Analysis of Effect of Foreign Capital Inflows on Manufacturing Sector Growth in Nigeria: The EGM Approach

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Abstract

The manufacturing sector of any economy is reputed to be the engine of growth and a catalyst for sustainable transformation and national development, but requiring huge capital outlay to grow. This ex-post-facto study was set to model the effect of foreign capital inflows on the growth of manufacturing sector in Nigeria. The study used secondary data extracted from the World Bank (2014), CBN Statistical Bulletin, National Bureau of Statistics and the Nigeria Exchange Group (NGX), over the period 1986 to 2020. The foreign-capital-inflow was represented by foreign direct investment (FDI), foreign portfolio Investment (PFI), and official development assistance (ODA) while manufacturing sector growth was measured by the sector's output growth. The two-step Engle-Granger estimation procedure (EGM) and the Granger Causality were employed to estimate parameters of the indices of manufacturing output growth and capital inflows to Nigeria. Findings revealed that FDI and PFI had significant positive effects on the manufacturing sector growth; ODA however had an insignificant effect. Findings also revealed unidirectional causality of FDI and PFI to the growth of manufacturing sector in Nigeria. Based on the findings, it was recommended that the Nigerian government should create an enabling environment including the improvement on the existing infrastructure to attract more capital inflows that could augment domestic resources with the sole aim of growing the manufacturing sector.

Background to the Study

Manufacturing sector is vital in the growth of contemporary economy the world over. As adequately acknowledged by Simbo, Iwuji, and Bagshaw (2012) "the manufacturing sector of any economy worldwide is reputed to be the engine of growth and a catalyst for sustainable transformation and national development". This is true because of its vital nature in the economy due to its enormous potentials and capacity as a wealth-creating tool, and for generating employment, and contributing to the nation's Gross Domestic Product as well as its ability to alleviate poverty among the citizenry. Furthermore, the sector has the capacity to create a variety of well-organized recessive and onward linkage with other segments of the economy. Indeed, the sector has been described as fundamental to any economy. As a segment of the industrial goods sector, it focuses on producing goods and services by combining and utilizing raw materials and other manufacturing aspects that includes labour strength, land and capital or by ways of production procedure. In cutting-edge economies, the manufacturing sector is principal in many dimensions (Mounde, 2017). It is a way of growing output relating to importation of spare and exportation of increase, generating high external earning volume; and raising employment and per capita income which prompt inimitable consumption levels. Additionally, as posited by Simbo et al. (2012), this sector generates investment capital more rapidly compared to other segments of the economy, and still serves as an impetus to supporting broader and more operative links between sectors. This explains why the sector is also globally recognised not just as being fundamental to growth but also serving as a reagent for sustained alteration and economic expansion as evidenced in the experiences of some advanced and developing countries alike (Simbo et al., 2012).

Regrettably however, the manufacturing sector in Nigeria is reported to operate lower than its installed capacity as compared with other sectors, and ultimately having a relatively lower influence on gross domestic product (GDP), as noticed between 1981 and 2020. Evidence from the Central Bank of Nigeria (CBN) Statistical Bulletin (2020), is indicative of the low input of the sector despite the various macro economy polices and strategies made towards revitalizing the manufacturing sector. In contributing to this assertion, Alege and Ogun (2014), elucidated that "various policies have highlighted the importance of the manufacturing sector as seen in the first, second, third and fourth national development plans (1981-1985) as well as various industrial growth strategies, standpoints and medium-term plans with the goal of improving the sector". Moreover, the pre-Structural Adjustment Program (SAP) era of import substitution plan and the post-SAP era of export promotion strategy were adopted to improve the growth of the sector.

