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## An ARDL Approach on the Nexus of Foreign Direct Investment and Export in Nigeria

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### **Abstract:**

*The opening of the Nigerian economy to foreign investors via economic restructuring, to strengthen export accomplishment for efficient return resulting in increased exports and export competitiveness through foreign direct investments, has met with some pressures leading to neglect in output and closure of some businesses. This necessitated the study to examine foreign direct investment's impact on export accomplishment in Nigeria from 1986 to 2019. Foreign direct investment, trade openness, money supply, rate of inflation and interest were the explanatory variables while export was the control variable. The Auto-Regressive Distributed Lag (ARDL) model was employed using time series data. The results of the analysis showed a positive effect of foreign direct investment on the country's export though insignificant. Trade openness has a significantly positive influence, whereas money supply, inflation rate and interest rate were negative on export accomplishment. The conclusion derived from the results is a positive but insignificant relationship between foreign direct investment and export accomplishment in Nigeria while the reverse is the case for money supply, inflation and interest rate. The recommendation is that the Nigerian government through its policy formulators should encourage stable and sustainable foreign direct investment in a conducive economic and political environment for improvement of the nation's productivity, international trade competitiveness, technological advancement and external reserves via export.*

**Keywords:** Foreign direct investment, export accomplishment, trade openness, inflation, auto-regressive distributed lag model

### **1. Introduction**

Globally, the level of Foreign Direct Investment (FDI) and the accomplishment of export have significantly increased in the past four decades. Most developing countries adopt FDI as a vital tool for economic development. The rate of growth globally, in foreign trade and GDP is incomparable to FDI flows, with record of higher rate of growth (UNCTAD, 2015). FDI occurs when business institutions and foreign capitalist engage in direct investment in other countries. FDI can take the form of fixed asset creation, specific purpose autonomous corporation set up, or fully financed firm in capital-importing country by some established entity in the investing country. Some influence on FDI is; the rate of interest, marginal efficiency of investment, foreign capital policy, economic, political and environmental conditions, and exchange control policy and tax policy. FDI is poised to have positive effect on the capital importing country in the areas of improvement in; production output, employment of labour, balance of payment, technological lead, managerial and marketing expertise and overall economic condition.

Policy makers and economist indicate interest in the impact of FDI on a nation's accomplishment, thereby bringing to bear the need for, adequate planning and policy formulation to thrive FDI. Increase in export accomplishment is expected as a result of FDI flows arising from technological transfer, leading to productivity enhancement, human capital skills improvement and ultimately growth in the economy and welfare of the citizens (Chenery & Strout 1966). Estimates from the Institute of International Finance (IIF) as reported by Fofack, 2021, indicated that capital inflows to the region of Africa would strengthen in 2021 and beyond, due to a moderate increase in FDI and a large reversal of portfolio outflows. The various sectors of the Nigerian economy and specifically the industrial sectors of manufacturing, solid minerals and energy; are poised to providing dynamic benefits essential for the transformation of the economy. The outcome would create foreign exchange earnings, expand export, increase investment, enhance consumption and per capital income (Todaro & Smith 2015). However, in Nigeria, the inputs used in the production process of FDI has been linked to the unanticipated increase in volume of import, impacting the economy negatively and leading to capital flight which ultimately resulting in trade deficit and decline in balance of payment.

According to the Afrexim bank report, the full implementation of the Multilateral Agreements of the African Continental Free Trade Area (AfCFTA) in which 54 of the 55 AU countries have signed the agreement, will create an integrated African market for goods and services and ensure the free mobility of people and capital across the continent (AFREXIM, 2021). Nigeria has signed the agreement, ratified and deposited instruments of acceptance and approval to the African Union Commission (AUC). The impact of this on FDI, export accomplishment and eventual growth within the African Continent cannot be overemphasized. External borrowings and foreign grants from developed to developing

countries as a means of earning foreign exchange to improve a countries condition are limited, diminishing and cannot be used indefinitely while FDI inflow has improved momentarily through the decade and countries. Some definitive of FDI in Nigeria are stable macroeconomic policy, market size and infrastructure development which is captured in the (AfCFTA) agreement. This inspired the assessment of the direction of foreign direct investment on export accomplishment in Nigeria and, in particular, whether increasing foreign direct investment have positive impact on export accomplishment in the long run. To actualize this objective, the null hypothesis ( $H_0$ ): Foreign direct investment has no significant effect on export accomplishment; was tested.

