

Foreign Direct Investment and Manufacturing Output in Nigeria: Empirical Evidence from VECM Model

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Abstract: *This research is set out to examine the relationship that exists between foreign direct investment and manufacturing output for the period 1980 to 2018. The selected macroeconomic variables are Foreign Direct Investment (FDI), Interest Rate (INT) and Export (EXPT). The study is an attempt to evaluate how these key macroeconomic variables explain manufacturing output in Nigeria. The scientific method adopted for this investigation is multiple regression analysis using vector error correction model to estimate both the short run and long run relationship between the regressor and the regressand. The result obtained indicate that Foreign Direct Investment has a positive but poor effect and contribution on the manufacturing sector output growth. The granger causality test established a bidirectional causality running from manufacturing output to foreign direct investment in Nigeria. Based on the findings, the researcher made the following recommendations. The government should provide enabling macroeconomic environment which should be characterized by stability and credibility of economic policies for the engineering of foreign direct investment inflows to augment domestic production; this will bring desirable positive changes in manufacturing sectors in Nigeria.*

Keywords: *Foreign Direct Investment, Manufacturing Output, Interest Rate, Export, Vector Error Correction Model*

INTRODUCTION

The essence of foreign investment into an economy has generated interest among development experts on its desirability or otherwise. While some stress that though economic activities of a nation is a stimulator of growth and development, they believe that opening an economy to sudden inflow and outflow can destabilize sound economies and compel them to adopt fiscal policy measure capable of creating problems in the operations of their security market. Yet, others believe that foreign investment inflows has help emerging economies to benefit from research and development from advanced economies which had assisted their industrialization efforts as well has boost output of the manufacturing sector, as the gains from the development in the real sector has also encouraged the inflow of foreign investment.

Foreign direct investments consist of external resources, including technology, managerial and marketing expertise and capital. The inflow of these resources enables the recipient economy to expand her productive base and by implication grow domestic economy. At the current level of Gross Domestic Product, the success of government's policies of stimulating the productive base of the economy depends largely on her ability to control adequate amount of foreign direct investments comprising of managerial,

capital and technological resources to boost the existing production capabilities. The Nigerian government had in the past endeavored to provide foreign investors with a healthy climate as well as generous tax incentives, but the result had not been sufficiently encouraging. Nigeria still requires foreign assistance in the form of managerial, entrepreneurial and technical skills that often accompany foreign direct investments.

In recent times, foreign direct investment has emerged as the most important source of external resource inflows to developing countries and now plays an extraordinary role in globalization. Foreign direct investment inflow is expected to increase the output of the manufacturing sector, transfer technology, as well as increase managerial and marketing skills to domestic industries in order to enhance their productivity and economic growth to wider economy of the host nation (Chenery & Strout 1966). Evidence abound that fastest growing third world nations or newly industrialized countries accounted for the hosting of 90 percent of the world's foreign direct investment (Todaro, 1997). As a result of these benefit, attracting foreign direct investment is at the top of the policy agenda for both developing and developed countries of the world.

Contrary to common perception, foreign direct investment in Africa is no longer concentrated in the primary sector. In most countries, services and manufacturing are key sectors for foreign direct investment. For example, Nigeria is the second largest recipient of foreign direct investment among low income countries. Traditionally, foreign direct investment has been concentrated in the extractive industries, but there has been a recent diversification into the manufacturing sector, which had 47 percent foreign direct investment stock in 1992 (Odi, 1997).

The manufacturing firm plays a catalytic role in the modern economy and has many dynamic benefit that are crucial for the economic transformation of any nation. In an advanced economy, the manufacturing sector is leading in import substitution and export expansion, creating foreign exchange earnings, raising employment and per capita income, which widens the scope of consumption in a dynamic pattern. Furthermore, it promotes the growth of investment at a faster rate than any other sector of the economy, as well as wider and more efficient linkages among different sector (Ogwuma, 1995).

