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THE IMPACT OF MANUFACTURING SECTOR ON ECONOMIC GROWTH IN NIGERIA

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Abstract

The study examined the impact of manufacturing sector on economic growth in Nigeria using time series data obtained from Central Bank of Nigeria statistical bulletin on real gross domestic product (RGDP), manufacturing capacity utilization (MCU), manufacturing output (MO), interest rate (INR) and labour force (LF) from 1981 to 2019. Autoregressive Distributed Lag (ARDL) technique was utilized for the analysis. The bounds cointegration test provides enough evidence of long-run relationships among the variables. The results showed thatMCU has positive, significant and inelastic influence on RGDP both in the short run and in the long run.Manufacturing output on the other hand has positive, inelastic but insignificant effect on RGDP in the short run but it is significant in the long run. Labour force has positive, significant and elastic effect on RGDP both in the short run and the long run.Interest rate has insignificant effect in explaining variation in RGDP both in the short run and long run.It is recommended that government should pursue favorable policy framework and provide necessary assistance, such as increasing investment in the area of capital market development, promote increased funding in the field of innovative technological advancement. Investment policies are expected to be flexible and more friendly in order in improve the contribution of the sector to economic growth and hence make the contribution of manufacturing capacity utilization as well as manufacturing output to exhibit an elastic influence on economic growth.

Keywords: Autoregressive Distributed Lag (ARDL), Co-integration, Economic Growth, Manufacturing Sector.

JEL Classification: O44, Q56

Introduction

Arguably, the fastest channel by which rapid sustainable growth and development is achieved in any economy is via manufacturing capacity, technological innovation and enterprise development, rather than vast human resources and level of endowed material resources (Olamade, Oyebisi&Olabode, 2014).The manufacturing sector is widely conceived as a critical tool for accelerating economic growth and development of both developed and developing nations (Olorunfemi, Tomola, Felix &Ogunleye, 2013). The sector is a catalyst that accelerates the pace of economic diversification and structural transformation, open up the opportunity for a country to utilize its factor endowment and less dependency on imported products.

Most developed countries like Germany, rose to become one of the largest economy in the world today despite its poor natural resources and chronic inflation it faced from 1920s, due to its effective exploitation of the manufacturing sector (Bennett, Anyanwu&Kalu 2015).In another dimension, the developmental success of the East Asian Tigers also called the newlyindustrialized countries (NICs) has been attributed not to their natural resource endowment but to transformation of their manufacturing sector, which has further culminated into rapid economic growth for these countries (Aderoju&Oyefusi, 2011).In Nigeria, the history of manufacturing and industrial development reflect how a nation could neglect a vital sector via economic policy inconsistencies and the abandonment of the agricultural sector for oil sector

(Adeola, 2005). This neglect is contested by authors like Ogbu (2012) that oil industry in Nigeria is not a major determinants of employment; hence, it has limited contributions to other sectors of the economy since the capacity is yet to be developed by the government to vigorously pursue the more value-added activities of the petrochemical value chain.

Despite the enormous natural resources endowment, Nigeria has been placed amongst the 47th poorest countries in the world (WBDI, 2012). However, the mono-economic practice and the underutilization of the endowed natural resources of the country were blamed for the extreme poverty observed in the economy, especially in the manufacturing sector that has the potentialities of boosting employment opportunities and economic development of the nation. In other word, the performance of the manufacturing sector of the nation is below expectation. For instance, the manufacturing sector contribution to the gross domestic product (GDP) was 5.4% in 1980 and rose to 10.7% in 1985. In 1990 and 1995, the share of the manufacturing sector to GDP declined to 8.1% and 6.7% respectively. By 2000 and 2013, the contribution of the manufacturing sector to GDP further declined to 6.2% and 4.23% respectively (CBN, 2013). Compare to other strong manufacturing sectors in other emerging economies,the structural change in the manufacturing sector had lifted millions of people out of extreme poverty. For instance, manufacturing sector contributes 20% to GDP in Brazil, 35% in Thailand, 34% in China, 30% in Malaysia and 28% in Indonesia (Ogbu, 2012). However, the economic structure of Nigeria reflects typically an underdeveloped nation with over 50% of the total GDP) being accounted for by the primary sector of the economy such as agriculture while the oil and gas sector being the major driver of the economy thereby accounting for about 95% of the export earnings of the economy and 85% of the government revenue between 2011 and 2012 (Chete, Adeoti, Adeyinka&Ogundele, 2016).The manufacturing sector is the backbone of economic growth. In addition to reducing demand pressures on foreign exchange, a strong manufacturing sector is strategic in ensuring value addition, job creation and export or consumption, which will result to industrial growth.