Empirical evidence in the literature on FDI in developed and developing nations existed. (Mukhtarov, Alalawneh, Ibadov, & Huseynli, 2019, Azatbek & Ramazanov, 2016, Bayar 2014, Thi& Thin, 2013, Albahi 2016, Acaravci&Ozturk 2012 among others). Similarly, there are evidences from Nigeria (Oyero, 2019, Eboreime & Umoru, 2016, Okechukwu, De Vita & Luo, 2018, Agbarakwe 2019, among others). Of these studies, a high percentage used economic growth as the proxy. Others focusing on export emphasized on the trade regime, credit rating and export structure changes which favours products whose value-added are higher. This study attempts at filling the gap in the literature on the benefits on export as a result of FDI in Nigeria in terms of; its mitigation of seasonal demand, diversification of business opportunity, access to larger financial markets and strengthening of business opportunity in the long run, using a wider scope of 1986 – 2019. This is pivotal to the study because the industrial sector has been calling for an enabling environment due to the significant downturns been experienced in the Nigerian economy coupled with the COVID '19/20 pandemic. The Nigerian government has also illustrated commitment to economic reforms by the recently implementation of the removal of fuel subsidy. This gave the impetus to find out if the foreign direct investment policy implemented by the government have been capable of enhancing export accomplishment and enable industries to make informed investment decisions, reaping from the benefit of export and invariably leading to growth of the Nigerian economy. The main question is: Does FDI improve export accomplishment in Nigeria? Our main results showed a positive outcome of FDI on the country's export accomplishment, which confirms the theoretical knowledge.

The structure of the paper is; Section 2 reviews literatures on foreign direct investment and export accomplishment with empirical perspective. Methodology and data used were explained in Section 3. The results of the analysis were presented in Section 4. Section 5 concludes.

## 2. Literature Review

Investing in a nation's business or production in the form of outright purchase or business operations expansion by another nation is referred to as foreign direct investment (Densa, 2010). The World Bank affirms that investment inflow for the acquisition of an enduring management interest (10% or more voting stock) is known as foreign direct investment. As asserted by Salvatore (2007), incoming and outgoing capital flows is a recognized economic activity for international trading and the cost of international trade is distinguishes by the movement in production from exporting countries to importing countries. The adoption of a stable political and economic environment strategy would attract foreign direct investment, thereby making nations to experience international exchange of capital, labour and productivity (Andersen & Babula 2008, Idoko& Taiga 2018).

### 2.1. Empirical Review

Mukhtarov, Alalawneh, Ibadov, and Huseynli, (2019) investigated FDI on Jordan's exports using ARDL's approach, revealing a long run positive influence, thereby promoting investment incentives, climate and other benefits available in the country to attract export-led investment. Using data from Vietnam, Thi&Thin 2013 analysed FDI, export and REER linkages. The results revealed a number of statistically significant links between FDI, REER and Exports. The relative prices of goods were directly impacted whereas the impact through FDI flow was indirect. The authors therefore commend Vietnam's policy maker's effort to improve her role concerning investment inducement and expansion. Acaravci and Ozturk (2012) investigated ten transition EU countries, using ARDL approach between 1994 – 2008 on the occurrence of a casual linkage connecting economic growth, export and FDI. The result depicted a causal relationship for four countries from the ten. The author expressed that implementation of policies to strengthen FDI should focus on the financial system, financial market regulations, trade regime, free trade zones, tax incentives, human capital and infrastructural quality.

Oyero (2019) employed correlation analysis on FDI Trends and Economic Growth in Africa and the results obtained stipulated a high positive correlation linking FDI and economic growth in Nigeria, suggesting fiscal direction and control in the nation's structure of spending and borrowing. Eboreime and Umoru (2016) recommended that Nigeria should concentrate her exports in highly competitive markets like the United States, Japan and Canada, as against the United Kingdom. Olayiwola and Okodua (2013) affirmed that the larger part of the inflow from FDI in Nigeria advances to the oil sector, suggesting FDI effectiveness through sustained promotion of non-oil exports in Nigeria.

The literatures reviewed, are in contrast and this tend to unpredictability of the results. With focus on export, the variables of interest for foreign direct investment were considered individually whereas some did not take into consideration, all the variables of interest. This study will add to the literature using these independent variables (foreign direct investment, trade openness, money supply, inflation rate and interest rate) to analyze the effects, on export accomplishment in Nigeria.

