

PAPER • OPEN ACCESS

## Correlation Between Manufacturing Sectors and Foreign Direct Investment

To cite this article: A. Afolabi *et al* 2019 *J. Phys.: Conf. Ser.* **1378** 032005

View the [article online](#) for updates and enhancements.



**IOP | ebooks™**

Bringing you innovative digital publishing with leading voices to create your essential collection of books in STEM research.

Start exploring the collection - download the first chapter of every title for free.

# Correlation Between Manufacturing Sectors and Foreign Direct Investment

A. Afolabi<sup>1\*</sup>, O. T. Laseinde<sup>2</sup>, I.J. Oluwafemi<sup>3</sup>, O.D. Atolagbe<sup>4</sup> and J.F Oluwafemi<sup>1</sup>

<sup>1\*</sup>Department of Accounting and Finance, Afe Babalola University, Ado Ekiti, Nigeria

<sup>2</sup>Department of Mechanical and Industrial Engineering, University of Johannesburg, South Africa

<sup>3</sup>Postgraduate School of Engineering Management, University of Johannesburg, South Africa.

<sup>4</sup>Department of English and Communication, Kwara State Polytechnic, Ilorin, Nigeria

Corresponding Author: johnifetayo@abuad.edu.ng

## Abstract-

The manufacturing sectors of nation's economies have without doubt been noted as the chief driver of economic growth the world over. The connection between the Nigerian manufacturing sector and foreign direct investment (FDI) was assessed in this work. The study, in order to empirically examine how the variables are related in the long term and short term, utilised time series data spanning 36 years, while the autoregressive distributed lag (ARDL) and co-integration technique were used. From the result, it is seen that the dependent variables explained R<sup>2</sup> of 97% of the variations in manufacturing sector indicators (MFI), while Foreign direct investment, (FDI), Inflation rate (INF), government expenditure (GOE), and money supply (MSP) represent the independent variables. One of the recommendations of the study is that the federal government should consciously increase amount of foreign direct investments (FDI) made available to this all-important sector-manufacturing sector to boost its efficiency especially with respect to percentage impact on GDP and employment generation in Nigeria.

**Key words:** Foreign Direct Investment, Manufacturing Sector, Economy

## 1. Introduction

The manufacturing sector has a great impact on the Nigerian's gross domestic products. Clearly many sectors of the Nigerian economy are underperforming and one of the chief culprits is the manufacturing sector for a long time because of many reasons. Just like most African countries, Nigeria also operates an agrarian mono-economy which is highly vulnerable to the instabilities of international prices. The country's natural resources are usually of little or no direct benefit to the general population which results in high dependency on imported products, thereby leading to a dysfunctional manufacturing sector in Nigeria due to increase in imports and decrease in exports. Poor access to an effective and competent labour force, poor infrastructure, political instability, unstable exchange rate, fluctuating fuel and electricity prices, are the factors affecting the Nigerian manufacturing sector[1].

Also, lack of technical proficiency is a big problem for several sectors in the economy which has not exempted the Nigerian manufacturing sector. The employment of new and improved technology is common in many sectors of the economy, the entire world is embracing technologies which can be used in promoting international trade and innovation that can be applied to the manufacturing sector of a nation. There has been a slow growth in the Nigerian



manufacturing sector over the years as seen in its contributions to the GDP of the country. During the 1970s and 1980s, there was a 7-11% contribution to GDP, which drastically fell to 3% in the 90s (precisely 1990-1996) due to the poor growth rate per year standing at 1.6%. It was during the years of massive oil fortunes, which is in the late 70s, that the sector peaked its contribution to GDP at about 11%. Contribution to GDP fell abysmally to 2.4% when the price of crude oil fell in 2010, coupled with huge accumulated debt. Manufacturing capacity utilization later in the 1970's was up to 78.70%, which was alarming, and drastically reduced to 43.80% in the 1980's, within the year 2000 and 2005, it fluctuated in the range of 34.60 % and 58.78%.

Adejumo *et al.*[2] observed that Nigeria contributed 70% and 11% of the FDI inflow in West Africa and Africa respectively, according to the 2006 report by UNCTAD world investment report. Where the Nigerian oil sector accounted for 70% of the inflow. On the average, the inflow of foreign direct investment to the manufacturing sector in Nigeria within the time of analysis is favorable, compared to that of the mining as well as the quarrying sector. The manufacturing sector experience about 32% value averagely while FDI in the mining and the quarrying sector has been diminishing, from about 51% in 1970-1974 to 30% in 2000-2001. In 1985-1989, FDI of the trading and business sector rose to 32.6% from 16.9% in 1970-1974, before it dropped drastically to 8.3% in 1990-1994. It however regained momentum in 2000-2001 when it rose to 25.8%. FDI in other sectors like agriculture, transport, communication, building and construction were always the least. Though investors seem to be increasingly interested in the transport and communications sector, especially the telecommunications sector. While investors generally prefer to avoid the banking sector because of the limits placed on foreign involvement by regulations. Foreign investments are expected, sooner or later, in the power sector which has just been privatised. Poor technological advancements remain a major issue in the manufacturing sector[3].

