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International Capital flows and Manufacturing Output: Evidence from Nigeria

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Abstract
This study examined the effect of international capital flows on Nigeria's manufacturing output from the period of 1986 to 2022. As part of the methodology, the study used the Autoregressive Distributed Lag (ARDL) approach and an exp-post research design in the investigation. The annual times series data for exchange rate, foreign direct investment inflows, official development assistance received, external debt, and manufacturing output were obtained from the World Development Indicators (WDI) and Central Bank of Nigeria Statistical Bulletin (various issues). The long run and short run results of the study disclosed that, at 5 percent level exchange rate does not influence growth in manufacturing output in Nigeria. In another light, foreign direct investment has a significant negative impact on manufacturing output in the short run. In contrast, official development assistance received and external debt both established significant positive effect on manufacturing output in the short run. Further, the long run result showed that both the foreign direct investment inflows, official development assistance received do not influence growth in manufacturing output. However, the study found evidence of significant positive impact of external debt on the performance of Nigeria's manufacturing output in the long run. Following these developments, the study recommended that Nigeria should seek more official development assistance and external debt as they positively influence growth in manufacturing output.

Keywords: *Nigerian, External Sector, Manufacturing output*

1. Introduction

The manufacturing sector speeds up economic diversification and structural advancement, allowing a nation to make better use of its resources and rely less on importing raw materials or finished goods (Yaya, Oladipo, Oyefabi & Okoli (2022). The manufacturing sector is well-positioned to offer the dynamic advantages necessary for the economy's transformation, which will substitute imports, generate foreign exchange profits, increase exports, boost investment, and dynamically raise consumption, the employment rate, and per capita income (Agbarakwe 2019).

As the economy's output rises due to mass production of goods and services using improved labor capabilities, materials, and technology, capital formation occurs, which inevitably improves the nation's economic performance (Okuneye, 2019). Through massive supplies of capital and consumer goods at reduced costs and prices, increased productivity among manufacturing enterprises is a surefire way to boost economic growth, enhance company growth, and raise people's standard of life. The Nigerian manufacturing sector contributed 4.73% in 1961 and 7.00% in 1966, respectively, before the country's strong reliance on crude oil (Siddique, 2020; Chete, Adeoti, Adeyinka, & Ogundele, 2014).

Nigeria's manufacturing sector performed poorly, so from 1960 to the present, several policies were implemented by successive administrations to guarantee the sector's growth. All of these regulations sought to regulate the internal and external factors influencing the functioning of the industrial sector. (Ewubare & Ozo-Eson, 2019; CBN, 2020 as referenced by Mohammed & Ibrahim, 2022). Nigeria's manufacturing industry is segregated into oil and non-oil manufacturing, which are further subdivided into sub-sectors. Although policies have been put in place to support the growth of these sectors, a number of factors continue to influence their productivity and contribution to economic expansion. These elements may have a negative or good impact and be internal or external. The external sector's primary function is to guarantee the expansion and stability of any globalized economy (Mohammed & Ibrahim, 2022).

Mohammed & Ibrahim (2022) have further established that Nigeria's manufacturing sector has had erratic development and its share of the country's GDP has also decreased. The sector contributed 21% of GDP at its best point and 17% at its lowest point between 1981 and 1997. In 1998, it fell to sixteen percent. During the democratic era, which began in 1999, the sector's GDP contribution peaked at 13.9% in 1999 and 2000, while its lowest contribution was 6.6% in 2009. The trade controls and industrial policies of the government as well as dilapidated infrastructures led to a severe decline in the real output of this sector. Thus, the sector recorded a 40 percent fall in real output between 1994 and 1996 and, since then, the sector has continued to experience a downward trend in real output. In fact, in the past thirty years, capacity utilization of the manufacturing sector has not moved above 80 percent at any time Yaya *eta la.* (2022).