Theoretical postulation suggests that a rise in manufacturing sector brings about improvement in gross domestic product of a nation. However, the contribution of the sector to gross domestic product is far below expectation in the case of Nigeria. It is against this background that this study is carried out to investigate the short run and long run impact of manufacturing sector on economic growth in Nigeria.The rest of the study is structured as follows: literature review is followed in section two, section three deals with data and method, empirical results is presented in section four, while section five concludes the work.

2.0 Literature Review

2.1. Conceptual Issues

According to Adofu, Taiga and Tijani (2015), manufacturing is viewed as the production of merchandise for sale or use through the application of tools, machine, labour, chemical and biological formulation. It involves both handicraft of human activities and high tech through which raw materials are transformed or converted into finished product in large scale.It can be said to be the major driver of economic growth in most developing countries.Bennett, Anyanwu and Kalu (2015) postulated that modern manufacturing processes involve the development of managerial and entrepreneurial skills as well as high technological innovations that often promote large scale productivity and improved living conditions. They consider manufacturing as a subset of the industrial sector (processing, quarrying, craft and mining). It therefore, involves the conversion of raw materials into finished consumer goods or intermediate or producer goods.

The degree of manufacturing is a measure of the extent to which the other components of the industrial sector are effectively utilized (Kaldor, 1966).According to Banjoko,Iwuji and Bagshaw (2012), manufacturing like other industrial activities creates avenue for employment, helps to boost agriculture and helps to diversify the economy while helping the nation to increase its foreign exchange and local labour to acquire skills. It minimizes the risk of over dependence on foreign trade and leads to fullest utilization of available resources. Modern

manufacturing processes involve the development of managerial and entrepreneurial skills as well as high technological innovations that often promote large scale productivity and improved living conditions (Celina,EzeandNweke 2018).

2.2 Theoretical Literature

2.2.1 Kaldor's law of economic growth

Nicholas Kaldor (1966) came up with his famous law of economic growth and further developed three major laws after his work on the stylized facts of economic growth. According to Kaldor's first law, "Manufacturing industry is the engine of economic growth", implying that the faster the rate of growth of the manufacturing sector, the faster will be the rate of growth ofgross domestic product(GDP). This observation form the origin of Kaldor's first law.This first law emphasized on a close relationship between the growth of manufacturing output and the growth of the GDP. Therefore, it is summed up in the expression that the "manufacturing industry is the engine of economic growth". The first law expects the regression coefficient to be positive.

His second law of economic growth also known as Verdoon's law states that the faster the rate of growth of manufacturing output, the faster will be the rate of growth of labour productivity in that sector (Thirlwall, 1983). The third law is the association between the output of the manufacturing sector and labour transfer where, the faster the rate of growth of manufacturing output, the faster the rate of transfer of labour from nonmanufacturing sectors to the manufacturing sector when there is either diminishing returns or where no relationship exists between employment growth and output growth (Chatterji and Wickens 1983).

2.3. Empirical Literature

Chukwuedo and Ifere (2017) investigated the nexus between manufacturing output and economic growth in Nigeria for the period 1981-2013 using an econometric model consisting of both the Kaldor's first law of growth and the endogenous growth model with the use of error correction model (ECM). The study discovered that output of the manufacturing sector, capital and technology are the key determinants of economic growth in Nigeria. The results also showed that labour force and quality of institutions do not influence economic growth in the economy. Emmanuel and Saliu (2017) investigated the impact of manufacturing sector on economic growth in Nigeria for the period 1981- 2015 by employing ordinary least square (OLS) technique. The results showed that manufacturing output has positive effect on the growth of the Nigeria's economy.