It is therefore imperative to introduce more advanced technologies into the sector if high efficiency is to be achieved. FDI is a means of meeting this objective. FDI significantly increases chances of increased technological knowledge. Owing to the knowledge advantage, the country has strived to promote FDI inflow through trade liberalisation, and also, by signing the Mutual Investment Agreements and eleven (11) binary taxation agreements. However, even with the introduction of FDI into these sectors in the economy, the manufacturing sector still produces abysmal performances. This is why the study is aimed at looking into the role FDI plays in the Nigerian manufacturing sector. And also assess the long run relationship between foreign direct investment and manufacturing sector performance in Nigeria.

## 2.0 Manufacturing Sector Contribution to GDP in Nigeria

The manufacturing sector contributed 6.55% to the GDP in 2010 with a value of N3, 578,641.72. In 2011, it grew by 26.51%. In 2012, it grew by 23.44% which came to about 8% of nation's real gross domestic product. The following year, 2013 experienced one of the highest GDP recorded, at 29.42% (N1, 644,500.79), which resulted in a contribution of 9.03% (N7, 233,322.48) to the GDP. Such had previously never been recorded[1].

Sugar subsector is the biggest contributor in the three years of review, in the years 2010, 2011 and 2012 respectively it grew at 39.36 %, 44.98% and 43.20% of the food, beverages and tobacco respectively. Putting this into perspective, Sugar on it's on accounted for 28.45%, 29.94% and 28.59% of the output of the manufacturing sector in 2010, 2011 and 2012 respectively. The percentage growth of sugar in 2011, which was at 25.66% (N497,902.73

million), was more than the average growth of the entire manufacturing sector, consequently resulting in it being the major growth factor in the sector in 2011. In 2012 also, an 11.15% (N271, 968.03 million) output of sugar resulted in it being a large contributor to growth again. Bread was the next highest contributor to output with N1, 398,459.12 million in 2010 (28.36% of total activity), N1, 099,934.59 million in 2011 (20.30% of total activity) and N1, 319,418.19 million in 2012 (21.52% of total activity). It also had a significant portion in the total growth of the entire manufacturing sector in each of these years, with 20.43%, 13.46% and 13.43% respectively. Coincidentally, bread is one of the two products with declined output in that period, with a 21.35% (N298, 524.52 million) decline in 2011, recovering in 2012 with 19.95% (N219, 483.60 million) decline. Juice was the other product with a decline, declining in 2011 at 60.35% or N182, 858.28 million declines. Like bread, Juice also recorded substantial growth in 2012, with a 31.76%.

Rice was the third biggest contributor, followed by biscuits. The output of rice was 2,211,827kg in 2010. Also, there was an increase of 33.98% (N172, 842.71 million) and 11.61% (N79, 157.08 million) was seen in 2011 and 2012 respectively. Biscuits represented N353, 836.08 million (7.18%), N453, 807.45 million (8.37%) and N503, 679.49 million (8.21%) in output in 2010, 2011 and 2012 respectively[1].

## 2.1 Theoretical Literature

### 2.1.1 Capital Arbitrage of the Cost Capital Theory

Founded by Samuelson in 1948, this theory is related to international trade and it states that variations in rates of return on investment influence the decision of potential foreign investors to move their capital resources. According to this theory, it is predicted that capital will move from a country with excess capital to a country with inadequate capital because of a higher output of capital until there are equal return rates. This theory also expects that foreign direct investment will be present because investing enterprises having the required management and/or technological knowhow to take advantage of the foreign economies. Some factors such as rate of return on investment, higher output etc. that affects FDI inflow in developing countries are stated by this theory. The theory also didn't address the reason why FDI are mostly among developed countries than less developed countries. Following Caves (1974), the theory of the firm assumes perfect market conditions and suggests transnational corporation when home investments have reached an optimum level which can lead to diminishing returns to scale of further investments are made. It is predicted in this theory that provided there is a profit future market for the products, the will to open new plants will expand output. FDI is therefore dependent on market factors and marginal efficiency. Consequently, this theory shows that the aim of foreign entrepreneurs when investing in developing countries is to broaden their production reach, while enjoying economic scale and huge profit.

Dunning[4] suggests in his Eclectic paradigm of FDI that FDI is as a result of the benefits of ownership, internationalisation and location. According to him if the following conditions are met, FDI will exist: there must be ownership benefits; the organisation must possess some kind of competitive advantage to successfully compete with the foreign companies in their home; the business in the foreign country must yield more profit than in native country. Therefore, Dunning postulates that location benefit is the determinant of the cross-country nature of FDI. Though it has been challenged that there is a change in the location benefit sought by the investors as a result of globalisation. Dunning [4] stated that it is more important for FDI

to come from non-traditional industrialised countries, into countries with government policies as well as reliable government and helpful infrastructure. While FDI coming from larger developing countries require normal economic determinants such as market size, infrastructure and other resources that promotes effective focus on production, political and macro-economic stability.