It is crucial to remember that all Nigerian industries depend on inputs to produce goods and/or services, and the majority of these inputs are imported from overseas. As a result, it is anticipated that the external sector will have an impact on industrial development, input costs, and overall production levels throughout time. Therefore, the growth and stability of any open economy depend on the external sector operating at its best Nteegah & Olubiyi (2022). According to Akidi, Tubotamuno, and Obayori (2018) Whether an economy is developed or not, the external sector is one of the most crucial to its growth and development. This is so because the external sector constitutes a nation's economic exchanges with other nations of the world. Trade openness, exchange rates, and external debt are the three main measures of the external sector. Foreign Direct Investment (FDI), Foreign Exchange Earnings, Imports, and Foreign Portfolio Investment (FPI) are further indicators. These metrics influence Nigeria's manufacturing sector's success in one way or another (Mordi, Englama & Adebusuyi, 2010; Nteegah & Olubiyi (2022).

Several related empirical research have been carried out to ascertain the impact of interational capital flows on manufacturing output; however, it appears that no firm conclusion has been reached on the direction and magnitude of the external sector's influence on Nigeria's manufacturing sector's performance. Therefore, the lack of agreement among empirical works makes it abundantly evident that more research is required (Nteegah & Olubiyi, 2022). In addition, this study took a step that previous studies had not taken before by including official development assistance as one of the independent variables. Therefore, the specific objective of the study was to determine the effect of international capital flows on manufacturing output in Nigeria from 1986 to 2022.

2. Literature Review

2.1. Theoretical Framework

The liberal economic theory serves as the theoretical foundation for the research. The main contention of the liberal economic theory is that, when trade and exchange barriers are loosened, economic liberalization will contribute to a rise in the amount of foreign investment flowing into emerging nations. During this process, the establishment of a global market society becomes feasible (Biersteker, 1993). Once more, one of the main goals of liberalization is to close the resource gap in LDCs by promoting net capital inflow and enhancing the trade balance. This fosters dependency and suppresses the nascent industry in the periphery. They bind peripheral states to agreements that require them to remove their protective barriers, preventing the development of trade profiles that deviate from the model prescribed by the purported comparative advantage because they are the main organizations that formalize and institutionalize market relationships between nations (Burchill, 1996). The aforementioned explanation demonstrates how Nigeria's economy has been liberalized, resulting in a steady influx of manufactured goods, foreign investment, and rising national debt (Mohammed & Ibrahim, 2022).

2.2. Empirical Review

Nteegah and Olubiyi (2022) evaluated the external sector and the performance of manufacturing sector in Nigeria. In order to achieve this purpose, data on trade openness, foreign direct investment, foreign debt and exchange rate of the naira to the US dollar were sourced from the World Bank data base and regressed on share of the manufacturing sector to GDP using Parsimonious Vector Error Correction model (VECM) method. The result of Johansen Cointegration Test showed that there exists a long run relationship or cointegration between external sector and the performance of manufacturing sector in Nigeria. The result of Parsimonious Vector Error Correction Model showed that trade openness and external debt have positive effects on the performance of manufacturing sector in Nigeria while foreign direct investment and exchange rate have negative effects on the performance of manufacturing sector in Nigeria over the period of investigated (1985 – 2020). The result further revealed very high speed of adjustment among the variables in the manufacturing sector in the changes in the long run dynamics.

Mohammed and Ibrahim (2022) examined the nexus between external variables and manufacturing sector performance using data from 1981 to 2021. The result of the study after

employing Autoregressive Distributed Lag (ARDL) showed that in the long run, debt, import, FDI and GFCF all had negative impact on the sectors performance while export and external reserve had positive effect on the sectors performance. In the long run negative effect was still maintained with the exception of GFCF. The study therefore recommended that external fund through debt and FDI should be directed towards the development of the sector, import of manufactured goods should be minimized while export should be encouraged.

Yaya *et al.* (2022) investigated the impact of foreign direct investment (FDI) on the Nigerian manufacturing sector over a period of forty years (40) from 1981 – 2020. In order to achieve this, annual time series data on the variables-Manufacturing Output (MFO), Foreign Direct Investment (FDI), Exchange Rate (EXCH), Interest Rate (INTR), Degree of Openness (DOPN) and Government Capital Expenditure (GCPE) were collected from the Central Bank of Nigeria (CBN) Statistical Bulletin and the National Bureau of Statistics. The tools of empirical analysis employed were the Augmented Dickey Fuller (ADF) Unit Root test, the ARDL Bounds Test for Co-integration and the Auto Regressive Distributed Lag (ARDL) Model. Results from this study revealed that there exists a positive and significant impact of foreign direct investment on the Nigerian manufacturing sector in both the short and long run. This indicates that FDI is vital to the development of the sector.