Emilia (2016) investigated the role of industries, especially the manufacturing sector in the national economy and its impact on sustainable development and employment creation in Romanian economy. The results revealed that the major challenge of the Romanian manufacturing sector is the low level of labour productivity as well as medium and high technology manufacturing activities in the economy.Modebe and Ezeaku (2016) examined the linkage between inflation and manufacturing sector growth in Nigeria for the period 1982-2014 through the application of Johansen co-integration test, vector error correction model (VECM) and Granger causality approach. The results showed evidence of long run relationship among the variables. The results also revealed that interest rate and inflation rate have negative and insignificant influence on manufacturing sector growth whereas exchange rate had significant and positive impact on the growth of manufacturing sector value added in the economy.Dan and Wanjuu. (2016), in a study on the impact of industrialization on economic growth in Nigeria using the VECM methodology, showed that capital/ industrial output ratio and the labour/ industrial output ratio has a negative impact on per capita GDP. The finding reveal that human capital, income levels and industrial output have not reached the threshold needed to contribute reasonable to economic growth.

The results indicated that manufacturing sector has insignificant contribution to economic growth of Nigeria. Adofu, Taiga and Tijani (2015) examined the effect of manufacturing sector on economic growth in Nigeria from 1990 to 2013 through the application of ordinary least square (OLS) approach to determine the nexus between manufacturing including its components and economic growth in the economy. The empirical results indicated that manufacturing sector output has negative and insignificant effect on real GDP while average manufacturing capacity utilization had positive and

significant effect on real GDP within the period under study. Furthermore, the results revealed that interest rate and exchange rate do not contribute to real GDP. Similarly, Bennett, Anyanwu and Kalu (2015) studied the effect of industrial development on economic growth in Nigeria for the period 1973-2013 using ordinary least square (OLS) technique. The results indicated that industrial output has insignificant and positive effect on economic growth whereas savings has positive and significant effect economic growth of the economy.

Assessing the contribution of manufacturing sector to economic growth in Nigeria in the era of globalization, Akinmulegun and Oluwole (2014) applied Ordinary Least Square (OLS) approach using time series data on trade openness, manufacturing output and current account balance. Teshome (2014) investigated the impact of manufacturing sector on economic growth in Ethiopia for the period 1980-2009 using both descriptive and econometric methods of analysis. The results indicate that manufacturing sector positively and significantly affect economic growth and productivity of Ethiopia.

Sola, Obamuyi, AdekunjoandOgunleye (2013) investigated the performance of manufacturing sector to sustainable growth and development of Nigeria through the application of panel data analysis for the period 1980-2008. The results discovered that capacity utilization has positive impact on manufacturing sector in Nigeria. Similarly, results however, revealed that exchange rate, export and investment have negative influence on manufacturing sector in the economy.Olorunfemi, Tomola,Felix and Ogunleye(2013) studied the influence of manufacturing sector performance on sustainable economic development in Nigeria for the period 1980-2008 using panel data analysis. The results revealed that capacity utilization, investment and import are the key determinants of manufacturing performance in Nigeria.

Simon-Oke and Awoyemi (2010) examined the influence of manufacturing capacity utilization on industrial development of Nigeria from 1976 to 2005 using co-integration test and error correction model (ECM). The results indicate evidence of long run relationship among the variables such as manufacturing capacity utilization, index of industrial productivity and value added in Nigeria. The study recommended that government should rectify infrastructural inadequacies by providing infrastructural facilities and as well encourages local sourcing of raw materials and intermediate products to increase manufacturing value added and create mass employment in Nigeria.

Most of the previous studiesfailed to include manufacturing capacity utilization, which appears to be one of the major indicators of manufacturing sector performance in any economy. Secondly, in all the studies reviewed in Nigeria, most of the studies were carried out applying ordinary least square (OLS) approachusing either Engle and Granger (1987), Johansen (1988) and Johansen and Juselius (1990) cointegration techniques. The co-integration approach developed by Engle and Granger (1987) is considered suitable for the test based on the expectation of only one co-integrating vector being present, which in most cases more than one cointegration vector abound. Further, the approach proposed by Johansen (1988) enables researchers to test the case that there is more than one co-integration vector by using the VAR model in which all the variables are accepted as endogenous. However, the stringent condition that must be met to perform these standard cointegration tests is that all series should not be stationary at levels and they should be integrated of the same order but not higher than order one. In order to overcome this problem, Pesaran, Shin and Smith (2001) have developed the bounds test approach. According to this method, the existence of a co-integration relationship can be investigated between the time-series regardless of whether they are I(0) or I(1) (under the circumstance that the dependent variable is I(1)). This point is the greatest merit of the bounds test over conventional co-integration testing. Moreover, this approach can distinguish dependent and independent variables and is more suitable than another method for dealing with small sample sizes (Ghorbani and Motallebi 2009). In addition, different variables can be assigned different lag lengths as they enter the model.