### 2.1.2 External Capital Requirement Theory (ECRT)

From the report of Luiz A. Pereira da Silva, Prof. Richard Agnor, Profs. Ana Rosa Fonesca and F. Gonzalez (2009). This theory suggests that countries vary in respect to how much of other forms of capital inflow can be substituted by foreign direct investment. This can result from the different economic structures, each having its own distinct attraction to foreign investors along with differences in the macroeconomic causes of the necessity for external capital inflow. This implies that larger countries with more infrastructure, resources and a vigorous industrial sector can utilise FDI to replace borrowing from international financial market. Countries with previous affiliation to international corporate business also attract FDI. Therefore, countries with small international market, relatively under-developed infrastructure and limited export potentials may be unable to invite a substantial of FDI for their economy, even with a host of incentives. The currency area argument developed by Aliber [5] opined that companies in nations where their national currencies are strong seem often times to invest more in foreign countries and companies from abroad too seem less disposed to invest in the economy of such a country. This argument has supportive mandate on capital market assets in selected currencies. Testing this argument further, reveals that over- valuation of a currency is likely to lead to FDI outflows while under- valuation attracts FDI.

## 2.2. Empirical Literature

In a study by Turkan, *et al* [6], which utilized a panel data set of 230 OECD countries between 1975 and 2004 to test how FDI and economic growth are endogenously connected a positive relationship it is seen from the results that FDI and the manufacturing sector are positively related. The study utilized FDI and economic growth as endogenous variables and employed a two-equation of simultaneous equation system using a Generalized Methods moments known as GMM. The result showed that both variables influence each positively and significantly. Several studies has been carried out bases on Toda Yamamoto test for casualty. This test is occasionally chosen ahead of the Standard Granger Casualty test which does not pay based on pre-testing evaluations. Evidence of this study revealed a bidirectional relationship between economic growth and foreign direct investment, which has a long run effects, implying that foreign direct investment had a direct impact on Malaysia's economic growth.

Olayemi [7], utilizing annual test series between 1978 and 2008, also studied the influence of foreign direct investment on the manufacturing capacity utilization in Africa's biggest economy- Nigeria, he employed the cointegration technique and error correction model (ECM) to test for long run relationships. Results obtained revealed poor attraction of FDI to the Nigerian economy, FDI had little or no impact on the manufacturing capacity utilization in Nigeria. Also shown in the study is the conducive macro-economic environment and sound economic policy that results in the necessary sustainable economic growth for FDI inflow into the country which would ultimately promote domestic production, thereby improving manufacturing capacity utilization rate. Animola [8], instead, observed a 50% variation in

capacity utilization. While others had positive relationship with capacity utilization, inflation rate was the only variable among six that had a negative effect on capacity utilization. A highly significant and positive association was also observed between manufacturing capacity utilization and imported manufacturing in the study, confirming that Nigeria is highly dependent on importation. The study shows that 1 per cent variation in imported manufactures accounts for 18:33 per cent rise of capacity utilisation. Economic liberalization in Nigeria and performance of the Nigerian industrial sector was assessed by Richardson and Tamarauntari [9].

The role foreign direct investments play in the Nigerian economy's manufacturing sector, with regards to performance was also examined by Okoli *et al* [10]. Time series data covering a 40-year period was obtained from the Nigerian Central bank's statistical bulletin and the World bank records, using manufacturing value added (MVA) for the performance of manufacturing firms. The researchers utilised an OLS evaluation with FDI modelled as a quadratic function to account for its turning point and the VECM to establish both the long term and the short-term causalities running from the explanatory variables to dependent variable. From the results, conclusion was made that in order to ensure positive impact on the manufacturing sector, the government should focus on purposefully implementing policies that will promote FDI inflows especially for long term effects and also encourage an effective and supporting macroeconomic environment that will enhance the efficiency of manufacturing firms. It also stated that it is imperative that there is domestic investment and increased human capital skills.

### 3. METHODOLOGY

#### 3.1. Model Description

The first model assessed how foreign direct investment (FDI) affected long term performance of the manufacturing sector in Nigeria. The autoregressive distributed lag (ARDL) and co-integration technique are used to empirically analyses how the variables of interest would interact in the short term and long term. Pesaran *et al* [11] developed the co-integration technique approach. It permits a combination of I (1) and I (0) variables as regressors, which means that it is not required that all variables are integrated in the same order. According to Pesaran *et al* [11], the augmented ARDL ( $p, q_1, q_2, \dots, q_k$ ) can be written as

$$\alpha(L, p)y_t = \alpha_0 + \sum_{i=1}^k \beta_1(L, q_i)x_{i,t} + \varepsilon_t \quad (1)$$

Where  $\alpha_0$  is a constant,  $y_t$  denotes the dependent variable,  $L$  is a lag operator,  $x_{i,t}$  is the vector of regressors (where  $i = 1, 2, \dots, k$ ) and  $\varepsilon_t$  is the disturbance term.

The long run relationship model is specified as follows;

$$MFI_t = f(FDI_t, INF_t, GOE_t, MSP_t, \varepsilon) \quad (2)$$

$$\ln MFI_t = \beta_0 + \pi \ln FDI_t + \nu \ln INF_t + \upsilon \ln GOE_t + \theta \ln MSP_t + \varepsilon \quad (3)$$

The second model assessed how foreign direct investment affected the short-term performance of manufacturing sector in Nigeria.