Ezeudu, Ariwa, and Edeoga (2017) ascertained the impact of external debt on construction industry in Nigeria with emphasis on cement industry in Nigeria. Ex-post facto research design was adopted for the study. The data used for the analysis were collected from Central Bank of Nigeria Statistical Bulletin, 2013. The period of study was 1999-2015 and Ordinary Least Square was the tool of analysis. From the results of the data analysis, it was discovered that External Debt stock had a positive and significant impact on cement industry activities, while External Debt Service Payment had negative and significant impact on cement industry activities in Nigeria. The study recommended amongst others, that Debt Management Office should set mechanism in motion to ensure that loans were utilized for purposes for which they were acquired as well as set a ceiling for borrowing for states and federal governments based on well-defined criteria.

3. Methodology

Ex-post facto research design was adopted for this study. An Ex-post Facto research determines the cause-effect relationship among variables. The World Development Indicators (WDI) and Central Bank of Nigeria Statistical Bulletin (various issues) were the sources of the annual times series data used in the study from the years 1986 to 2022.

3.1. Model Specification

The study adopted the Auto-Regressive Distributed Lag (ARDL) econometrics regression technique. To this end, the model specification of the study goes by the following order:

The functional form of the model are as follows;

$$MAF = f(EXR, FDI, ODA, XDT) \quad (1)$$

Stated in linear form gives;

$$MAF = b_\circ + b_1EXR + b_2FDI + b_3ODA + b_4XDT + \mu \quad (2)$$

A priori Expectations: $b_1 < 0, b_2 > 0, b_3 > 0, b_4 > 0$

Formulating the Autoregressive Distributed Lag (ARDL) long-run model gives;

$$\Delta(\text{MAF})t = b_\circ + b_1(\text{MAF})t + b_2(\text{EXR})t + b_3(\text{FDI})t + b_4(\text{ODA})t + b_5(\text{XDT})t + \sum_{i=1}^{n} \Delta b_1(\text{MAF})_{-t-1} + \sum_{i=1}^{n} \Delta b_2(\text{EXR})_{t-1} + \sum_{i=1}^{n} \Delta b_3(\text{FDI})_{t-1} + \sum_{i=1}^{n} \Delta b_4(\text{ODA})_{t-1} + \sum_{i=1}^{n} \Delta b_5(\text{XDT})_{t-1} + \mu_{1t} \quad (3)$$

While the short-run Error Correction Model derived from the ARDL model yields;

$$\Delta(\text{MAF})t = \partial_\circ + \partial_1(\text{MAF})t + \partial_2(\text{EXR})t + \partial_3(\text{FDI})t + \partial_4(\text{ODA})t + \partial_5(\text{XDT})t + \sum_{i=1}^{n} \Delta \partial_1(\text{MAF})_{t-1} + \sum_{i=1}^{n} \Delta \partial_2(\text{EXR})_{t-1} + \sum_{i=1}^{n} \Delta \partial_3(\text{FDI})_{t-1} + \sum_{i=1}^{n} \Delta \partial_4(\text{ODA}))_{t-1} + \sum_{i=1}^{n} \Delta \partial_5(\text{XDT}))_{t-1} + \Pi ECM + \mu_{2t} \quad (4)$$

Where: MAF = Manufacturing output; EXR = Exchange rate; FDI = Foreign direct investment inflows; ODA = Official development assistance received; XDT = External debt; b_0 = $Intercept\ of\ the\ models$; $b_1 - b_4$ = $Slopes\ of\ the\ models\ respectively$; $b_1 - b_5$ = $Long-run\ dynamic\ coefficients$; $\partial_1 - \partial_5$ = Short − run dynamic coefficients; μ_t = $Disturbance\ or\ error\ term$; Δ= $First\ difference\ operator$; n = $Maximum\ lag\ lenght$; Π = $Error\ correction\ coefficient$; ECM = $Error\ correction\ term\ with\ one\ period\ lag$; f = $Functional\ Notaton$

4. Results and Discussion

4.1. Unit Root Test

The unit root test preceded the model estimate because of its usefulness in exposing the variables' time series characteristics. Table 1 below shows the results of the unit root test using the Augmented Dickey Fuller (ADF) method.

