = 0.29. in the long run, an increase of 1 unit supply of electricity to manufacturing sector will lead to an increase of 0.29 units in the growth of manufacturing sector in Nigeria. This demonstrated how paramount electricity is to the manufacturing company in Nigeria, the more the power supply the more quantity of goods will be produce at cheap rate.

Consumer price index has an inverse relationship with the growth of manufacturing sector and statistically significant. A unit increase in consumer price index will lead to an average of 0.53 units decrease in the growth of the manufacturing sector in Nigeria. The long run multiplier effect is 0.69/0.53 = 1.30. in the long run, an increase of a unit in consumer price index will result to 1.30 units fall in the growth of manufacturing sector in Nigeria. This illustrate how disastrous inflation could be to manufacturing sector in Nigeria.

Monetary policy rates has positive relationship with the growth of manufacturing sector in Nigeria and statistically significant. This is similar with the outcome of the work of Charles (2012). A unit increase in monetary policy rate will lead to an average of 3.21 units

increase in the growth of manufacturing sector. The long run multiplier effect is 0.69/3.21 = 0.21. in the long run, a unit increase in monetary policy rate the growth of manufacturing sector will rise by 0.21 units. This goes to mean that, if the rate of returns on investment or manufacturing industry is relatively high investors can borrow at higher lending rate so long as the rate of returns on investment is higher than lending rate.

Lastly, credit to core private sector has positive relationship with the growth of manufacturing sector in Nigeria and statistically significant. A unit increase in the credit to core private sector will to an average of 0.19% increase in the growth of the manufacturing sector in Nigeria and statistically significant. the long run multiplier effect is 0.69/0.19 = 3.63. in the long run, a units increase in the credit to core private sector will lead to 3.63 units increase in the growth of manufacturing sector. The impact is very low because availability of credit to the core private sector does not determine the start of business, there are other factors that needed to be taken care or put into consideration such as market, climate, location, environment, and many others.

R^2 = 89% which shows total variation in regressors explaining response variable. Is a good fit. F – statistic is 5% whose shows that the explanatory variables are simultaneously significant with probability value less than 5%. DW = 2 which shows absent of autocorrelation.

Since there is long run relationship between the dependent variable and regressors, we estimate the ECM to ascertain short run relationship between the response variable and independent variables.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.335739	2.145662	2.020700	0.0615
D(MGR(-1))	0.060898	0.180929	0.336587	0.7411
D(LINTR)	-0.104588	0.363105	-0.288039	0.7773
D(LINTR(-1))	-0.121635	0.376713	-0.322885	0.7512
D(ELECT)	-0.643148	0.430263	-1.494778	0.1557
D(ELECT(-1))	-0.022562	0.404922	-0.055720	0.9563
D(CPI)	-0.012492	0.074061	-0.168666	0.8683
D(CPI(-1))	0.051103	0.055373	0.922894	0.3707
D(MPR)	-0.583018	0.636786	-0.915564	0.3744
D(MPR(-1))	0.137771	0.505092	0.272765	0.7888
D(LCCPS)	3.244789	16.52629	0.196341	0.8470
D(LCCPS(-1))	-46.40768	21.37803	-2.170812	0.0464
ECT(-1)	-0.887090	0.279316	-3.175942	0.0063
R-squared	0.693696	Mean dependent var		0.659286

Adjusted R-squared	0.448653	S.D. dependent var	6.237937
S.E. of regression	4.631839	Akaike info criterion	6.208202
Sum squared resid	321.8090	Schwarz criterion	6.826726
Log likelihood	-73.91483	Hannan-Quinn criter.	6.397291
F-statistic	2.830915	Durbin-Watson stat	1.865389

The short run causality test shows that there is no short run causality between endogenous variable and exogenous variables in the model.

The short run coefficient result show that, the past value of MGR, CPI MPR and current value of CCPS has positive effect on the growth of manufacturing sector in Nigeria and statistically insignificant. The current and past value of lending interest rate, electricity to manufacturing sector, current value of consumer price index, and monetary policy rate has negative effect on the growth of manufacturing sector in Nigeria and statistically insignificant. And lastly, past value of credit to core private sector has inverse relationship with the growth of manufacturing sector in Nigeria and statistically significant at 5%.