The short-term dynamic interaction between foreign direct investments and the performance of manufacturing sector is modelled as follows;

$$\begin{aligned} \Delta \ln MFI_t = & \beta_0 + \pi \Delta \ln MFI_t + \nu \Delta \ln FDI_t + \varpi \Delta \ln INF_t + \upsilon \Delta \ln GOE_t + \theta \Delta \ln MSP_t + \sum_{i=0}^p \pi \Delta \ln MFI_{t-1} + \sum_{i=0}^{q_1} \nu \Delta \ln FDI_{t-1} \\ & + \sum_{i=0}^{q_2} \varpi \Delta \ln INF_{t-1} + \sum_{i=0}^{q_3} \upsilon \Delta \ln GOE_{t-1} + \sum_{i=0}^{q_4} \theta \Delta \ln MSP_{t-1} + \varepsilon_t \end{aligned} \quad (4)$$

Where  $\Delta$  is the first-difference operator and  $\pi, \nu, \varpi, \upsilon, \text{ and } \theta$  are the coefficients.

*MFI = Manufacturing Sector Indicator.*

*FDI = Foreign Direct Investment.*

*INF = Inflation Rate.*

*GOE = Government Expenditure.*

*MSP = Money Supply.*

$\varepsilon$  = Error Term.

**Model (3)** investigated the direction of casualty between the performance of manufacturing sector in Nigeria and FDI

In estimating the relationship, the following test was carried out:

$$X_t = \sum_{i=1}^n \alpha_i Y_{t-i} + \sum_{j=1}^n \beta_j X_{t-j} + \mu_{1t} \quad (5)$$

$$Y_t = \sum_{i=1}^n \lambda_i Y_{t-1} + \sum_{j=1}^n \delta_j X_{t-1} + \mu_{2t} \quad (6)$$

**Table 1: Summary Table**

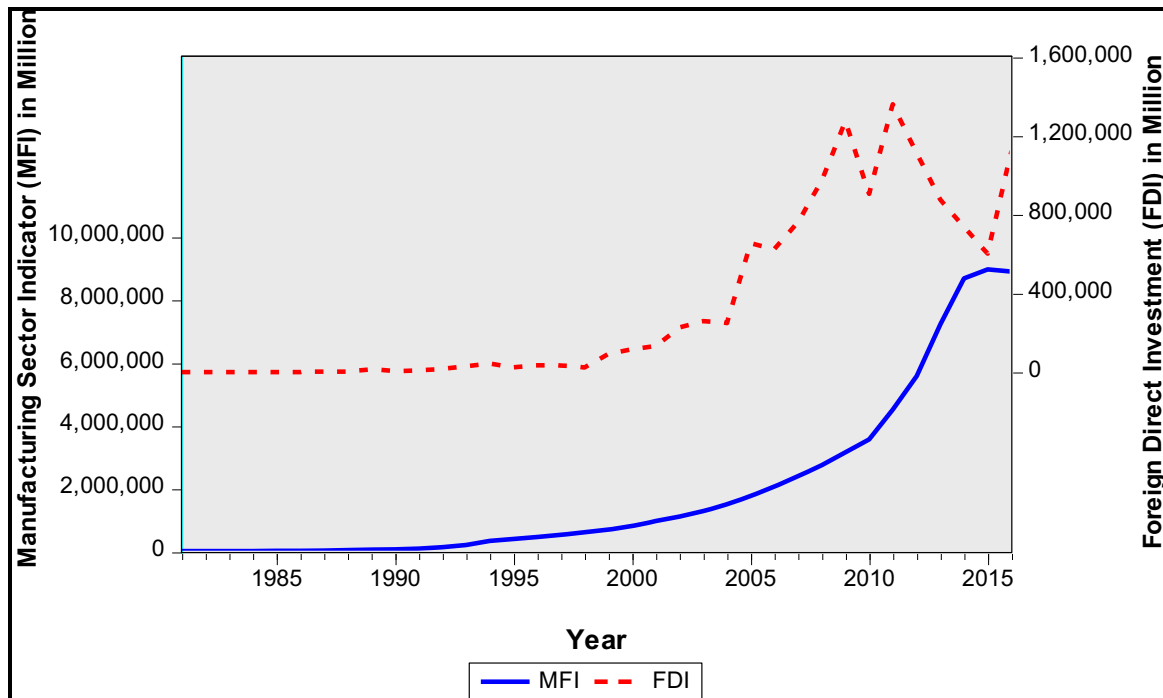
	Obs.	Mean	Max.	Min.	Std. Dev.	Skew	Kurts	J-Bera (Sig.)
MFI	36	1930961.84	8973773.15	26885.96	2712763.99	1.62	4.40	18.67 (0.000)
FDI	36	342024.59	1360307.91	145.00	441554.07	0.98	2.47	6.16 (0.046)
INF	36	20.24	76.76	0.22	18.71	1.57	4.45	17.9 (0.000)
GOE	36	1435526.56	4797447.46	9636.50	1698237.09	0.89	2.18	5.76 (0.056)
MSP	36	4172186.62	21607681.68	14471.17	6363748.21	1.45	3.74	13.46 (0.001)

Source: World Development Indicator (WDI) Database and CBN annual report

The basic features of the indicators under consideration in this study are summarized in Table 1. Explicitly, the manufacturing sector indicator (MFI) takes values between N26885.96m and N8973773.15m, with an average value of N1930961.84m. Foreign direct investment (FDI) has an average value of N342024.59m with minimum and maximum values of N145.00m and N1360307.91m respectively. Inflation rate (INF) during the period hovers around 0.22% and 18.71% with mean 20.24% and a standard deviation of 1.57. Government expenditure Kurtosis statistic indicates MFI, INF and MSP are leptokurtic (high kurtosis) while FDI and GOE are platykurtic (low kurtosis) when compared with normal distribution value of 3.