Table 1: Augmented Dickey Fuller (ADF) Unit Root Test Results

Variable	ADF Test Stat.	5% Critical Value	P-value	Order of Integration	Test Option	Remark
MAF	-5.573847	-3.544284	0.0003	I(1)	Trend & Intercept	Integrated of order 1
EXR	-4.608128	-3.544284	0.0040	I(1)	Trend & Intercept	Integrated of order 1
FDI	-4.074631	-3.540328	0.0148	I(0)	Trend & Intercept	Integrated of order 0
ODA	-4.292060	-3.544284	0.0089	I(0)	Trend & Intercept	Integrated of order 0
XDT	-4.644845	-3.544284	0.0037	I(1)	Trend & Intercept	Integrated of order 1

Source: Author's computation from Eviews software, 2024

Table 1 shows that FDI and ODA were integrated of order 0 since at 5 percent level, their corresponding ADF test statistic values of -4.074631 and -4.292060 are more negative than their respective critical values of 0.0148 and 0.0089. It follows that these variables do not have unit root. However, the other variables (MAF, EXR, and XDT) were differenced once before they became stationary at 5 percent level. This suggests that the series are integrated of order 1. Stationarity among the variables of the study implies that the mean and variance of the series do not vary systematically over time.

4.2. Lag Length Selection

Table 2 shows the result of the lag length criteria used in selecting the appropriate number of lags to be employed in the regression.

Table 2: Optimal Lag Length Test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-504.4506	NA	7119738.	29.96768	30.19215	30.04423
1	-371.7880	218.5031	12885.68	23.63459	24.98138*	24.09388
2	-346.6167	34.05526	14124.63	23.62451	26.09363	24.46655
3	-306.8041	42.15451*	7833.564*	22.75318*	26.34462	23.97797*

*Indicate lag order selected by the criterion
Source: Author's computation from Eviews software, 2024

The result in Table 2 indicates that the optimum lag is the lag length of 3 based on the premise that the Akaike Information Criterion (AIC) yielded the lowest value of 22.75318 at lag 3 compared to other lags. Therefore, in estimating the model of the study, the optimum number of lags used was 3.

4.3. Cointegration Test Result

Following the evidence of mixed integration in the model, the ARDL bounds cointegration test method was utilized by the study. The result is shown in Table 3.

Table 3: Summary Result of the ARDL Bound test

Test Statistic	Value	Signif.	I(0)	I(1)	Decision
F-statistic	4.747531	10%	2.2	3.09	
K	4	5%	2.56	3.49	Cointegrated
		2.5%	2.88	3.87	
		1%	3.29	4.37	

Note: K denotes number of explanatory variables
Source: Author's computation from Eviews software, 2024

The result in Table 3 alludes to the existence of long run relationship among the variables of the study. This is on the basis that, the computed F-statistic value of 4.747531 is greater than the upper critical bound value of 3.49 at 5 percent level. This confirms the presence of cointegration relationship between MAF and the independent variables.

4.4. Model Estimation

The result of the regression analysis using the ARDL method is presented in Table 4.

Table 4: ARDL Long and Short Run for Model

Dependent Variable: MAF				
		Short run results		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR)	0.012657	0.007359	1.719961	0.1017
D(EXR(-1))	-0.013083	0.007166	-1.825887	0.0836
D(FDI)	-0.948693	0.138961	-6.827023	0.0000
D(FDI(-1))	-1.540060	0.171014	-9.005434	0.0000
D(FDI(-2))	-0.913954	0.155018	-5.895798	0.0000
D(ODA)	0.322548	0.141676	2.276664	0.0346
D(XDT)	0.047258	0.019531	2.419597	0.0257
D(XDT(-1))	0.082755	0.019966	4.144837	0.0006
D(XDT(-2))	0.028658	0.015765	1.817780	0.0849
CointEq(-1)*	-0.184984	0.030839	-5.998440	0.0000
		Long run results		
EXR	-0.010236	0.010748	-0.952289	0.3529
FDI	0.377334	1.614532	0.233711	0.8177
ODA	3.685802	2.119412	1.739068	0.0982
XDT	0.181534	0.054780	3.313868	0.0036
R-squared	0.789950			
Adjusted R-squared	0.711181			