3. Methodology

Time series dataspanning the period 1981 to 2019 were obtained from Central Bank of Nigeria statistical bulletin on real gross domestic product (RGDP), manufacturing capacity utilization (MCU), manufacturing output (MO)

and interest rate (INR). Data on labour force total were however obtained from Word Bank Development Indicators.The study adopted the Kaldor first and second law of growth in other to examine the impact of manufacturing sector on economic growth in Nigeria.Kaldor first law states that there exists a positive relationship between the growth of the manufacturing sector and economic growth. In it linear specification it is thus;

$$RGDP = f(MO) \quad - \quad - \quad - \quad (1)$$

Where:

$RGDP$ = Real gross domestic product representing economic growth

MO = Manufacturing output

This Kaldor model is expanded by adding other growth influencing variables and the model is specified in functional form as: $RGDP = f(MCU, MO, INR, LF)$ . . . (2)

Where;

$RGDP$ = Real Gross Domestic Product

MCU = Manufacturing Capacity Utilization

MO = Manufacturing output

INR = Interest Rate

LP = LabourForce

The model is specified in a standard form as follows:

$$RGDP_t = \lambda_0 + \lambda_1 MCU_t + \lambda_2 MO_t + \lambda_3 INR_t + \lambda_4 LF_t + \varepsilon_t$$

- - - (3)

Where;

$RGDP$ is the dependent variable whereas MCU_t, MO_t, INR and LF_t are the independent variables; λ_0 is the constant term, $\lambda_1 \; to \; \lambda_4$ are the parameters of the regression equations and ε_t is the error term.

With regards to the functional form, many researchers such as Khan and Rose (1997) suggested that a log-linear specification is better that a standard linear one on both empirical and theoretical ground. That is, the log-linear specification allows the dependent variable to react proportionally to an increase or decrease in the regressors and exhibits interaction between elasticities. Therefore, all variables in Equation (3) are expressed in logarithmic form as follows:

$$\ln RGDP_t = \lambda_0 + \lambda_1 \ln MCU_t + \lambda_2 \ln MO_t + \lambda_3 \ln INR_t + \lambda_4 \ln LF_t$$

- - -(4)

Where: $\ln$, is the log function of the variables of interest in the research.

This research work used a relatively new estimating technique popularized by Auto-Regressive Distributed Lag (ARDL) approach developed by Pesaran and Shin (1999) and Pesaran, Shin and Smith, (2001). The ARDL form of equation 4 is specified as:

$$\Delta \ln RGDP_t = \lambda_0 + \sum_{i=1}^{N} \lambda_1 \Delta \ln RGDP_{t=i} + \sum_{i=0}^{N} \lambda_2 \Delta \ln MCU_{t=i} + \sum_{i=0}^{N} \lambda_3 \Delta \ln MO_{t=i} + \sum_{i=0}^{N} \lambda_4 \Delta \ln INR_{t=i}$$
$$+ \sum_{i=1}^{N} \lambda_5 \Delta \ln LP_{t=i} + \delta_1 \ln RGDP_{t-1} + \delta_2 \ln MCU_{t-1} + \delta_3 \ln MO_{t-1} + \delta_4 \ln INR_{t-1} + \delta_5 \ln LF_{t-1} + \varepsilon_t$$

- - - (5)

Where; $\ln RGDP_t$ is natural logarithm of real gross domestic product, $\ln MCU_t$ is natural logarithm of manufacturing capacity utilization, $\ln MO_t$ is natural logarithm of manufacturing output, $\ln INR_t$ is natural logarithm of interest rate, $\ln LF_t$ is natural logarithm of labour force and ε_t is error term λ_0 is the constant term and $\lambda_1, \lambda_2, \lambda_3, \lambda_4, and \; \lambda_5$ are the parameters of independent variables to be estimated.