### Trend Analysis

The progression of foreign direct investment (FDI) and manufacturing sector indicator (MFI) between 1981 and 2016 (a period of 36 years) is shown in figure 1. It is seen in this illustration that the series are directly proportional to each other during the years of study. On the other hand, though there are some fluctuations in recent years, the variables move in a like manner which suggests that the MFI growth pattern mirrors the FDI trend during that period. FDI specifically grows from N335.00min 1981 to N1124148.99m in 2016 with some fluctuation. Similarly, MFI rises to N8903236.28m in 2016 from N26885.96m in 1981.



Sources: Compiled by the author from WDI and CBN Bulletin, 2017

Fig. 1: Trend of Foreign Direct Investment and Manufacturing Sector Indicator (MFI)

### Unit Root Test

**Table 2** reveals the unit roots of the series should be rejected at levels within the 1% and 10% conventional levels of significance. Meaning, the rejection of the null hypothesis which shows that the series are integrated of order zero.

In contrast, however the obtained result also cannot be rejected at levels within the 1% and 10% significance levels. In this case, the result can be interpreted to mean that the series are not stationary at levels hence, there is need to examine the property of the series at first difference. Nevertheless, the result at the first difference indicates the variables of MFL, FDL, GOE as well as MSP have unit roots and can be safely rejected at first difference. Therefore to make the series stationary they have to be differenced once again by proceeding to do Bounds testing of ARDL, to examine the possibility of both short and long run relationship of the series.



**Table 2: Unit Root test**

VAR.	T.Stat/ Critical Value	ADF		Order	PP		Order
		@Level	@ First Diff.		@Level	@ First Diff.	
MFI	Test Stat [Prob]	-1.524 [0.801]	-4.215** [0.011]	I(1)	-1.749 [0.707]	-4.228** [0.011]	I(1)
	1% level	-4.253	-4.253		-4.244	-4.253	
	5% level	-3.548	-3.548		-3.544	-3.548	
	10% level	-3.207	-3.207		-3.205	-3.207	
FDI	Test Stat [Prob]	-0.737 [0.962]	-9.540*** [0.000]	I(1)	-1.749 [0.708]	-9.906*** [0.000]	I(1)
	1% level	-4.253	-4.253		-4.244	-4.253	
	5% level	-3.548	-3.548		-3.544	-3.548	
	10% level	-3.207	-3.207		-3.205	-3.207	
GOE	Test Stat [Prob]	0.3167 [0.998]	-4.903*** [0.002]	I(1)	-0.540 [0.977]	-7.771*** [0.000]	I(1)
	1% level	-4.263	-4.263		-4.244	-4.253	
	5% level	-3.553	-3.553		-3.544	-3.548	
	10% level	-3.230	-3.230		-3.205	-3.207	
INF	Test Stat [Prob]	-3.338* [0.077]	-5.456*** [0.001]	I(0)	-3.340* [0.077]	-5.957*** [0.000]	I(0)
	1% level	-4.244	-4.285		-4.244	-4.253	
	5% level	-3.544	-3.563		-3.544	-3.548	
	10% level	-3.205	-3.215		-3.205	-3.207	
	1% level	-4.244	-4.253		-4.244	-4.253	
	5% level	-3.544	-3.548		-3.544	-3.548	
	10% level	-3.205	-3.207		-3.205	-3.207	
	1% level	-3.633	-3.639		-3.633	-3.639	
	5% level	-2.948	-2.951		-2.948	-2.951	
	10% level	-2.613	-2.614		-2.613	-2.614	
MSP	Test Stat [Prob]	-2.025 [0.567]	-3.261* [0.000]	I(1)	-1.971 [0.596]	-3.256* [0.000]	I(1)
	1% level	-4.253	-4.253		-4.244	-4.253	
	5% level	-3.548	-3.548		-3.544	-3.548	
	10% level	-3.207	-3.207		-3.205	-3.207	

Sources: CBN Annual Report (2018)

Note: \*, \*\* and \*\*\* imply statistical significance at 1%, 5% and 10% levels respectively.

### Objective 1 Result and Interpretation

To determine long run dynamics of MFI, FDI, GOE, INF and MSP bounds co-integration test is employed with the advantage that the variables in the co integrating relationship can be either of order one or of order zero.

**Table 3: BOUND TEST**

Critical value	F- Statistics	Lower Bound Value	Upper Bound Value
10%	10.420	3.17	4.14
5%		3.79	4.85
2.5%		4.41	5.52
1%		5.15	6.36

Sources: World Development Indicator (WDI) Database and CBN annual report 2018

**ARDL Analysis of the effects of FDI on the performance of manufacturing sector in Nigeria.**

Table 4 presents the result of ARDL (1, 0, 2, 0, and 0) from the table, it is suggested by the  $R^2$  (co-efficient of determination) that the dependent variables accounts for about 97.3% of the variations in MFI. Furthermore, in confirmation that the model is fit, it is seen in the adjusted  $R^2$  that even the addition of other explanatory variables into the model, the selected explanatory variables will still account for 96.6% of the variations in MFI. The proxy for the dependent variable is the Manufacturing Sector indicator (MFI), while those of independent variables are Inflation rate (INF), Government Expenditure (GOE), Money Supply (MSP), and Foreign Direct Investment (FDI).