The speed to correct the previous disequilibrium is 89%. It is statistically significant and it has the conventional sign (negative), which validate existence of long run equilibrium. R^2 shows total variation in independent variables in explaining the dependent variable by 69% which is a good fit and F- statistics = 2.83. it then mean that the explanatory variables are jointly significant because probability value is less than 5%. DW = 1.87 approximately 2 which means there no autocorrelation.

CONCLUSION AND RECOMMENDATION

In this work effort was made to determine the effect of lending interest rate on the growth of manufacturing sector in Nigeria with particular reference to both short run and long run effect using ARDL model. The result of the finding indicates that lending interest rate has negative relationship with the growth of manufacturing sector in Nigeria both short run and long run, statistically insignificant in the short run and statistically significant in the long run. This result was so because lending interest rate in Nigeria has being one of the major factor that determine the output, profit and sustainability of manufacturing sector. At higher lending interest rate the strength of the industrial borrowing becomes less which reduces profit and even its size of expansion. To attract more foreign and domestic investors to Nigeria, political instability and epileptic lending interest rate should be revisit. Electricity to manufacturing sector and credit to core private sector has positive relationship with growth of manufacturing sector in Nigeria and statistically significant. On these, the study recommends that the central Bank of Nigeria (CBN) should step in with measures to regulate lending rate by maintaining the monetary policy rate at a level low enough to bring down the the rate at which deposit

money banks lend to their clients and avoid playing politics like soften lending rate to a particular firm. Government at all levels should try to contribute its quarter to promote peace in all geo-political zone, improve and fixed decay infrastructure such as electricity, improve security and favourable environment.

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APPENDIX I

DATA SET

YEAR	MGR	LINTR (%)	ELECT(%)	CPI(%)	MPR (%)	LCCPS
1986	26.22	12	33.3	20.9	10	1.81
1987	-3.74	19.2	34.5	7.7	12.75	1.91
1988	3.96	17.6	34.1	23.2	12.75	1.99
1989	13.89	24.6	26.4	40.7	18.5	2.06
1990	2.17	27.7	25.6	4.7	18.5	2.13
1991	4.93	20.8	26.8	5.4	14.5	2.18
1992	9.36	31.2	24.7	10.2	17.5	2.35
1993	-4.49	36.09	20.8	56	26	2.67
1994	-3.71	21	21.3	50.5	13.5	2.74
1995	-1.33	20.79	20.3	7.5	13.5	2.85
1996	-5.18	20.86	22.8	12.7	13.5	2.97
1997	0.85	23.32	23.5	44.8	13.5	3.10
1998	0.41	21.34	22.5	57.2	14.31	3.15
1999	-6.88	27.19	21.7	72.9	18	3.23
2000	3.44	21.55	22	29.3	13.5	3.33
2001	3.44	21.34	21.9	8.5	14.31	3.49
2002	6.99	30.19	11.5	10	19	3.57
2003	10.07	22.88	12.9	6.6	15.75	3.63
2004	5.66	20.82	21.8	6.9	15	3.75
2005	11.90	19.49	21.8	18.9	13	3.87
2006	9.61	18.7	22	12.9	12.25	3.97
2007	9.39	18.36	22	8.2	8.75	4.19
2008	9.57	18.7	20	11.6	9.81	4.44
2009	8.89	22.62	21.01	13.7	7.44	4.55
2010	7.85	22.51	22	12.5	6.13	4.59
2011	7.57	22.42	21	13.5	9.19	4.63
2012	17.82	23.79	20.8	12.82	12	4.75
2013	13.46	24.69	20.6	12.14	12	4.78
2014	21.80	25.59	20.4	11.46	12	4.82
2015	14.72	26.49	20.2	10.78	12	4.85

Source: *Central Bank of Nigeria Statistical Bulletin (various issues),*

Note: *CCPS are expresse in log*
CU, LINT, MPR and ELECT expressed in rate (%)
CPI is expressed as an Index for inflation

APPENDIX II

Dependent Variable: D(MGR)
Method: Least Squares
Date: 09/08/16 Time: 15:02
Sample (adjusted): 1988 2015

Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-120.3808	40.22402	-2.992758	0.0135
D(MGR(-1))	0.261267	0.158404	1.649374	0.1301
D(LINTR)	-0.149952	0.324199	-0.462529	0.6536
D(LINTR(-1))	0.173066	0.336488	0.514331	0.6182
D(ELECT)	0.543099	0.559555	0.970591	0.3546
D(ELECT(-1))	-0.948918	0.447303	-2.121419	0.0599
D(CPI)	0.328779	0.078877	4.168244	0.0019
D(CPI(-1))	0.212805	0.057101	3.726789	0.0039
D(MPR)	0.914988	0.640107	1.429430	0.1834
D(MPR(-1))	-0.876791	0.594528	-1.474770	0.1710
D(LCCPS)	-2.468881	13.17872	-0.187338	0.8551
D(LCCPS(-1))	-32.97899	16.25166	-2.029269	0.0699
MGR(-1)	-1.902012	0.366769	-5.185852	0.0004
LINTR(-1)	-0.692875	0.375733	-1.844061	0.0950
ELECT(-1)	2.372447	0.697614	3.400801	0.0068
CPI	-0.530008	0.106378	-4.982306	0.0006
MPR(-1)	3.211052	1.053925	3.046754	0.0123
LCCPS(-1)	19.04738	5.048609	3.772797	0.0036

R-squared	0.895572	Mean dependent var	0.659286
Adjusted R-squared	0.718043	S.D. dependent var	6.237937
S.E. of regression	3.312319	Akaike info criterion	5.489269
Sum squared resid	109.7146	Schwarz criterion	6.345686
Log likelihood	-58.84977	Hannan-Quinn criter.	5.751084
F-statistic	5.044671	Durbin-Watson stat	2.049048
Prob(F-statistic)	0.006414		

Null Hypothesis: C(13) = C(14) = C(15) = C(16) = C(17) = C(18) = 0
Alternative Hypothesis C(13) ≠ C(14) ≠ C(15) ≠ C(16) ≠ C(17) ≠ C(18) ≠ 0
Wald Test:
Equation: Untitled

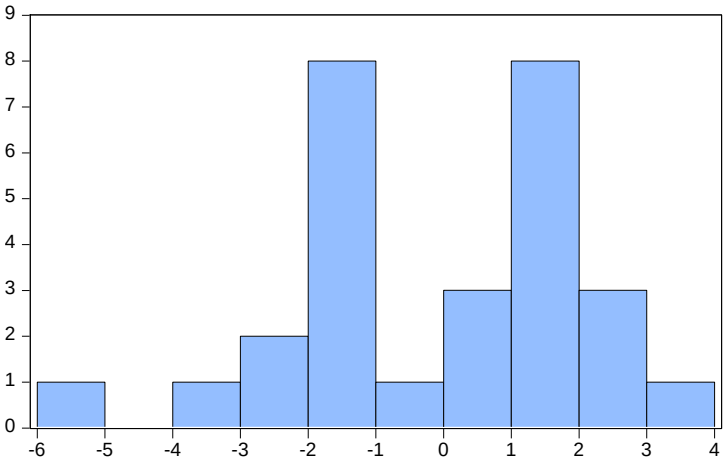
Test Statistic	Value	Df	Probability
F-statistic	6.509192	(6, 10)	0.0051
Chi-square	39.05515	6	0.0000

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.073488	Prob. F(2,8)	0.9298
Obs*R-squared	0.505137	Prob. Chi-Square(2)	0.7768

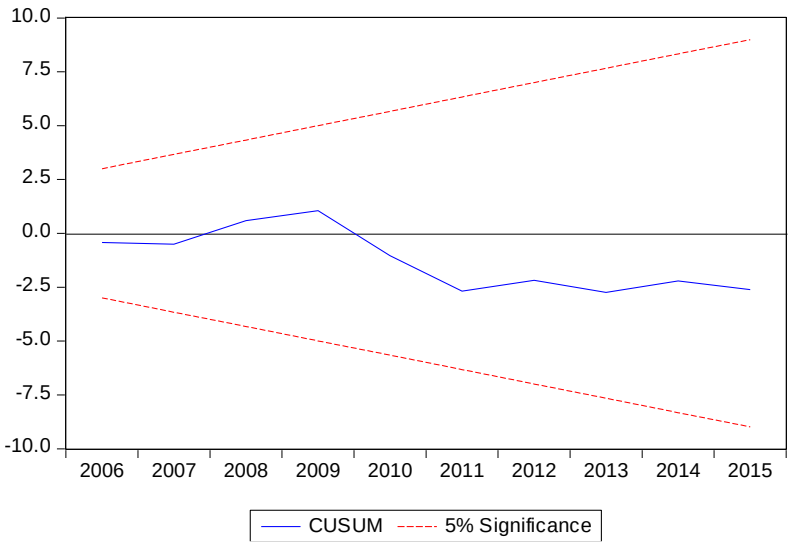
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.073488	Prob. F(2,8)	0.9298
Obs*R-squared	0.505137	Prob. Chi-Square(2)	0.7768