Statement of the Problem

It is believed that the manufacturing sector in Nigeria has benefited less from the increased volume of foreign direct investment inflow just as the sector's contribution to GDP has not been significant. One of the main objectives of Structural Adjustment Programme was to reduce the high dependence of the economy on crude petroleum, as a major foreign exchange earner by promoting non-oil export particularly manufactured goods. In the 1990's, Nigeria embarked on policies and structural reforms leading to increased openness, lowered barrier to trade, liberalized its domestic financial markets and removed restrictions on capital movements, including the open war against corruption with the sole aim of attracting foreign direct investment inflow.

In effect, the Oversea Development Initiative, (Odi,1997) noted that by the end of 1990s, Nigeria was the second largest recipient of Foreign Direct Investment among low

income countries. However, despite the increase in foreign direct investment inflow, the output of the manufacturing sector has declined steadily, meaning that Nigeria is yet to fully tap its potentials from this sector. The persistent decline of the manufacturing sectors contributions to Gross Domestic Product fell steadily and could not play any leading role in exports expansion programme and employment generation to the army of unemployed youths in Nigeria.

According to Makwembere (2014), despite the widely publicized theory linking FDI to economic growth, it is on record that FDI inflows have not really translated to growth in developing nations. With the substantial rise in FDI into Nigeria in years past, little or no impact has been seen on job creation, technology transfer and economic growth.

Against this background, the relationship between foreign direct investment and manufacturing output represents one of the most widely discussed issues among macroeconomists. Different scholars have carried out empirical studies into the impact of foreign direct investment on the performance of manufacturing output. However, their submissions have been conflicting, for example, Orji, Anthony & Okafor (2015), Adejumo (2013), Osisanwo (2013) hold the view that foreign direct investment is negatively related to manufacturing output. In other hand, some researchers believe that foreign direct investments are positively related with manufacturing output (see Anowor Ukwani & Ezekwen 2013, Patience, 2011). It is therefore a core research issue and this is the pivot of this study.

Research Questions

This study is aimed at finding answers to the following research questions

1. To what extent has foreign direct investment impacted on manufacturing output in Nigeria?
2. Does interest rate predict manufacturing output in Nigeria?
3. Does export explain manufacturing output in Nigeria?
4. Is there any significant causal relationship between foreign direct investment and manufacturing output in Nigeria?

Objectives of the Study

The broad objective of the study is to determine the relationship between fiscal deficit and macroeconomic performance in Nigeria. Specifically, the study will:-

1. Evaluate to what extent has foreign direct investment impacted on manufacturing output in Nigeria
2. Determine if interest rate predict manufacturing output in Nigeria.
3. Examine to what extent export explain manufacturing output in Nigeria
4. Establish the existence or not of any significant causal relationship between foreign direct investment and manufacturing output in Nigeria.

Research Hypotheses

For the proper analysis of this research work, the following hypotheses have been posited

1. **Ho₁**: There is no impact between foreign direct investment and manufacturing output in Nigeria.
2. **Ho₂**: Interest rate does not predict manufacturing output in Nigeria
3. **Ho₃**: Export does not explain manufacturing output in Nigeria
4. **Ho₄**: Causality does not significantly run from foreign direct investment to manufacturing output in Nigeria.

EMPIRICAL LITERATURE

Ebekozien, Ugochukwu and Okoye (2015), employed simple percentages, regression analysis, Duncan Multiple Range Test and Granger Test to analyse the effect of inflow trends of Foreign Direct Investment in the Nigerian construction industry with data sourced from the central bank of Nigeria and the National Bureau of Statistics served, and revealed that there is poor flow (or an insignificant flow) of FDI into construction sector when compared to other sectors of the economy.

Orji, Anthony-Orji, Nchege, & Okafor (2015), employed the classical linear regression model and with relevant data sourced from Central Bank of Nigeria (CBN) statistical bulletins, they examined the impact of FDI on the Nigeria manufacturing sector over the period of 1970 to 2010, which revealed that FDI impacted negatively on the manufacturing sector. Based on the results, they suggested that the unhealthy relationship can be reversed if the country receives increased FDI inflows into critical sectors that support the necessary inputs and raw materials needed by the local industries.