**Table 4: ARDL Estimates**

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(MFI(-1))	0.743676	0.128686	5.778993	0.0000
LOG(FDI)	0.050340	0.023783	2.116603	0.0440
LOG(GOE)	-0.008771	0.082010	-0.106952	0.9156
LOG(GOE(-1))	-0.138372	0.076569	-1.807172	0.0823
LOG(GOE(-2))	-0.170642	0.104918	-1.626430	0.1159
INF	-0.001543	0.001076	-1.433856	0.1635
LOG(MSP)	0.284494	0.137910	2.062896	0.0492
C	3.455222	1.642891	2.103136	0.0453
R-squared	0.973399	Mean dependent var		14.60347
Adjusted R-squared	0.966237	S.D. dependent var		0.526971
S.E. of regression	0.096830	Akaike info criterion		-1.629405
Sum squared resid	0.243775	Schwarz criterion		-1.270261
Log likelihood	35.69988	Hannan-Quinn criter.		-1.506927
F-statistic	135.9138	Durbin-Watson stat		1.428621
Prob(F-statistic)	0.000000			

Sources: World Development Indicator (WDI) Database and CBN annual report (2018)

**Model Selection Criteria**

Figure 2 shows the model selection criteria graph to show why the selected model is relatively superior to the alternatives. The figure shows that according to Akaike Information Criteria (AIS), the selected ARDL (1, 0, 2, 0, 0) model is far better than the other top 19 models. This shows the superiority of the selected model in this study. Also, the figure shows that most of the models use one lags of the dependent variable.

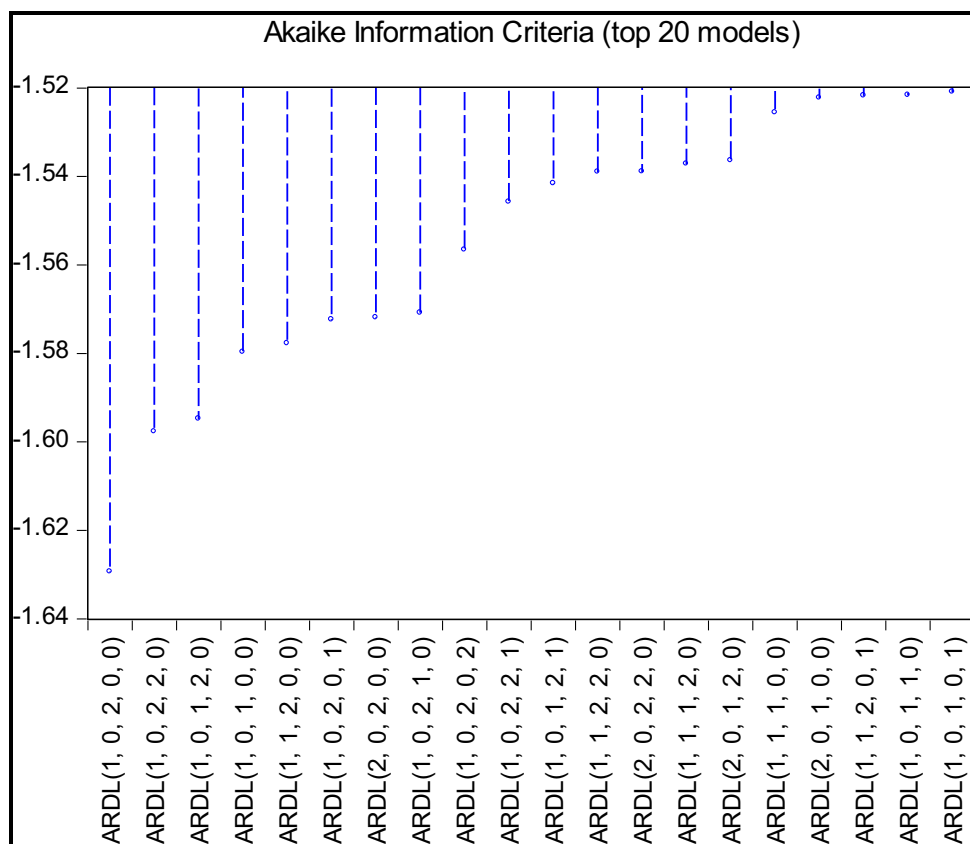


Figure 2: Graph of the AIC of the top twenty models

**The ARDL Analysis (Objective1)**

Table 5 reveals a dynamic long run relationship of the variables of FDI and the Manufacturing sector indicator (MFI), as well as other explanatory variables. It shows that there is an insignificant but positive relationship between FDI and MFI. Also, the result shows there exist a negative but significant relationship exists at 1% between GOE and MFI in the long run. This means that government expenditure has a negative impact on manufacturing sector indicator during the period of the study.