Thus, without mincing words, the study states that, the Nigerian manufacturing sector has over the years grossly underperformed and growth can best be described as retrogressive and strinking, despite its potentials and capacity to flourish. The issues are far from the common daunting challenges enunciated by Simbo et al. (2012), such as unfavourable business environment, erratic power supply, poor and decaying physical infrastructures, multiple taxations, obsolete technology, high interest rates and inconsistency in government policies. The key issues hinged on lack of visible growth as compared to other nations on the same developmental pedestal. According to Vanguard (2022), manufacturing sector had recorded

a contraction of 2.75 per cent in 2020 from N6.47 trillion GDP in 2019 and grew by 3.35% from 2020 to 2021, this snapshot report simply indicates a crawling situation which needs special remedy when compared to Indian annual GDP in this sector of at least 17%. Also, it is understood that the gross retrogressive growth is highly linked with serious underfunding, which begs for cash inflows, and this underscores the importance of this research study. Baghebo and Apere (2014) lamented that "the capital flows into the Nigerian economy has not really been tremendous when compared with flows into some developing economies of South Africa and Brazil". They backed up their claim that from 2001 to 2007, the average annual capital inflows into Nigeria in terms of FDI and FPI were barely US $33,006 million and US $60,172 million, respectively (Baghebo and Apere, 2014)

The axiom is that, countries need external funds to ascend when there are more investments than available capital, and investments with extended maturity stages that produce financial yields. Adegboye (2014) argued that "the future progress of a growing country like Nigeria requires consistent and robust expenses in investing to match the high demand for capital". Because of the vigor of the essential monetary bedrocks, numerous avenues are constantly being discovered to meet these objectives. Among the several avenues used to establish trade between nations and accentuate the effective flow of capital is through flow of foreign direct investment (Okafor, Ogochukwu and Chijundu, 2016). Foreign portfolio investment (FPI) is another way of injecting external capital into the economy; and this is achievable by way of financial assets, and aspects like cash, stocks or bonds across universal borders in desires of gains. Also, Official development assistance (ODA), more frequently referred to as foreign aid, encompasses the allocations from public sector in form of grants and loans as agreement in monetary terms, to evolving economies. The effectiveness of these donations in realizing the desired goals of promoting economic progress and wellbeing of emerging nations has been ascertained. From the aspects of a growing economy in terms of manufacturing and increase in employment the need for external investments into the economy is imperative. Apparently, the observation is that the production sector has performed below expectation despite exertions of the central authorities to revive this sector of the economy.

There is dearth of research findings on the nexus between the implicit effects of the many dimensions of capital inflow and the manufacturing sector growth cited by many scholars (see Driffield and Jones, 2013; Reisen and Soto, 2001; Aizenman, Jinjarak and Park, 2013), and scanty studies available have fallen short of providing a possible causality of capital inflows on the growth of the manufacturing sector. There is evidence of a mixed reaction or outcome in the existing literature because others claim that positive relationship exist; for instance, the work of Baghebo and Apere (2014) indicated that foreign portfolio investment, Market capitalization and Trade openness had positive long-run relationship with real gross domestic product in Nigeria. On the other hand, there are still other studies whose findings of refute such assertions. Therefore, there is a disparity in the outcome of previous studies as such the current study expands the view by concentrating on manufacturing sector growth that was scarcely considered in the prior works to reconcile the current discrepancies, and to add literature. Besides, the addition of the dimensions of capital flow provides that impetus to access the appropriate effect (positive or negative) of capital flows on manufacturing sector

growth. Given the operational problem and the gap existing in literature, this study examined the effect of foreign capital inflow dimensions on the growth of manufacturing in Nigeria with the following hypotheses to guide the research work:

Ho1:   There is no significant effect of foreign direct investment on the growth of manufacturing sector in Nigeria

Ho2:   Foreign portfolio investment has no significant effect on the growth of manufacturing sector in Nigeria

Ho3:   There is no significant effect of Official development assistance on the growth of manufacturing sector   in Nigeria

Conceptualisation
Foreign Capital Inflow

The concept of Foreign Capital Inflow is pivoted on the movement of external capital into a country's economy. Foreign capital inflows refer to "the inflows of capital from one country to the other, and do not relate to the movement of goods or payment for exports and imports between countries" (see http://www.google.com). They take place through government, private and international organizations or agencies. Nkoro and Furo (2012) explained that capital inflows represent a way that helps the financially deficient economies to supplement their small capital in order to invest. Obadan (2004) further highlighted that this capital inflow is conveyed through Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), foreign loans and credits (Cross-Border Borrowing), etc. External capital flows could be non-debt creating flows (as in official transfers/grants and direct investment flows), debt creating flows (as in official development finance), commercial bank loans and international bond offerings, or a combination of these, such as Foreign Portfolio Investments and International Equity Offerings.