### 3. Methodology

#### 3.1. Theoretical Framework and Model Specification

This research is anchored on the Neoclassical and International business economic theories. FDI and international capital flows are considered by the Neoclassicals as closing the gap in transition economies as a result of scarce capital, for it is expected to flow from wealthy economies to poor countries (Chenery & Bruno, 1962), thereby leading to profitable investment opportunity for capital in transition economies' trade approach (Mundell 1957). The ultimate result of these opportunities for the recipient countries is often sought in terms of economic growth and development practically interpretable as rising levels of industrialization (Szirmai, 2009). As stated by the international business economist, some firm specific assets are required by multinationals for her distinction from interregional enterprises and to equilibrate for the additional cost in terms of local knowledge for international markets operations using the OLI framework (Dunning, 2001). This explains FDI based on Ownership specific advantage of the enterprise, Internationalization incentives and Location advantages. Meanwhile, given that Nigerian economy still yearns for structural change in view of the oil-dominated economy, this study becomes relevant for policy direction.

This research adapted the estimated model of Agbarakwe (2019). Manufacturing output was exchanged for export on the dependent variables while export was exchanged for trade openness, money supply and inflation rate as factors that influence export. The functional relationship between dependent and independent variable in this research is specified as follows:

$$EXP = f(FDI, TOP, MS, INF, INT) \quad (1)$$

The above equation can be transformed into an econometric model in a semi log form as follows:

$$EXP = \beta_0 + \beta_1 FDI + \beta_2 TOP + \beta_3 \ln MS + \beta_4 INF + \beta_5 INT + \mu \quad (2)$$

Where,

EXP = Export accomplishment

FDI = Foreign Direct Investment

TOP = Trade Openness

MS = Money Supply

INF = Inflation rate

INT = Interest rate

$\mu$  = stochastic variable

$\beta_0$  is constant term;

Apriori expectation:  $(\beta_1, \beta_2 \text{ \& } \beta_3 > 0), (\beta_4 \text{ \& } \beta_5 < 0)$

Ln = Natural Logarithm (the logged variable is money supply). The likelihood of multi-collinearity is possible between export and one of the variables. Finch, Bolin and Kelly (2014) postulated the use of centered values and this was adopted in this research work. The period 1986 to 2019 for which data are available was covered as major economic trade cycles occurred during this period. World Development Indicators (WDI) was the source of data, which was used on E-views 10 econometric tool.

### 4. Results and Discussion

#### 4.1. Preliminary Analysis

Figure 1 present the line and symbolic basic graph of the variables. EXP has its highest point in 2000. FDI was relatively stable in the period recording the highest in 1994. INF had a sharp increase from 1992 to 1995 with the highest in 1995, but dropped afterwards to the lowest in 2007.

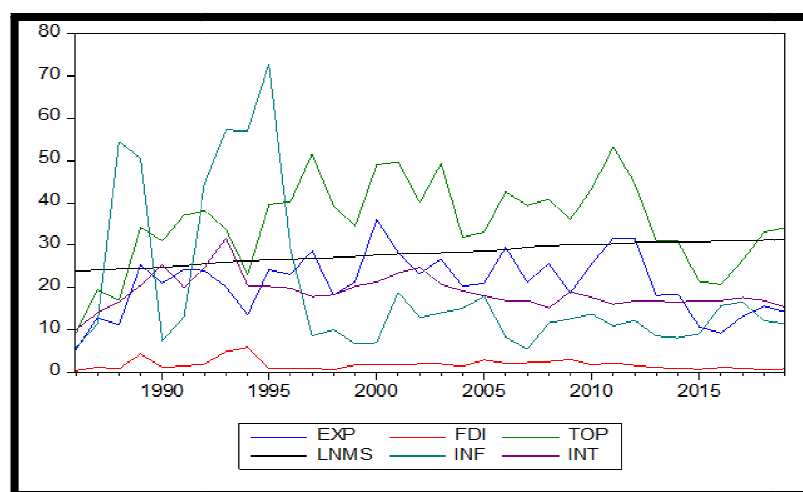


Figure 1: Line and Symbol Basic Graph  
Source: Author's Computation 2021

#### 4.2. Descriptive Statistics

In the table 1 below, INF's standard deviation is relatively higher compared to other variables, revealing that inflation is more volatile and unpredictable. Positive skewed values to the right, was observed for FDI, INF and INT variables, while, EXP, TOP and MS are negatively skewed to the left. Kurtosis statistics of FDI, INF and INT are greater than 3 indicating that it is highly leptokurtic, whereas, the distribution of EXP, TOP and MS are highly platykurtic. Jarque-Bera statistics and P-values presented that EXP, TOP and MS have normal distribution while the null hypothesis for FDI, INF and INT variables was rejected.