**Table .5: ARDL Co integrating and Long Run Form**  
Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(FDI)	0.196391	0.151440	1.296824	0.2061
LOG(GOE)	-1.239778	0.276720	-4.480263	0.0001
INF	-0.006020	0.005450	-1.104588	0.2795
LOG(MSP)	1.109897	0.199097	5.574650	0.0000
C	13.479884	1.023899	13.165245	0.0000

Sources: World Development Indicator (WDI) Database and CBN annual report (2018)

### Objective 2 Result and Interpretation: Using the ECM Model

Table 6 shows a dynamic short run model, the error correction term of  $-0.0256$  ( $P = 0.57$ ) indicates the models' stability at 1% significance. It also, confirms that MFI and the explanatory variables are related in the long term. Based on the coefficient of the explanatory variables, a positive and significant (5% significance level) short term relationship is seen between FDI on MFI. This suggests that MFI will increase by 0.284 percent given a given an increase of one percent in MSP. On the contrary, the result shows that current GOE and INF in the short run have negative relationship with MFI but these relationships are not significant. This indicates that GOE and INF are not major determinants of MFI especially when not in the long run.

**Table 6: ARDL Co-integrating and Short Run Form**

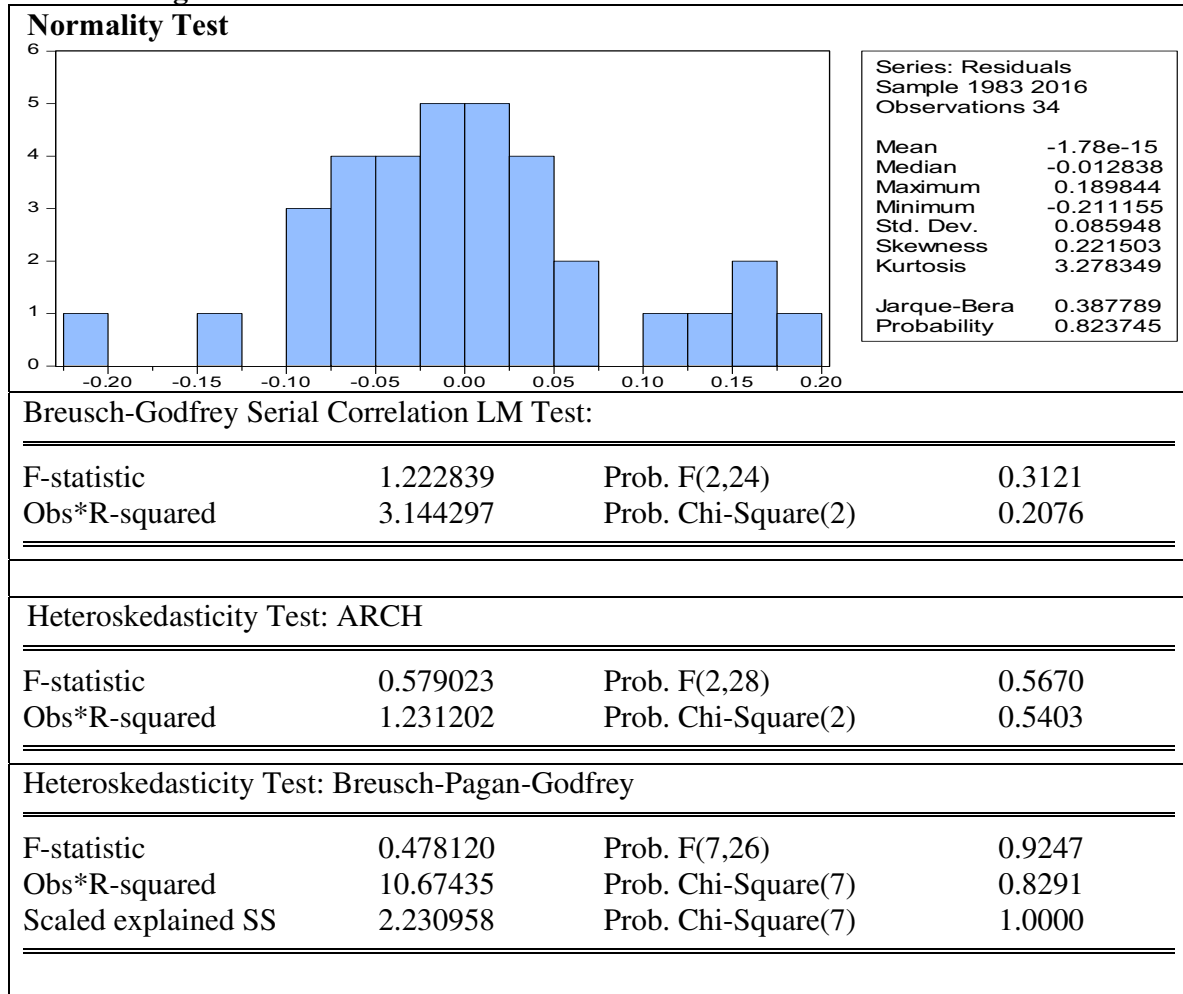
Co integrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(FDI)	0.050340	0.023783	2.116603	0.0440
DLOG(GOE)	-0.008771	0.082010	-0.106952	0.9156
DLOG(GOE(-1))	0.170642	0.104918	1.626430	0.1159
D(INF)	-0.001543	0.001076	-1.433856	0.1635
DLOG(MSP)	0.284494	0.137910	2.062896	0.0492
CointEq(-1)	-0.256324	0.128686	-1.991858	0.0570

$$\text{Cointeq} = \text{LOG(MFI)} - (0.1964 \cdot \text{LOG(FDI)} - 1.2398 \cdot \text{LOG(GOE)} - 0.0060 \cdot \text{INF} + 1.1099 \cdot \text{LOG(MSP)} + 13.4799)$$