3.4.1 Error Correction Model (ECM)

In order to examine the short run relationships of the model, the error correction model has been used. Error

correction term included in the model, explains the speed of adjustment towards the long run equilibrium. Initially, if the variables confirm the existence of co integration, then the Error Correction Model (ECM) will be estimated. Granger and Weiss (1983) and Engle and Granger (1987) pointed out that if two variables are co-integrated in first difference, their relationship can be expressed as the ECM by taking past disequilibrium as explanatory variables for the dynamic behavior of current variables. The ECM method corrects the equilibrium error in one period by the next period (Maddala, 1992). Therefore, the deviation from the long run relationship should be included as an explanatory variable in an Error Correction Model. Pesaran, Shin and Smith, (2001) error correction model is presented as follows:

$$\Delta \ln RGDP_t = \beta_0 + \sum_{i=1}^{N} \varpi_i \Delta \ln RGDP_{t-1} + \sum_{i=1}^{N} \varphi_i \Delta \ln MCU_{t-1} + \sum_{i=1}^{N} \Omega_i \Delta \ln MO_{t-1}$$

$$+ \sum_{i=1}^{N} \mathrm{h}_i \Delta \ln INR_{t-1} + \sum_{i=1}^{N} \varnothing_i \Delta \ln LF_{t-1} + \Psi ECM_{t-1} + V_t \quad \ldots (6)$$

Where $\Delta \ln RGDP_t = RGDP_t - RGDP_{t-1}$, and ditto to all other explanatory variables, β_0 is the constant, $\varpi_i, \varphi_i, \Omega_i, \mathrm{h}_i, and \varnothing_i$, are the dynamic adjustment coefficients, ECM_{t-1} is the lag of residual representing short run disequilibrium adjustments of the estimates of the long run equilibrium error, ECM_{t-1} represents short run disequilibrium adjustments of the estimates of the long run equilibrium error and Ψ is the coefficient of the error correction term, while V_t is the random error term (Gujarati, 2004). The error correction coefficient must be negative which indicates the existence of a short-run relationship. The size of the error correction coefficient determines the speed of adjustment towards equilibrium.

4.0 Data Presentation and Analysis of Results

4.1 Stationarity Test

One of the major short coming of ARDL approach is that, it collapses if any variable(s) is/are *I(2)*. Researchers have developed several procedures for the test of order of integration. The most popular oneis the Augmented Dickey-Fuller (ADF) test due to Dickey and Fuller (1979, 1981).The test relies on rejecting a null hypothesis of unit root (the series are non-stationary) in favor of the alternative hypotheses of stationarity. The results for Augmented Dickey-Fuller (ADF) test is presented in table 1.

Table 1: Augmented Dickey-Fuller Unit Root Test Results

AUGMENTED DICKEY-FULLER							
	LEVELS			**FIRST DIFFERENCED**			
Variable	t-statistic	Critical value	p-value	t-statistic	Critical value	p-value	*I(d)*
Log(RGDP)	2.251139	-2.945842	0.9999	-3.604682 **a****	-2.948404	0.0107	*I(1)*
Log(MCU)	-2.053895	-2.948404	0.2637	-3.569030 **a****	-2.948404	0.0117	*I(1)*

Log(MO)	0.816330	-2.948404	0.9929	-5.245595 **a*****	-2.948404	0.0001	*I(1)*
Log(LF)	3.169969	-2.945843	1.0000	-5.684693 **a*****	-2.948404	0.0000	*I(1)*
Log(INR)	-4.053864 **a****	-2.954021	0.0035	-	-	-	*I(0)*

Source: Researcher's computation (2021) using E-view 9.0

Note: ***, ** and * imply statistical significance at 1%, 5% and 10% levels respectively.
Also, '*a'* denotes model with constant.