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Observations
EXP	20.921	21.135	36.023	5.249	7.064	-0.123	2.579	0.336	34
FDI	1.725	1.501	5.791	0.352	1.229	1.734	5.865	28.676	34
TOP	35.234	35.258	53.278	9.136	10.314	-0.431	2.925	1.062	34
LNMS	28.032	28.136	31.179	23.885	2.352	-0.244	1.769	2.485	34
INF	19.698	12.386	72.835	5.388	18.060	1.658	4.381	18.282	34
INT	18.884	17.872	31.650	9.959	3.885	0.965	5.298	12.764	34

Table 1: Descriptive Statistics

Source: Author's Computation 2021

#### 4.3. Unit Root Tests

Table 2 present mixture of I(0) and I(1) series implying a need for long-run relationship via ARDL model.

Variables	ADF Test Statistics (At Levels)	Critical Values @ 5%	ADF Test Statistics (At 1st Diff.)	Critical Values @ 5%	Integration Order
EXP	-3.676	-3.5529	-7.7986	-3.5577	I(0)
FDI	-4.353	-3.5529	-7.34865	-3.5577	I(0)
TOP	-3.4089	3.5529	-7.1128	-3.5577	I(1)
LNMS	-1.2149	-3.5577	-3.6718	-3.5577	I(1)
INF	-3.1876	-3.595	-6.616	-3.6121	I(1)
INT	-4.1873	-3.5683	-6.587	3.5577	I(0)

Table 2: Summary and Decision for Unit Root Test

Note - The Decision Is Made on Trend and Intercept with Significance at Level Is I (0) and At First Difference (1).

Source: Authors Computation 2021

#### 4.4. VAR Lag Order Selection Criteria

The optimal lag length of the variables included in the ARDL model with a critical band of 5% significant level, was selected based on the LR, FPE, and AIC, with a lag length of two (2) but lag length of one (1) was selected by SC and HQ as seen in table 3.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-514.2265	NA	5320159.	32.51415	32.78898	32.60525
1	-394.067	187.7492	28854.99	27.25419	29.17796*	27.89186*
2	-349.7446	52.63278*	22139.49*	26.73404*	30.30677	27.91830

Table 3: VAR Lag Order Selection Criteria

Indicate Lag Order at 5% Selection Criterion

Source: Author's Computation 2021

The variations in the lag selection order in table 3 above led to the compilation of lag exclusion wald test to determine the joint probability of the variables.

	EXP	FDI	TOP	LNMS	INF	INT	Joint
Lag 1	2.967396	34.78088	5.736549	45.31114	18.35952	12.44223	152.8053
	[ 0.8129]	[ 0.0000]	[ 0.4533]	[ 0.0000]	[ 0.0054]	[ 0.0528]	[ 0.0000]
Lag 2	2.251261	31.11837	3.651814	3.823828	15.88557	11.19596	104.7042
	[ 0.8952]	[ 0.0000]	[ 0.7237]	[ 0.7005]	[ 0.0144]	[ 0.0825]	[ 0.0000]
df	6	6	6	6	6	6	36

Table 4: Var Lag Exclusion Wald Test

Source: Author's Computation 2021

The joint probability of 0.0000 (at 5% level) is significant at lag 2 and hence the selection of lag 2 for the variables.

#### 4.5. Stability Test

The Recursive CUSUM test results in figure 2 indicated no break in the regression coefficients and the departure of the parameters from the constancy were within the straight line that represents critical band at 5% significant level.