Sources: World Development Indicator (WDI) Database and CBN annual report (2018)

### Diagnostic Tests

Based on normality of residual terms (Jarque-Bera), Breusch-Pagan serial correlation and Breusch-Pagan-Godfrey and ARCH effects for heteroskedasticity test results presented in Table 7, there are evidences that the model pass all the diagnostic tests. In other words, the insignificant values of the test results suggest the acceptance of null hypothesis and the model free from heteroskedasticity problem.

**Table 7: Diagnostic Test**

Sources: World Development Indicator (WDI) Database and CBN annual report (2018)

### Objective 3 Result and Interpretation

Pair wise Granger Causality tests for a lag length of two variables helps to determine the direction of casualty.

Generally, in the estimation test for the direction of causality reveals that is no bi-directional causal relationship between any of the variables. A unidirectional causal relationship running from FDI to MFI and MSP, from GOE to MFI, INF and MSP, from EXR to MFI, FDI, GOE and MSP and from INT to MFI during the period of this study within the 1% and 10% conventional level of significance is seen in the results. Alternatively, the table shows that FDI granger causes MFI and MSP, GOE granger causes MFI, INF and MSP, EXR granger causes MFI, FDI, GOE and MSP, and INT granger causes MFI. With specific focus on FDI and MFI, the result shows that foreign direct investment (FDI) is a determining factor in manufacturing sector indicator (MFI) in Nigeria.

#### 4.0 RECOMMENDATIONS

The results of this study are for vital for policy formations. It shows that manufacturing sector in the country have taken advantage of the FDI inflow in the country. However, foreign Direct Investment has not impacted significantly on the manufacturing sector of the nation. This is as a result of failure of FDI inflow to focus attention on the manufacturing sector of the country. Even with the low impact of FDI on the manufacturing sector, local farmers and entrepreneurs have tried to impact growth in the sector but it is at a slow rate. This has consequently been unable to statistically impact the manufacturing sector. The following recommendations arising from the study are made;

1. Foreign direct investment inflows should intentionally be focused on the manufacturing sector in order to promote significant output.
2. The Federal government should work towards increasing access to FOREX at a concessionary rate by the manufacturing sector in Nigeria to help increase production and hence create more employment.
3. Foreign investors should be assured safety by solving the issues with insurgency in the country as instability anywhere will scare away prospective investors.
4. Government should provide clear policy directions especially on tax cuts and tax holidays particularly to aid manufacturers on importation of new technology and expatriate quotas to encourage and improve the level of productivity and innovative abilities of the companies.

#### References

- [1] E. S. Akpan and G. O. Eweke, (2017) "Foreign Direct Investment and Industrial Sector Performance: Assessing the Long-Run Implication on Economic Growth in Nigeria," *Journal of Mathematical Finance*, vol. 7, (02), pp. 391.
- [2] A. V. Adejumo, (2013) "Foreign direct investments and manufacturing sector performance in Nigeria,(1970-2009)," *Australian Journal of Business and Management Research*, vol. 3, (4), pp. 39.
- [3] J. Wu, S. Guo, H. Huang, W. Liu and Y. Xiang, (2018) "Information and communications technologies for sustainable development goals: state-of-the-art, needs and perspectives," *IEEE Communications Surveys & Tutorials*, vol. 20, (3), pp. 2389-2406.

- [4] J. H. Dunning, (1982) "Explaining the international direct investment position of countries: Towards a dynamic or developmental approach," in *International Capital Movements* Anonymous Springer, pp. 84-121.
- [5] R. Z. Aliber (1978), *Exchange Risk and Corporate International Finance*. Springer.
- [6] B. Türkan, A. Duman and I. H. Yetkiner, (2008) "How does FDI and economic growth affect each other? the OECD case," in *International Conference on Emerging Economic Issues in a Globalizing World*, pp. 21-40.
- [7] S. Olayemi, (2012) "Human capital investment and industrial productivity in Nigeria," *International Journal of Humanities and Social Science*, vol. 2, (16), pp. 298-307.
- [8] S. S. Enimola, (2011) "Foreign direct investment and export growth in Nigeria," *Journal of Economics and International Finance*, vol. 3, (11), pp. 586-594.
- [9] R. K. Edeme and T. M. Karimo, (2014) "Economic Liberalization and Industrial Sector Performance in Nigeria-A Marginal Impact Analysis," *International Journal of Development and Emerging Economics*, vol. 2, (4), pp. 43-59.
- [10] O. C. AGU and T. T. OKOLI, (2015) "Foreign direct investment flow and manufacturing sector performance in Nigeria,".
- [11] M. H. Pesaran, Y. Shin and R. P. Smith, (1999) "Pooled mean group estimation of dynamic heterogeneous panels," *Journal of the American Statistical Association*, vol. 94, (446), pp. 621-634.