The results as presented in table 1revealed interest rateisstationary at levels, while real gross domestic product (RGDP),manufacturing capacity utilization (MCU), manufacturing output (MO) andlabour force (LF) have unit root problem at their levels but are integrated of order one using Augmented Dickey-Fuller tests. The results of the unit root test has necessitated the co-integration test as well as the choice of ARDL model because interest rate is*I(0)* while others are *I(1).*

4.2 Bounds Testing Approach for co-integration

Equation 5 is used in testing for co-integration using ARDL bound test. The null hypothesis of no co-integration, $H_0 : \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0$ is tested against the alternative hypothesis, $H_0 : \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0$.The result as presented in table 2 shows that the computed F-statistic of 4.350539 is far above the upper bound critical value of 3.52 and 4.01 for 10% and 5% respectively as suggested by Pesaran et al (2001).

Table 2: Co-integration Result

Null Hypothesis: No long-run relationships exist				
Test Statistic	Value	k		
F-statistic	4.350539	4		
Critical Value Bounds				
Significance	I0 Bound	I1 Bound		
10%	2.45	3.52		
5%	2.86	4.01		

Source: Researcher's computation (2021) using E-view 9.0

This is an evidence of strong long-run relationship between and among manufacturing sector and economic growth in Nigeria based on the data used. In order words, there is long-run co-integration between and among the variables. Therefore, manufacturing sector is a long run determinant of economic expansion.The implication of the existence of cointegration is that any of the regressor variable can be targeted as a policy variable to bring about the desired changes in other variables in the system.This result buttress that of Simon-Oke and Awoyemi (2010) who examined the influence of manufacturing capacity utilization on industrial development of Nigeria from 1976 to 2005 using cointegration test and error correction model (ECM) .

4.3: Long- runs ARDL Estimates

The results of long- run estimates using Schwarz Criterion (SC) whit optimal lag selection of 4, suggest the model of ARDL (1,0,1,1,0) as parsimoniousand the result is presented in Table 3.

Table 3: Long- run (ARDL 1, 0, 1, 1, 0) results for economic growth model in Nigeria

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(MCU)	0.569215**	0.231348	2.460428	0.0203
LOG(MO)	0.055546	0.154909	0.358571	0.7226
LOG(LF)	1.665167***	0.228905	7.274502	0.0000
LOG(INR)	0.040174	0.030591	1.313274	0.1998
C	-21.677814	3.474074	-6.239883	0.0000

Source: Researcher's computation (2021) using E-view 9.0

*Note: ***and ** signifies 1% and 5% levels of significance respectively.*

For the fact that a cointegration relationship was detected between the series, ARDL models were established to determine the long- and short-term relationships. According to Pesaran and Shin (1999), the SIC is generally preferred to other criteria because it tends to define more parsimonious specifications even with the limited observation. This study used the SIC to select appropriate lags for the ARDL models which is found to be the order of ARDL (1, 0, 1, 1, 0).

In terms of direction of relationship, there exist a positive relationship between all the regressors (manufacturing capacity utilization, manufacturing output, labour force and interest rate) and economic growth. This means that increase/decrease in any of these variables will result to increase/decrease in economic growth. Precisely, manufacturing output and interest rate have positive but insignificant relationship with economic growth based on the data and time frame used for the analysis. The insignificant nature of manufacturing output reflect the poor condition of physical infrastructure notably the power supply that militate against massive productivity in the sector.Manufacturing capacity utilization as well as labour force have positive and significant impact on economic growth. However while MCU is inelastic in influencing growth, labour force is elastic in explaining growth. The result shows that a percentage increase in manufacturing capacity utilization will increase economic growth by about 0.57 percent.This imply that we are 95 per cent confident that a one per cent increase in manufacturing capacity utilization will improve the level of economic growth by 0.57 per cent, all things being equal.This result is in consonance with that of Adofu, Taiga and Tijani (2015) who examined the effect of manufacturing sector on economic growth in Nigeria from 1990 to 2013 and found a positive relationship between manufacturing capacity utilization and economic growth through the use of ordinary least square. One percent increase in manufacturing output will insignificantlyincrease economic growth by about 0.06 percent.The manufacturing output is statistically insignificant and its coefficient has the correct a priori sign and is consistent with kaldor's first law of growth.

A one percent increase in labour force will result to a significantincrease in economic growth by about 1.7 percent. The labour force having significant impact on economic growth there is every need to increase and continue the investment in human capital development and on research and development (R&D).