Unarguably, capital flows are due to imbalances between savings and investment among economies that translate into transfer of resources via trade or transactions, economic fundamentals, official policies, and financial markets imperfections. It is, however, extremely difficult to assess the effect of these policies and distortions because they generally overlap, creating both impediments and stimuli to capital flows. The external part refers to businesses, persons or equities beyond the local or home economy. 'Capital' in this perspective is money meant for investment by governments, businesses or individuals, including highly cash-based assets. It also includes physical assets like stocks, real estate and high-interest loans. Large financial institutions that make most investments prefer using borrowed money. 'Inflow' signifies money moving into the economy. It must be clear that large capital inflows can bring considerable economic benefits to developing countries, but they also have their dark side: if not properly managed, capital inflows can cause economies to overheat, increase exchange rate volatility, and lead eventually to large outflows.

Foreign Direct Investment

Foreign direct investment (FDI) is described as the process by which individuals from one country gain control over the production, distribution, and other operations of a company in another one. FDI takes place when an investor, firm, or foreign government invests directly in,

or establishes foreign business operations or acquires foreign business assets abroad. By its nature, FDI involves a business taking a controlling ownership in a company, sector, individual, or entity in another country—so that the foreign entities are directly involved with day-to-day responsibilities from the other country, resulting in a transfer of money, knowledge, skills, and technology. (See Research FDI, 2021). In line with this definition, Glass and Saggi (2009), accept FDI involvement in the development of capital that incorporates the ownership and control of a company in another country. Chen (1983) submits that such a business will have a significant majority stake in an outside company (above 10% offer) or will establish a subsidiary in another country. FDI also includes mergers and acquisitions (M&A), the building of new offices, the reinvestment of profits from international operations, and intra-organization credits (Hannon and Reddy, 2012). In most time, FDI constitutes a large source of capital flows to a country and greatly supports the economy. According to Otepola (2002), FDI has been the most vital spring of outside assets flowing to emerging economies countries over the years, signifying recently a vital aspect of capital planning in these economies.

Foreign Portfolio Investment
Foreign portfolio investment (FPI) is an aspect of international capital flows or a kind of foreign capital flow involving the unprofitable movement of financial assets such as cash, stocks, mutual funds, fixed deposits or bonds across international borders, in want of profit (Ezeanyeji and Ifeako, 2019). When investors purchase non-controlling interests or minority shares in foreign companies or purchase foreign corporate or government bonds, short-term securities or notes (Ezeanyeji and Ifeako, 2019), they are involving in this activity. Investors who invest in foreign porfolios are known as Foreign Porfolio Investors. As a result, just as trade flows are the result of individuals and economies looking to exploit their well-being by exploitation of advantage they have over other countries, capital flows are the result of people and economies that seek to improve their condition by transferring amassed assets to the most productive location. So foreign portfolio investment describes the acquisition of assets in a domestic stock/market by a foreign national or company. In other words, it refers to foreign people who hold transferrable stocks, equity shares, debentures, bonds, promissory notes, and money market instruments issued in a local market. Obadan (2004) furnished examples of money market instruments to include Treasury bills, commercial papers, bankers' acceptances, and negotiable certificates of deposits.

Official Development Assistance
Official development assistance (ODA), also known as international assistance, is a type of capital transfer from the public organizations to underdeveloped countries in the form of subsidies and low-interest loans. It is also understood to mean financing by government to support agencies to underprivileged countries freely or by charging an interest which is less than the prevailing rate, and foreign debt (FD). Many empirical studies of foreign aid efficacy have tried to analyze if it meets its primary purpose of promoting the economic social welfare services of poor countries and have made a case for more ODA in recent years to developing countries if poverty is to be eradicated. Advanced economies, international institutions, and billionaires have all renewed calls for a significant infusion of development aid into

undeveloped countries such as Nigeria. Okon, Augustine and Chuku (2012) accept that experts that called for more aid believe that boosting foreign aid will considerably benefit the poor of the receiving countries. There is a perceived wide savings-investment gap among the developing countries which needs closing. Nigeria, like many other developing countries, for instance, is confronted with many economic challenges including low income, high unemployment, low industrial capacity utilization, and high poverty levels. In order to solve these challenges, foreign aid has been proposed as a viable panacea.