Durbin-Watson stat	2.091799

Source: Author's computation from Eviews software, 2024

The result in Table 4 shows that the long run and short run results of exchange rate (EXR) within the evaluation period do not significantly influence the performance of manufacturing output in Nigeria. This outcome is owing to the fact that the respective probability values associated with their coefficients are greater than 0.05. Further, the result indicates that at 5 percent level, FDI in the short run had a significant negative impact on MAF. However, in the long run, there was no evidence of a significant impact on MAF by FDI at 5 percent level. ODA and XDT on the other hand exerted significant positive impact on MAF in the short run at 5 percent level; although, XDT in the second lag period, failed to exert any significant impact on MAF under the evaluation period. In the long run, the result shows that ODA did not significantly influence changes in MAF. However, statistical evidence exists that XDT positively influenced growth in MAF at 5 percent level. The coefficient of 0.181534 associated with the XDT long run result indicates that 1 unit change in XDT causes a 0.181534 unit change in MAF in Nigeria.

Table 4 further shows that the error term represented as CointEq(-1) has a coefficient of -0.184984. This coefficient is rightly signed and falls within the acceptance region of -1< error term < 0. Also, the probability value of 0.0000 associated with the coefficient is highly significant at 5 percent level. This result suggests that deviation from the long run equilibrium is corrected annually at a speed of approximately 18.5 percent. The R-squared result of 0.789950 implies that approximately 79 percent of the variations in MAF are explained by the variations in the independent variables. The high R-squared value is testament that the model of the study is a good fit. Further, the Durbin-Watson statistic of 2.091799 indicates the absence of autocorrelation in the model since the value is approximately 2.

4.5. Diagnostic Tests Results

The results of the diagnostic tests comprising of the Serial Correlation LM test, Heteroskedasticity Test, Ramsey RESET, and CUSUM of Squares (CUSUMSQ) test are presented in Table 5 and Figure 1 respectively.

Table 5: Post-estimation Test Results for Model

Breusch-Godfrey serial correlation LM test	F-statistic	0.103940	Prob. F(1,18)	0.7509
	Obs*R-squared	0.195204	Prob. Chi-Square(1)	0.6586
Breusch-Pagan-Godfrey Heteroskedasticity	F-statistic	1.132318	Prob. F(14,19)	0.3929
	Obs*R-squared	15.46472	Prob. Chi-Square(14)	0.3471
Ramsey RESET	t-statistic	1.763209	Prob. Value	0.0948

F-statistic	3.108906	Prob. Value	0.0948

Source: Author's computation from Eviews software, 2024

The result in Table 5 indicates the evidence of the absence of serial correlation and heteroskedasticity in the model. This result is hinged on the premise that the Obs*R-squared results from the Breusch-Godfrey serial correlation LM test and Breusch-Pagan-Godfrey Heteroskedasticity of 0.6586 and 0.3471 respectively are greater than 0.05. Further, the result of the Ramsey RESET suggests that the model was well-specified since the probability value of 0.0948 associated with the F-statistic is greater than 0.05.