One percent increase in interest rate will increase economic growth by about 0.04 percent. This shows that manufacturing sector has positive and significant relationship with economic growth in Nigeria. This result is in agreement with that of Teshome (2014) who investigated the impact of manufacturing sector on economic growth in Ethiopia for the period 1980-2009 using both descriptive and econometric methods of analysis.

4.4: Short- runs ARDL Estimates:

Table 4:Short-Run (ARDL 1, 0, 1, 1, 0) results for economic growth model in Nigeria

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(MCU)	0.130182***	0.033766	3.855376	0.0006
DLOG(MO)	0.196563***	0.044932	4.374673	0.0002
DLOG(LF)	3.621297***	0.913472	3.964322	0.0005
DLOG(INR)	0.009188*	0.004819	1.906758	0.0669
CointEq(-1)	-0.228704**	0.103270	-2.214609	0.0351

R-squared	0.998163	Mean dependent var	10.26599
Adjusted R-squared	0.997703	S.D. dependent var	0.553741
F-statistic	2172.991	Durbin-Watson stat	1.992036
Prob(F-statistic)	0.000000		

Source: Researcher's computation (2021) using E-view 9.0
*Note: ***, **and * signifies 1%, 5% and 1% levels of significance respectively.*

The results of the short-term dynamic coefficients associated with the ARDL specifications are presented in tables 4. The error correction terms (CointEq(-1)) related to the cointegration vector. It indicates that short-term relationships are satisfactory because the error correction term is significant, less than one and exhibit the expected negative sign. This coefficient corresponds to the speed of the adjustment to equilibrium level due to short-run shocks. Thus, higher values of that coefficient are associated with more rapid adjustments. The significant and negative magnitude of the CointEq(-1), of −0.228704 reflects a rapid speed of adjustment. This implies thatthe speed of adjustment to the long run equilibrium in response to the disequilibrium caused by short run shock of the previous period is about 23% in the growth equation. This growth equation revealed that any deviation from the long run equilibrium is recovered in about 4.4 months (1/0.23). This is in agreement with the result of the co-integration test. Consequently, manufacturing sector will play important roles to absorb any negative shock to economic growth in Nigeria.

Just like in the case of long run, the variables have positive relationship with economic growth. Specifically, apart from interest rate which have positive and significant impact on economic growth only at 10 percent and stand inelastic, manufacturing capacity utilization, manufacturing output and labour force have positive and significant relationship with economic growth at 1 percent in which case manufacturing capacity utilization and manufacturing output stand inelastic while labour force is elastic. This confirms the works ofEmmanuel and Saliu (2017) who investigated the impact of manufacturing sector on economic growth in Nigeria for the period 1981- 2015 by employing ordinary least square (OLS) technique

but contradicts the works of Adofu,Taiga and Tijani (2015) who examined the effect of manufacturing sector on economic growth in Nigeria from 1990 to 2013 through the application of ordinary least square (OLS) approach to determine the nexus between manufacturing including its components and economic growth in the economy.With respect to interest rate, the result confirm the works of Modebe and Ezeaku (2016) examined the linkage between inflation and manufacturing sector growth in Nigeria for the period 1982-2014 through the application of Johansen cointegration test, vector error correction model (VECM) and Granger causality approach.

The magnitude of the long-run coefficients are, on average, larger than those of the short-run revealing that the impact of manufacturing sector on economic growth is more in the long run than in the short-run. This calls for long-run manufacturing policies that will stimulate economic growth in Nigeria.

The adjusted R-squared value of 0.986421 indicates that about 99 percent of the variation in economic growth is explained within the model and only about 1 percent that is explained by the variables outside the model. Durbin-Watson value of approximately 2 confirms the absence of serial correlation. The probability value of F-statistic suggests that the model perform well.

4.6:Post-Estimation Tests:

4.6.1: Linearity Test

Table 5: Ramsey RESET Test

	Value	Df	Probability	
t-statistic	1.495959	27	0.1463	
F-statistic	2.237892	(1, 27)	0.1463	

Source: Researcher's Computation (2021) Using E-view 9.0

Ramsey's RESET statistic is reported to judge misspecification. Given its probability value of 0.1463 and 0.1463 for t-statistic and F- statistic respectively, the RESET statistics are highly insignificant such that the null hypothesis of linear relationship between the variables cannot be rejected, hence supporting correct specification of the model.