Okoli and Agu (2015), employed the OLS and VECM techniques to assess the impact of foreign direct investment flow on the performance of the manufacturing firms in Nigeria spanning for a period of 40 years, with data sourced from World Bank and CBN bulletins, which revealed that FDI inflows had a positive impact only in the long-run. The results obtained suggest the need for government actions to be geared towards strategically maintaining and sustaining policies that will help encourage FDI inflows to promote an efficient and enabling macroeconomic environment on which manufacturing firms can thrive.

Anowor, Ukwani, Ibiam, & Ezekwem (2013), employed the OLS estimation technique to analyze the contributions of foreign direct investment to the growth of manufacturing sector in Nigeria using annual time series data from 1970 to 2011, with data sourced from Central Bank of Nigeria (CBN) Statistical Bulletins of 2012, which revealed that FDI was related and statistically significant to manufacturing sector output growth among other variables such as the exchange rate, degree of trade openness and domestic investment.

Adejumo (2013), used the autoregressive lag distribution technique to determine the relationship between FDI and manufacturing value added in Nigeria between the period 1970 and 2009 with data sourced from various issues of Central Bank of Nigeria (CBN) statistical bulletins and National Bureau of Statistics (NBS), which was revealed that in the long run, foreign direct investments have had a negative effect on the manufacturing sub-sector in Nigeria.

Osisanwo (2013), employed the ordinary least square (OLS) method to analyse

the impact of foreign direct investment on manufacturing output growth in Nigeria between a decade after independence (1970) and 2011 with data sourced from the CBN bulletins, which revealed that the first lag of real manufacturing output level (MANt-1) and inflation (INF) are significant factors influencing the growth rate of Nigerian manufacturing industry, while manufacturing output is insignificantly and inelastic of foreign direct investment in Nigeria.

Sola, Obamuyi, Adekunjo, & Ogunleye (2013), employed the panel data analysis to examine the manufacturing performance for sustainable economic development in Nigeria from 1980 to 2008 with various data obtained from National Bureau of Statistics (NBS), which recorded a positive relationship between manufacturing and capacity utilization; a negative relationship between manufacturing and investment rate, exchange rate, and export. The study suggests that the provision of incentives for firms to become more export oriented.

Taiga (2012), used the ordinary least square (OLS) method to ascertain the relationship between manufacturing and economic growth in Nigeria from 1990 to 2010, with relevant data sourced from various issues of National Bureau of Statistics and Central Bank of Nigeria (CBN) Statistical Bulletins, which revealed that the manufacturing sector output contributed positively to real gross domestic product growth. He suggested that there should be a reduction in interest rate to encourage more investment in the economy which will boost the economy growth of Nigeria.

Patience (2011), examines the impact of foreign direct investment on manufacturing output growth of West Africa. The study is conducted across the Economic community of West African States (ECOWAS) which is the most popular regional economic community in Africa. Data was collected from banks annual reviews. It was found that foreign direct investment contributes to manufacturing output growth in West Africa.

Chandran and Krishnan (2008), used the Autoregressive Distributed Lag (ARDL) approach to examine the short and long run dynamics of foreign direct investment (FDI) over the manufacturing growth in Malaysia for the period of 1970 – 2003 with data sourced from World Bank development indicators. The study revealed that FDI elasticity in the short and long run were found to be statistically significant. The study also revealed that strategies are to be developed to enhance the competitiveness of Malaysian manufacturing sectors in the world of intense competition for FDI.

Ayanwale (2007), employed the OLS technique to investigate the empirical relationship between non-extractive FDI and economic growth in Nigeria spanning from 1975 to 2006 with relevant data sourced from National Bureau of Statistics and Central Bank of Nigeria statistical bulletins, which revealed that FDI has a positive link with economic growth. However, he cautioned that the overall effect of FDI on economic growth may not be significant.

Li and Liu (2005), use the panel data of 84 countries to investigate the influence of FDI and economic growth spanning from 1990 to 2004 with relevant data sourced from World Bank's World Development Indicators, which revealed a significant relationship between FDI and economic growth. Additionally, a stronger relationship was extracted when FDI is interacted with human capital. The same conclusion emerged in the study of Kiong & Jomo (2005) who examined the influences of FDI on

Malaysian economy. However, while positive effects of FDI on growth were found, the study cautioned that the net effect of FDI could be limited when FDI affects the domestic saving rate negatively.