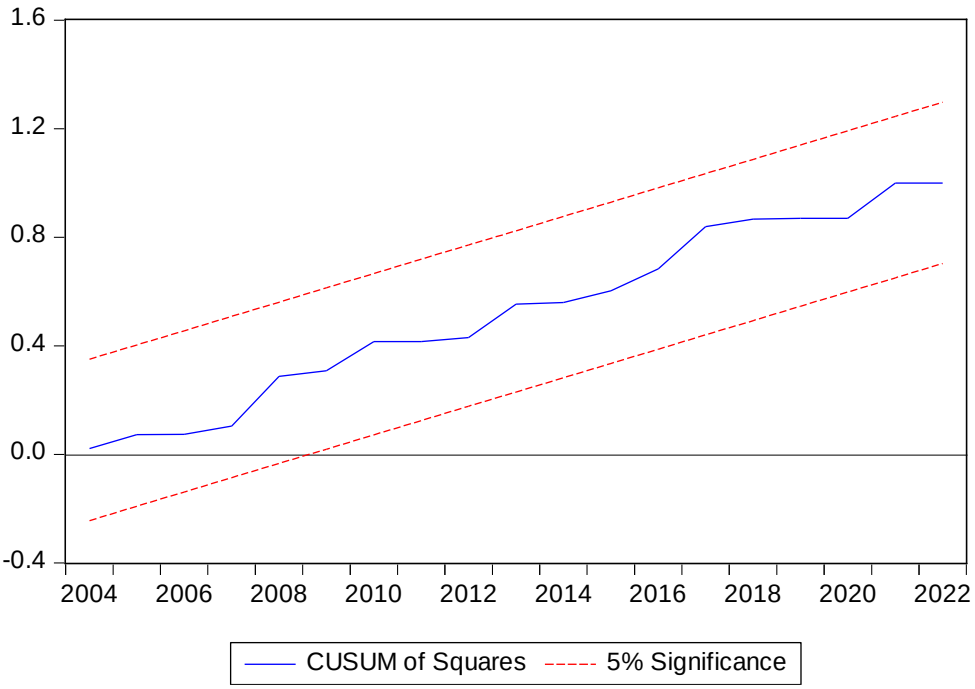

Figure 1: The Cumulative Sum of Squares Recursive Plot
Source: Authors estimation, 2024

The CUSUM of Squares plot in Figure 1 shows that the CUSUMSQ line is within the 5 percent critical bound. This suggests that the model of the study has proof of the existence of parameter stability.

4.6. Discussion of Result

The result of the study shows that changes in ERX do not significantly influence changes in Nigeria's manufacturing output. This result is not consistent with the findings of Mohammed and Ibrahim (2022) and Nteegah and Olubiyi (2022). However, this result agrees with the work of Yaya *et al* (2022) who concluded that exchange rate is not a determining factor in influencing

manufacturing output in Nigeria. The result of the study also shows that increase in FDI leads to a fall in MAF in the short run. In general, both past and current values of FDI influence the performance of MAF in the short run. This does not conform to the a priori expectations and theoretical postulation, that foreign direct investment is positively related to manufacturing output. The interpretation of this result is such that, foreign direct investment (FDI) inflows into Nigeria are not directed toward productive purposes, but rather toward consumption through misappropriation and poor management, which ultimately impacts the price level and, in turn, Nigeria's manufacturing sector. This result disagrees with the findings of Yaya *et al.* (2022).

In another light, the findings of the study hold that, ODA has a positive and significant effect on MAF in the short run; suggesting that changes in ODA have a positive boost on the growth of MAF in Nigeria. This result is in line with the a priori expectations and it shows that grants and grant equivalents from donor agencies to Nigeria are instrumental to the growth of the manufacturing sector. Further, the result indicates that both in the long run and short run, XDT exerts positive influence on the performance of manufacturing output in Nigeria. This result suggests that foreign loans secured by the government have been channelled to uses (such as infrastructure and manpower development) that directly or indirectly significantly raise manufacturing output in Nigeria. To a great length, this result collaborates with the findings of Ezeudu *et al.* (2017) in which external debt stock had a positive significant impact on cement industry activities in Nigeria.

5. Conclusion and Recommendations

5.1. Conclusion

The study examined the impact of Nigeria's international capital flows on manufacturing output from 1986 to 2022. The ARDL estimate approach was used in the study to get noteworthy empirical results lend credence to the conclusion that EXR has no significant effect on the performance of Nigeria's manufacturing output. Growth in FDI has a significant negative impact on manufacturing output in Nigeria in the short run but in the short run, no evidence of significant impact was established. The performance of ODA and XDT in the short run positively influence growth in manufacturing output in Nigeria. However, in the long run, their positions differ, such that. ODA does not significantly impact on Nigeria's manufacturing output while XDT significantly increases it.

5.2. Recommendations

Recommendations are made based on the conclusions drawn by this study that:

i. Policy makers and government should draft policies that will make Nigeria's exchange rate competitive such that it can boost the performance of the manufacturing sector.

ii. Nigeria should seek more official development assistance and external debt as they positively influence growth in manufacturing output.

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