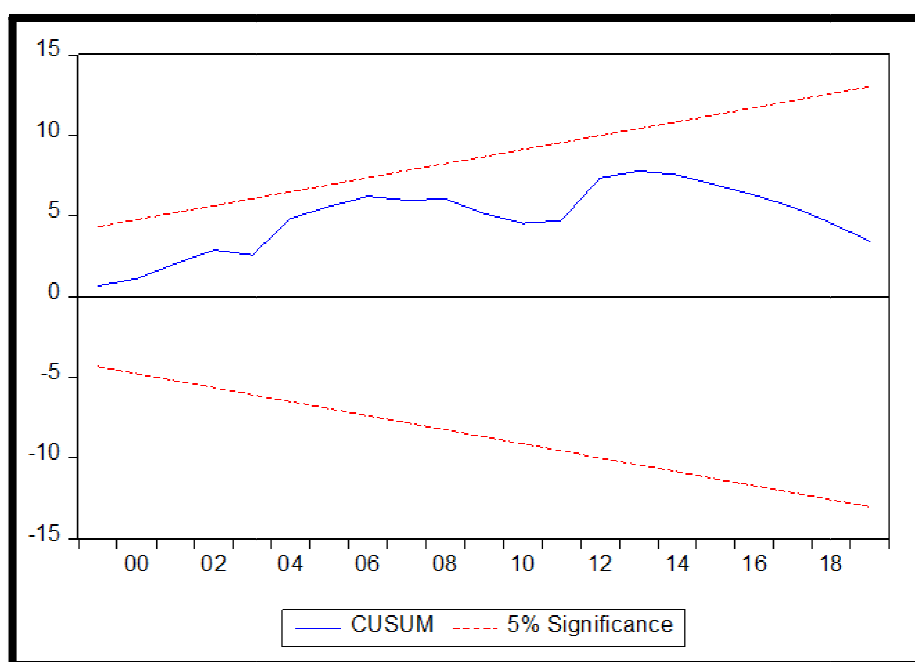


Figure 2: Cumulative Sum Of Recursive Residual  
Source: Author's Computation 2021

The Recursive CUSUM of squares results in figure 3 indicated that there is neither break in the regression coefficients nor departure of the parameters from the constancy on the straight line that represents critical band at 5% significant level.

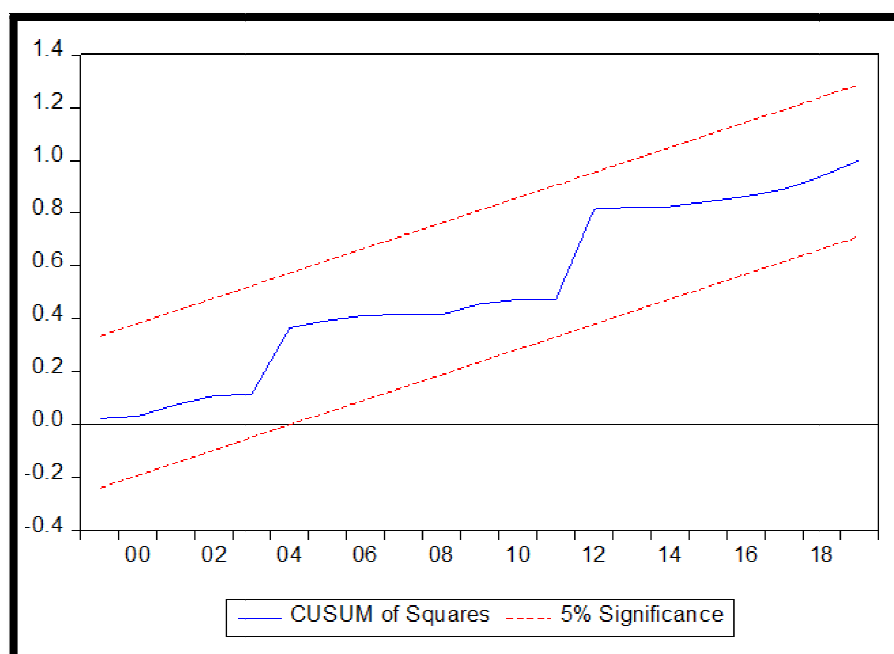


Figure 3: Cumulative Sum of Squares of Recursive Residual  
Source: Author's Computation 2021

#### 4.6. Bound Test

Table 5 reveals that the F-statistic of 28.27032 is above both the lower and upper critical bounds of 2.39 and 3.38 at 5% significant level, implying rejection of the null hypothesis and establishing a long-run relationship among the variables for the period (Pesaran, Shin, & Smith, 2001).