Series: Residuals
Sample 1988 2015
Observations 28

Mean	-9.93e-15
Median	0.453241
Maximum	3.477979
Minimum	-5.181584
Std. Dev.	2.015813
Skewness	-0.474682
Kurtosis	2.817776
Jarque-Bera	1.090248
Probability	0.579770



APPENDIX III

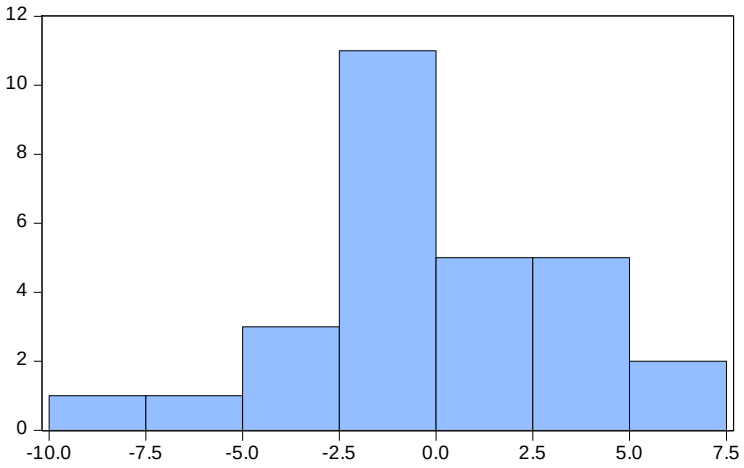
Dependent Variable: D(MGR)
Method: Least Squares
Date: 09/09/16 Time: 08:30
Sample (adjusted): 1988 2015
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.335739	2.145662	2.020700	0.0615
D(MGR(-1))	0.060898	0.180929	0.336587	0.7411
D(LINTR)	-0.104588	0.363105	-0.288039	0.7773
D(LINTR(-1))	-0.121635	0.376713	-0.322885	0.7512
D(ELECT)	-0.643148	0.430263	-1.494778	0.1557
D(ELECT(-1))	-0.022562	0.404922	-0.055720	0.9563
D(CPI)	-0.012492	0.074061	-0.168666	0.8683
D(CPI(-1))	0.051103	0.055373	0.922894	0.3707
D(MPR)	-0.583018	0.636786	-0.915564	0.3744
D(MPR(-1))	0.137771	0.505092	0.272765	0.7888
D(LCCPS)	3.244789	16.52629	0.196341	0.8470
D(LCCPS(-1))	-46.40768	21.37803	-2.170812	0.0464
ECT(-1)	-0.887090	0.279316	-3.175942	0.0063

R-squared	0.693696	Mean dependent var	0.659286
Adjusted R-squared	0.448653	S.D. dependent var	6.237937
S.E. of regression	4.631839	Akaike info criterion	6.208202
Sum squared resid	321.8090	Schwarz criterion	6.826726
Log likelihood	-73.91483	Hannan-Quinn criter.	6.397291
F-statistic	2.830915	Durbin-Watson stat	1.865389
Prob(F-statistic)	0.030029		

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.288293	Prob. F(2,13)	0.7542
Obs*R-squared	1.189135	Prob. Chi-Square(2)	0.5518



Series: Residuals	
Sample 1988 2015	
Observations 28	
Mean	3.73e-16
Median	-0.192582
Maximum	6.765134
Minimum	-8.540966
Std. Dev.	3.452369
Skewness	-0.105884
Kurtosis	2.975979
Jarque-Bera	0.052994
Probability	0.973851

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.811576	Prob. F(12,15)	0.6375
Obs*R-squared	11.02270	Prob. Chi-Square(12)	0.5270
Scaled explained SS	3.125406	Prob. Chi-Square(12)	0.9946