Model Specification

The VECM model adopted for the study is specified below:

$$MO_t = \alpha_0 + \alpha_1 FDI_t + \alpha_2 INT_t + \alpha_3 EXPT_t + \epsilon_t$$

Where;

MO_t = Value of Manufacturing output

FDI_t = Foreign direct investment at time t

INT_t = Interest rate at time t

$EXPT_t$ = Export at time t

$\alpha_0 - \alpha_3$ refers to the parameters to be estimated

ϵ_t = omitted variable

A priori expectation: (α_1 & $\alpha_3 > 0$) ($\alpha_2 < 0$)

Table 1: RESULT OF THE ADF UNIT ROOTS FOR STATIONARITY

VARIABLES	LEVELS			1 st DIFFERENCE			REMARKS
	ADF Statistic	1% Critical	5% Critical Value	ADF Statistic Value	1% Critical Value	5% Critical Value	
MO	-3.260503	-4.273552	-3.551153	-4.656039	-3.699871	-2.976213	1(1)
FDI	-2.587968	-4.273552	-3.551153	-7.435113	-4.243642	-3.544377	1(1)
INT	-1.971426	-4.273552	-3.551153	-5.478730	-4.243642	-3.544116	1(1)
EXPT	-2.685411	-4.273552	-3.551153	-4.479362	-4.243642	-3.544116	1(1)

Source: Author's compilation using E-View 9.5 computer software

As shown on table 1 above, the unit root tests result indicated that all the series namely; manufacturing output, foreign direct investment, interest rate and export contained unit root and are stationary only after first differencing, at 1% and 5% significant levels. This follows the decision rule which states that when the value of the computed ADF test statistics exceeds its critical value, the null hypothesis is rejected and the alternative accepted.

The stationarities of all the series in the same order was thus a motivation to run for co-integration tests. This is aimed at finding the presence or absent of any long run relationship among the series. This corroborates with the submission by Woodridge (2002) and Grene (1997) that when more than one variable is not stationary at levels,

there is every need to run a co-integration test in order to verify if the series have any long run equilibrium relationship.

In view of the above therefore, since the variables are stationary at difference orders, there was the need for a test for co- integration test using the Johansen (1991) co- integration technique. The result is presented in table 2 as shown below:

TABLE 2: JOHANSEN COINTEGRATION TEST

Date: 02/20/19 Time: 12:39
 Sample (adjusted): 1982 2018
 Included observations: 37 after adjustments
 Trend assumption: Linear deterministic trend
 Series: MO FDI INT EXPT
 Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.439132	49.32836	47.85613	0.0484
At most 1*	0.375439	32.93237	29.79707	0.0327
At most 2*	0.059151	17.51624	15.49471	0.0245
At most 3	0.007009	0.260263	3.841466	0.6099

Trace test indicates 2 cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.439132	29.39599	27.58434	0.0530
At most 1	0.375439	17.41613	21.13162	0.1533
At most 2	0.059151	2.255977	14.26460	0.9836
At most 3	0.007009	0.260263	3.841466	0.6099

Max-eigenvalue test indicates 1 cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Unrestricted Cointegrating Coefficients (normalized by b*S11*b=I):

Source: Author's computations using Eviews 9.5 computer software

In table 2 above, the outcome of the cointegration test employed using both the trace and max-eigen test statistics indicates the presence of a long-run relationship among the four variables at 5% level of significance, thereby leading to the rejection of the null hypothesis of no cointegration. From the result it is therefore evident that foreign direct investment (FDI), manufacturing output, interest rate and export are cointegrated.