It is also important to clarify some unique differences on some variables. According to Lyndon and Ayaundu (2020), "foreign direct investment was initially considered as part of portfolio investment and differences in rates of interest assumed as the main cause of capital inflows". And when interest rate is involved, the natural belief is that "by influence of interest rate, capital moves to any economy with expected higher returns". Lyndon and Ayaundu (2020), explained the main distinguishing feature between FDI and foreign portfolio investment (FPI): that FPI is the term used to describe short term investment in shares and bonds in host country and most of the times this is speculative in nature. Jones and Wren (2016) added that: "another important distinctive feature of FPI is the lack of control of the affiliate firm, because of which it is often categorized as an indirect investment".

Manufacturing Sector Growth
Industrial production is a subcategory of factory production and represents the aggregate output of the entire production of goods of establishments in a country. Manufacturing output is the entire output of industries that consist of creating things in factories or plants for a set period of time. Manufacturing output is the overall production of an industry as a whole. Economic development requires a high level of manufacturing output. Manufacturing is the part of the industrial sector that deals with the transformation of raw materials into completed finished products or work-in-progress. Manufacturing, can be compared to production activities, stimulate employment, enhances agricultural output, and lead economic diversification, while also allowing economies to raise its foreign exchange profits if the items are exported, aiding local workers to develop skills. It decreases the possibility of over-depending on foreign business and ensures that available resources are used to their full potential. The degree to which the other dimensions of the industrial sector are competently subjugated is assessed by the extent of manufacturing.

The industrial sector has long been seen as a launching pad for long-term economic growth. Developing countries, such as Nigeria, have shown an increased interest in the promotion of this sector since the 1970s for three main reasons: the failure of previous industrial policies to generate efficient self-sustaining growth; increased emphasis on a self-reliant approach to development; and recognition that a dynamic and growing real sector can contribute significantly to a wide range of developmental objectives. Ogunrinola and Osabuohien (2010) stressed that the industrial sector is important in the development process because it is projected to absorb excess agricultural labor discharged from rural areas. Essentially, modernization and growth begin when a country makes a concerted attempt to embrace the industrial sector. As a result, it is safe to argue that each state in the federation that wishes to

expand and create wealth for its citizens must, in reality, create an environment that facilitates and supports the growth of manufacturing activity. It is generally believed that most Nigerians still choose imported items for reason of status symbolism. Yet we must state here that most locally produced goods do not meet minimum acceptable quality standards.

Theoretical Framework
Absolute Advantage Trade Theory
Adam Smith in 1776 postulated the principle of total cost advantage on the conjecture that the basis of international trade was absolute cost advantage. This means trade between two nations would be mutually beneficial if one country could produce one commodity at absolute advantage (over the other commodity) and the other countries could, in turn, produce another commodity at an absolute advantage over the first. In other words, the principle of absolute advantage may be explained that the ability of a party (an individual, or firm, or country) to produce a greater quantity of a good, product, or service than competitors, using the same number of resources. Smith (1776) first described the principle in the context of international trade, using labour as the only input. Since absolute advantage is determined by a simple comparison of labor productiveness, it is possible for a party to have no absolute advantage in anything; in that case, the theory see that, no trade will occur with the other party. It can be contrasted with the concept of comparative advantage which refers to the ability to produce specific goods at a lower opportunity cost. Because of the necessary feedback against mercantilism, the concept gained traction. Smith (1776) promoted facilitated trade as the greatest solution for the world's countries. He argued that if trade were unrestricted, each country could devote more effort to the production of goods that it could deliver more efficiently than other countries, while importing goods that it could produce less efficiently.