Foreign Direct Investment			
F-statistic: 28.27032; K = 5			
Dependent Variable			
F-statistic Bounds Level		Lower Bound I(0)	Upper Bound I(1)
10% critical bounds value		2.08	3.00
5% critical bounds value		2.39	3.38
2.5% critical bounds value		2.70	3.73
1% critical bounds value		3.06	4.15

Table 5: ARDL Bound Test(Co-integration Analysis)

Source: Author's computation 2021

The result of the variance inflation factors for each of the variable are stated in table 6. Using the centered VIF, it implies that there is absence of severe multi-collinearity between the variables since all the values are less than ten (10). This establishes the non-linear relationship of the independent variables.

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
EXP(-1)	0.008880	21.71807	1.786246
FDI	0.240149	5.390236	1.714204
FDI(-1)	0.228088	5.146939	1.603664
TOP	0.003864	26.23987	1.465431
LNMS	0.128498	496.4996	2.849094
INF	0.001993	7.116653	3.134812
INF(-1)	0.002353	8.402726	3.702370
INF(-2)	0.002111	7.500138	3.366539
INT	0.037526	69.42490	2.186693
C	166.9828	801.8476	NA

Table 6: Variance Inflation Factors

Source: Author's Computation 2021

#### 4.7. Long Run Analysis

Table 7 displays the long run impact of EXP. It showed that FDI reduces/increases the impact of EXP in Nigeria. The coefficient of FDI is positive but not statistically significant, which implies one percentage increase in FDI increases EXP by 1.06 percent and percentage decrease in FDI decreases EXP in Nigeria. The eigenvalue of TOP is positive and statistically significant implying its significantly increase in export by 0.64 percent for a one percent increase. The coefficients of MS, INF and INT showed a negative relationship with EXP implying that one percent increase in money supply, inflation and interest rate, decreases export by 1.10, 0.12 and 0.22percent respectively.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP	0.639042	0.064264	9.944012	0
LNMS	-1.106981	0.346664	-3.19324	0.0042
INF	-0.125584	0.049691	-2.527306	0.0192
INT	-0.222519	0.189335	-1.175266	0.2525
C	34.54037	12.39075	2.787594	0.0107

Table 7: Long Run Coefficient of ARDL (1, 1, 0, 0, 2, 0)

Source: Author's Computation 2021

## 5. Discussion of Findings

The results of each of the variables reviewed in this work are at variant. Whereas a positive interaction existed between foreign direct investment and trade openness on export, a contrary nexus was obtained for money supply, inflation and interest rate. Conformity with the Neoclassical and International business economic theories predictions on foreign direct investment was established, as the value and level of foreign direct investment, influenced the accomplishment of export positively. The implication of this is that increase in foreign direct investment is desirable and essential. FDI policies should be synchronized with other monetary and fiscal policies in Nigeria whereby the government would attract export-oriented investments leading to expansion and diversification of the production base for local industries invariably leading to improvement in external reserves and growth for the economy. This corroborates the findings of Mukhatarovet. al, (2019), Ekine&Nnadi(2018) and Eboreime&Umoru (2016), Kutun&Vuksic (2007) but contrary to that of Uzoma-Nwosu&Orekoya (2019), Ayadi (2009). When FDI increases in the industrial sectors, export accomplishment also improves in the host country, as investors would be more efficient in the use of resources such as capital stock, human capital, information resources, and technological spread to be more productive and thrive their businesses. Whereas, when FDI reduces, it sends a negative signal to the international market and invariably affect the

accomplishment of export in the country as the drive for international competitiveness, innovativeness and informed decision is weakened as a result of the decline in the benefit effect.

## 6. Conclusion and Policy Recommendations

This study analyzed the impact of foreign direct investment on export accomplishment in Nigeria from 1986 to 2019. Firstly, the results revealed, a long run positive influence of foreign direct investment on export accomplishment, as foreign capital inflows in the industrial sectors would boost exports to other countries, though insignificant, a sustainable level of FDI should be maintained. Secondly, a significantly positive relationship was between trade openness and export which confirms the theoretical knowledge. Other variables such as money supply, inflation rate and interest rate; had negative relationship. From the variables used in the study, it is recommended that the policies put in place by the Monetary and Fiscal authorities in Nigeria should be such as to encourage stable and sustainable foreign direct investment in a conducive economic and political environment. This will bring about improvement in the nation's productivity, external reserves, international trade and competitiveness, information technology and technological advancement through improvement in export accomplishment in Nigeria.

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