4.6.2: Serial Correlation Test

Table 6: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.659308	Prob. F(2,26)	0.5256
Obs*R-squared	1.737649	Prob. Chi-Square(2)	0.4194

Source: Researcher's Computation (2021) Using E-view 9.0

To make sure residuals of the optimum model are autocorrelation free, the researcher reported the Breusch-Godfrey Lagrange Multiplier (LM) statistic. The LM statistic is insignificant since the probability values of 0.5256 and 0.4194 for F-statistic and Obs*R-squared respectively are greater than 0.05. Therefore, there is no evidence of serial correlation.

4.6.3: Heteroskadasticity Test:

Table 7: Heteroskadasticity Test Result

F-statistic	11.36188	Prob. F(1,33)	0.2019
Obs*R-squared	8.964133	Prob. Chi-Square(1)	0.1228

Source: Researcher's Computation (2021) Using E-view 9.0

Table 7 presents the results of heteroskadasticity test. The P-values of 0.2019 and 0.1228 for F-statistic and Obs*R-squared from Breusch-Pagan-Godfrey ARCH is in support of the null hypothesis of no evidence of heteroscedasticity.

5.Conclusion and Recommendations

This study examined the impact of manufacturing sector on economic growth in Nigeria using time series data from 1981 to 2019. The data on the variables of interest to the researcher has mix levels of integration as confirm through Augmented Dickey-Fullerstationarity test. Therefore, bounds test within the frame work of Autoregressive Distributed Lag was employed to examine the long run relationship between economic growth, manufacturing capacity utilization, manufacturing output, labour force and interest rate. The result established cointegration between and among the variables. The means that there exist a long run relationship between economic growth, manufacturing capacity utilization, manufacturing output, labour force and interest rate. In other word, manufacturing capacity utilization, manufacturing output, labour force and interest rate has the capacity to influence long run economic growth in Nigeria. The long run result revealed that manufacturing capacity utilization and labour force are the only variables in the regression that are positively and statistically significant in explaining growth in Nigeria.The results further revealed that increased funding for the training of the labour force on production techniques via expanding the frontiers of adaptation, invention, discovery, and increasing the accumulation of technology changing skills, will not only allow for increased efficiency in the manufacturing sector but will further promote long term economic growth.The means that policies to influence economic growth through manufacturing capacity utilization and labour force should be long run targeted. Manufacturing output and interest rate are positive but not statistically significant as a growth influencing variable in the long run. This could be that the output from the manufacturing sector is not significant enough to promote the desired level of economic growth on Nigeria. There is need to develop policies that will encourage investment in the manufacturing sector in order to produce the required level of output that will be significant enough to influence growth in the country. The insignificant nature of interest rate in promoting growth in the long run could be as a result of higher interest rate that discourages prospective investors from obtaining loans from the bank for the purpose of investing in the manufacturing sector. This is reflected in the low output from the sector which is not large enough to influence growth.

The short run estimates reported that apart from interest rate which is positive but not significant in explaining growth in Nigeria, all other regressors (manufacturing capacity utilization, manufacturing output and labour force) are positive and statistically significant. This shows that the effect of manufacturing sector to stimulated growth fizzles away as time passes. Furthermore, the speed of adjustment to long run equilibrium is quit high.

The findings have some policy implications:Government should pursue favorable policy framework and provide necessary assistance, such as increasing investment in the area of capital development, promote increased funding in the field of innovative technological advancement in orderto sustain the impact of the sector in stimulating growth through the long run path in Nigeria; Investment policies are expected to be flexible and more friendly in

order in improve the contribution of the sector to economic growth and hence make the contribution of manufacturing capacity utilization as well as manufacturing output to exhibit an elastic influence on economic growth. Efforts should be intensified by the government at improving physical infrastructure notably in power supply and make it more accessible and reliable to manufacturers to reduce self-supply of electricity which brings huge operating cost. The financial institutions in Nigeria should make effort to invest more in the manufacturing sector so that the sector can have enough funds to invest in modern energy saving and carbon dioxide emission friendly technologies and computer-integrated manufacturing systemso that economic growth will not be a course of retarded economy.

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