International Arbitrage Portfolio Theory (IAPT)
Ross and Walsh (1983) created the International Arbitrage Portfolio Theory (I-APT), a multifactor model that analyzes extra drivers of projected returns. Internationally diversified consumption preferences and pricing uncertainty, the Return and Credit Worthiness Model which states that long and short run changes in equilibrium capital flows are caused by initial liabilities shocks, alters in pull factors such as the domestic economic environment, and changes in push factors such as external financial conditions. According to Haque, Mathieson, and Sharma (1997), "money demand and productivity paradigm fundamentally connect the reasons of capital flows to vary in the money demand function, domestic capital productivity, and foreign influences such as the international interest rate". Capital inflows will be generated by an upward change in the money demand function and gains in domestic capital productivity, *ceteris paribus*, and vice versa. These features almost always result in long-term capital flows. If all other factors are equal, a falling interest rate will result in capital inflows, while a rising rate will result in capital outflows.

Empirical Review
Lyndon and Ayaundu (2020) carried out a study to evaluate the effect of foreign investment inflows on economic growth in Nigeria, using secondary data for the period 2001 to 2018,

collected from the CBN Statistical Bulletin. The study adopted gross domestic product (GDP) as the indicator of economic growth and the dependent variable, while foreign direct investment, foreign portfolio investment and exchange rate were used as explanatory variables. The study employed descriptive statistics and multiple regression analysis techniques, and analyses conducted by use of Eviews computer software. Result output revealed that foreign direct investment, foreign portfolio investment and exchange rate had significant positive influence on GDP. Based on the results of the empirical analysis, the study concluded that foreign investment inflows had made the desired positive impact on the growth of the Nigerian economy. However, a lot still need to be done to create conducive investment climate to attract sufficient amount of foreign investors into the productive sectors of the Nigerian economy. The study recommended that the regulatory authorities should formulate policies and create the enabling environment to attract foreign investments into Nigeria. The weakness of this study is that both the derived conclusion, and recommendation on regulatory authorities did not have direct bearing with the principal objective of the study.

Okafor, Ezeaku and Eje (2015) carried out their investigation on the effects of foreign investment inflows on economic growth in Nigeria. The study disaggregated foreign investment into foreign direct investment and portfolio investment in other to realize the objectives of the study using data spanning from 1987 to 2012 with OLS and granger causality econometric procedures. The findings of the study indicate that FDI and FPI had significant positive impact on economic growth in Nigeria. The study recommended that government should pursue policies that encourage foreign investment. Unlike our own study, the work of Okafor et al. (2015) was on broad factors - foreign investment inflows and economic growth in Nigeria.

Adekunle, Ogunade, Kalejaiye and Balogun (2020) carried out a study on capital inflow and industrial performance in Nigeria. To estimate parameters of the indicators of industrial production growth and capital inflows to Nigeria, the study used the two-step Engle and Granger estimation process and the Granger Causality. Labor participation, gross fixed capital creation, foreign direct investment (FDI), and portfolio investment all showed a substantial positive link with industrial performance in Nigeria, according to the findings. Unidirectional causality was also discovered between labor participation, gross fixed capital creation, foreign direct investment (FDI), and portfolio investment in Nigeria and industrial performance. To close the gap in sectorial peculiarity, this study focused on the industrial goods sector, whereas the current study focuses on the manufacturing sector, with explanatory variables slightly different from their study.

Etale and Sawyerr (2020) used secondary data from 2001 to 2018 to assess the impact of foreign investment (FDI) inflows on Nigerian economic growth. The dependent variable is GDP and the explanatory factors were foreign direct investment, foreign portfolio investment, and exchange rate. The CBN Statistical Bulletin provided the data for their study variables, which covering the period of 2001 to 2018. Study used multiple regression analysis technique to analyse the data. The result showed that FDI, FPI and the exchange rate has positive impact on GDP. The study also found that foreign investment inflows have negative

influence on Nigeria's GDP. The current study focuses on sectoral estimation, while the previous study focused on economic growth.