TABLE 3: VECTOR ERROR CORRECTION MODEL ANALYSIS

Vector Error Correction Estimates
 Date: 02/20/19 Time: 11:53
 Sample (adjusted): 1983 2018
 Included observations: 36 after adjustments
 Standard errors in () & t-statistics in []

Cointegrating Eq:	CointEq1			
MO(-1)	1.000000			
FDI(-1)	0.025961 (0.01199) [2.16522]			
INT(-1)	-2.156346 (0.42086) [-5.12362]			
EXPT(-1)	0.745146 (0.26308) [2.83238]			
C	12.72726			

Error Correction:	D(MO)	D(FDI)	D(INT)	D(EXPT)
CointEq1	-0.036919 (0.01512) [-2.44173]	0.071104 (0.39750) [0.17888]	0.299299 (0.08289) [3.61074]	0.189967 (0.13025) [1.45848]
D(MO(-1))	-0.047333 (0.20610) [-0.22966]	-0.073565 (0.54572) [-0.13480]	-0.135178 (0.11380) [-1.18787]	-0.060860 (0.17882) [-0.34035]
D(MO(-2))	-0.324100 (0.20384) [-1.58998]	-0.805433 (0.53974) [-1.49226]	-0.202205 (0.11255) [-1.79656]	-0.274842 (0.17686) [-1.55405]
D(FDI(-1))	0.144432 (0.08131) [1.77625]	0.260574 (0.21531) [1.21024]	-0.087696 (0.04490) [-1.95323]	-0.062616 (0.07055) [-0.88756]
D(FDI(-2))	-0.117024 (0.12679) [-0.92299]	0.284926 (0.33572) [0.84871]	0.063471 (0.07001) [0.90664]	0.063155 (0.11000) [0.57411]
D(INT(-1))	-0.351300 (0.32980) [-1.06521]	1.040978 (0.87326) [1.19206]	0.410602 (0.18210) [2.25482]	-0.222476 (0.28614) [-0.77751]
D(INT(-2))	-0.101278	-0.019025	-8.51E-05	0.123348

	(0.32854) [-0.30827]	(0.86994) [-0.02187]	(0.18141) [-0.00047]	(0.28505) [0.43272]
D(EXPT(-1))	0.203413 (0.22709) [0.89572]	-0.011652 (0.60132) [-0.01938]	0.116531 (0.12539) [0.92933]	-0.540599 (0.19703) [-2.74372]
D(EXPT(-2))	0.018302 (0.23574) [0.07763]	0.394827 (0.62422) [0.63251]	-0.111214 (0.13017) [-0.85438]	-0.177081 (0.20454) [-0.86576]
C	0.081107 (1.82605) [0.04442]	5.594445 (4.83517) [1.15703]	0.440224 (1.00827) [0.43661]	2.347208 (1.58433) [1.48152]
R-squared	0.733899	0.237431	0.418526	0.366948
Adj. R-squared	0.683326	-0.026535	0.217246	0.147814
Sum sq. resids	2080.451	14586.55	634.2855	1566.102
S.E. equation	8.945241	23.68589	4.939190	7.761102
F-statistic	4.448125	0.899476	2.079326	1.674541
Log likelihood	-124.1046	-159.1598	-102.7234	-118.9927
Akaike AIC	7.450254	9.397769	6.262413	7.166259
Schwarz SC	7.890120	9.837635	6.702279	7.606125
Mean dependent	0.869444	10.04907	-0.237390	1.296471
S.D. dependent	9.446582	23.37775	5.582685	8.407296
Determinant resid covariance (dof adj.)		32174613		
Determinant resid covariance		8753802.		
Log likelihood		-492.0571		
Akaike information criterion		29.78095		
Schwarz criterion		31.71636		

Source: Author's computations using Eviews 9.5 computer software

As shown in the upper region of the vector error correction model (VECM) above as well as the normalized cointegrating coefficients for two cointegrating equations given by the long run relationship as shown below:

Normalized cointegrating coefficients (standard error in parentheses)

MO	FDI	INT	EXPT
1.000000	0.025961 (0.01199)	-2.156346 (0.42086)	0.745146 (0.26308)

The coefficient of foreign direct investment has a positive but poor effect and contribution on manufacturing output. In terms of the expected signs, the relationship between foreign direct investment and manufacturing output is positive. In other words, there is a long run positive link among foreign direct investment, export and manufacturing output in Nigeria within the period under study. The result also depicted a negative long run relationship between interest rate and manufacturing output as can be observed in the upper region of the vector error correction model above.