Balogun, Okafor, and Ihayere (2019) used data from the CBN to assess the influence of capital flows on economic growth in Nigeria from 1981 to 2016. In order to estimate the stated model, the method of error correction model framework and autoregressive distributed lag were used. The calculated model demonstrated that capital movements had a considerable impact on Nigeria's economic growth. The study found capital inflows to have a major impact on economic growth. This study gathered data through 2016, while the current study fills in the gaps by gathering data until 2020.

In 2019, a group of researchers, (Afolabi, Laseinde, Oluwafemi, Atolagbe and Oluwafemi) undertook a study on Correlation between manufacturing sectors and foreign direct investment in Nigeria. Specifically, they made an assessment of the connection between the Nigerian manufacturing sector and foreign direct investment (FDI), using Manufacturing Sector Indicator (MFI) as the dependent variable while the independent variables included foreign direct investment (FDI), Inflation Rate (INF), Government Expenditure (GOE) and Money Supply (MSP). To empirically examine how the variables are related in the short run and long run, the researcher's utilized time series data sourced from the Central Bank of Nigeria Statistical Bulletin covering 36 consecutive years, while the statistical tools used were the autoregressive distributed lag (ARDL) and cointegration technique in line with Pesaran, Shin and Smith (1999). The output of their results showed that the coefficient of determinant (R-squared) was 0.973399 signifying that 97% of the variations in manufacturing sector indicators (MFI), was due to the independent variable, namely Foreign direct investment, (FDI), Inflation rate (INF), government expenditure (GOE), and money supply (MSP). Of particular interest from the results, only two of the predictors namely the Foreign direct investment (FDI) and Money supply (MSP) had positive significant values (p=0.0440 and p=0.0492 respectively). The other two predictors (GOE and INF) had insignificant effect as shown by their p values of much above the threshold level of 0.05. Afolabi et al. (2019) concluded that foreign direct investment (FDI) is a determining factor in manufacturing sector indicator (MFI) in Nigeria. They also made recommendation on the study, one of which 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.

Obi-Nwosu, Ogbonna, and Ibenta (2018), investigated the impact of foreign direct investment on Nigerian manufacturing capacity. Secondary data for FDI, exchange rate (EXR), inflation rate (INFR), and manufacturing capacity (MC) were sourced from the Central Bank of Nigeria Statistical Bulletin between 1984 to 2017 and the data was tested using the OLS Multiple regression Model. According to the findings, FDI and EXR were able to have a major impact on manufacturing capacity in Nigeria, but INFR was not able to have a meaningful impact. Within the era, there is also the existence of a long run link between the variables of investigation. As a result, the current study is unique in terms of variable combination.

Methodology

This study adopted the *ex post facto* research design, and used the Engle-Granger Two-Step Modeling (EGM) Approach (see later). The approach in this study followed that used by Adekunle et al., (2020). Secondary data collected for the study included the CBN Statistical Bulletin, National Bureau of Statistics and the Nigeria Exchange Group (NGX). The study covered a period of thirty-five (35) years from 1986 to 2020. The rationale for 1986 as base year was because Nigeria being the biggest economy in the sub-region introduced the Structural Adjustment Programme (SAP) in 1986. Another reason was that other countries in ECOWAS bloc were reformed and became more outward looking with SAP launched about the same time as Nigeria.

Model Specification

The regression model adopted for this study was derived from similar works of Nkalu, Edeme and Ifelunini (2016) and Adekunle et al. (2020) with slight modifications to suit the peculiarities of this study. With the variables adopted in this study, the mathematical function was expressed as:

$$MSG = f(FDI, FPI, ODA) \quad \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (1)$$

This function was then transformed into an econometric model as:

$$MSG = \beta_0 + \beta_1 FDI + \beta_2 FPI + \beta_3 ODA + \mu_t \ldots \ldots \ldots \ldots \ldots \ldots (2)$$

Where: MSG = Manufacturing Sector Growth, FDI = Foreign Direct Investment, FPI = Foreign Portfolio Investment, ODA= Official Development Assistance, μ_t = Stochastic error term.

Operationalising Variables

The study variables of measurement were described on a tabular form (see Table 1).