The VECM estimate result also depicts that the coefficient of determination with

an R^2 of 0.733899 implies that 73.38% of the total variation in manufacturing output (MO) is explained by the independent variables. While the adjusted R^2 of 0.683326 or 68.33% suggested that the independent variable was robust in explaining the variation in manufacturing output (MO), thereby indicating a good fit. Likewise, the F-Statistics of 4.448125 indicates that the model is significant at 1% level and is a good fit. The implication is that the estimates and inferences drawn are reliable.

Granger Causality Test

TABLE 4

Pairwise Granger Causality Tests
Date: 02/20/19 Time: 15:34
Sample: 1980 2018
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
FDI does not Granger Cause MO	37	3.53832	0.0448
MO does not Granger Cause FDI		4.89397	0.0140
INT does not Granger Cause MO	37	4.43470	0.0312
MO does not Granger Cause INT		3.84066	0.0420
EXPT does not Granger Cause MO	37	0.35597	0.7032
MO does not Granger Cause EXPT		1.85405	0.1730
INT does not Granger Cause FDI	37	0.04031	0.9605
FDI does not Granger Cause INT		1.06001	0.3583
EXPT does not Granger Cause FDI	37	3.37046	0.0470
FDI does not Granger Cause EXPT		1.11322	0.3409
EXPT does not Granger Cause INT	37	1.73676	0.1923
INT does not Granger Cause EXPT		0.41135	0.6662

Source: Author's computations using Eviews 9.5 computer software

Table 4 above, depicts the result of the relationship among the variables. The result suggests that Foreign Direct Investment (FDI) and interest rate causes manufacturing output (MO), hence the null hypothesis that FDI and INT does not granger causes MO cannot be rejected. The result also indicates that a bidirectional causality runs FDI to MO, INT to MO.

DISCUSSION OF FINDINGS

The analyses shows that the variables has unit root at level but became stationary at first differencing. The outcome of the Johansen co- integration test using both trace and max-eigen test statistics reveals the presence of long-run relationship among the variables at 0.05 level of significance, which support the rejection of null and acceptance of alternate hypothesis that there is co-integration. Following the results, it is therefore evident that foreign direct investment and manufacturing sector output are cointegrated. The causality test shows that manufacturing output granger causes

foreign direct investment in Nigeria and is not consistent with findings of Osisanwo (2013) where FDI and Manufacturing sector growth has inverse relationship and FDI cannot explain the variations in the changes of the manufacturing sector growth.

CONCLUSION

The study examined the effect of Foreign Direct Investment (FDI) on the manufacturing sector output growth in Nigeria from 1980 to 2018. In achieving the objectives of the study, vector error correction model (VECM) estimation technique and Johansen co-integration test were employed for the nature of the effects and long-run relationship of the variables. The results of the analysis showed that FDI had a positive but poor effect and contribution on the manufacturing sector output growth. And it also showed there was a presence of long-run relationship between the variables in the model. The causality test shows that foreign direct investment granger causes manufacturing output in Nigeria.

Therefore, on the basis of findings of this study, it was revealed that Nigeria is yet to fully reap the benefits of FDI, as its effects on manufacturing output growth at the moment is very little.

RECOMMENDATION

The study recommends that Nigerian government should encourage the inflow of foreign direct investment into manufacturing sector since it facilitates output. Furthermore, policies and programs that would facilitate infrastructural development, political and economic stability are key in supporting the appeal of these investment locations.

The government should also provide enabling macroeconomic environment which should be characterized by stability and credibility of economic policies for the engineering of foreign direct investment inflows to augment domestic production; this will bring desirable positive changes in manufacturing sectors in Nigeria.

The security level in the country should be tightened in order to encourage foreign investors' confidence, as instability anywhere in the country will scare away prospective investors. Policies should be enacted and strengthened by government to limit the repatriation of profits by foreign firms and ensure reinvestment of profit in the Nigerian economy.

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