Table 1: Characteristics and Measurement of Variables

Variable Acronym	Variable Label	Variable Type	Measurement	Source
MSG	Manufacturing Sector Growth	Dependent	Log of output growth of manufacturing sector	Eze, Nnaji and Kalu (2019)
FDI	Foreign Direct Investment (FDI)	Independent	Natural log of value of FDI of manufacturing sector throughout the period of the study	Sikandar et al., (2019); Eze, Nnaji and Kalu (2019); Ndubuisi and Abdul (2018)
FPI	Foreign Portfolio Investment	Independent	Natural log of value of FPI to manufacturing sector over the period of 1986-2020	Sikandar et al., (2019); Ndubuisi and Abdul (2018)
ODA	Official Development Assistance	Independent	Natural log of aggregate ODA to manufacturing sector over the period of 1986-2020	Sikandar et al., (2019); Ndubuisi and Abdul (2018)

Source: Author's Compilation, 2022**.**

Pre-Estimation Diagnostic Test

Stationarity Test: As explained by Njiru (2014), "unit root tests are used to detect non stationarity in the study variables; if variables are non-stationary, their statistical properties tend to change over time, a characteristic which leads to spurious estimates". Therefore, if variables are found to be non-stationary, either successful lagging is applied until the bias is eliminated or they are differenced. Augmented Dickey-Fuller (ADF) unit root test is one popular test that we will use here in our study.

Co-integration Test: Cointegration, is a statistical method used to test the correlation between two or more non-stationary time series in the long-run or for a specified time period. When co-integration exists among non-stationary variables it means that there exists a linear long-run relationship among variables. Cointegration is the statistical implication of the existence of a long-run relationship between economic variables. Its test stipulates that if variables are integrated of the same order, a linear combination of the variables will be integrated of that same order. The idea behind cointegration analysis is that, although time series variables may tend to trend up and down over time, groups of variables may drift together (Gujarati, 2004).

Error Correction Model

The main focus of our investigation is on the relationship between foreign capital inflow variables and manufacturing sector outputs in Nigeria, is undertaken by the Error Correction Mechanism. After establishing the existence of long-run cointegration relationship, the study investigated both the long-run effects and the short-run dynamics using the Error Correction Model (ECM) approach. A dynamic Error Correction Model (ECM) can be derived from autoregressive outline through a simple linear transformation. ECM gives the short run coefficient without losing the long run information.

Results, Analyses and Discussions

This section of the study is used to present and analyse the data collected for the study. This study used annual time series data for indices of capital inflows and manufacturing growth from 1986 to 2020. The choice of Nigeria was guided by the desire to explain the growth transformation of the Nigerian manufacturing sector with the attendant consequences of capital inflows. This study was also guided by the availability of reliable data on aggregates of capital inflows and associative consequences. Capital inflows were measured using foreign direct investment, official development assistance, foreign portfolio investment as used in the work of Reisen and Soto (2001); De Vita and Kyaw (2008); Opperman and Adjasi (2017). However, manufacturing sector growth was proxied by manufacturing sector GDP as in Osu (2019); Osisanwo (2013); Obi-Nwosu, Ogbonna and Ibenta (2018). The study relied on data from the World Bank Database (World Bank, 2014) and the CBN statistical Bulletin.

Descriptive Statistics

Various descriptive statistics were calculated from the variables under study in order to describe the basic characteristics of these variables. The descriptive statistics of the data provided vital information about the sample series such as the mean, median, minimum and

maximum values; and the distribution of the sample measured by the skewness, kurtosis and Jaque-Bera statistics. The variables used in this study are described in Table 2. From the descriptive statistics (Table 2), the mean value of growth of manufacturing sector as logged for the entire 35 years stood at 2.1846 with a standard deviation of 2.0054, which gave a range that tallied with the Minimum of 3.8140 and a Maximum of 4.2009 on the table is an indication of steady improvement in the growth of manufacturing sector over the years. The descriptive statistics showed that FDI had a mean of 3.3613 with a standard deviation of 2.208 and close to the mean showing a significant level of differences in the amount of FDI to Nigeria in the study period.

Table 2: Descriptive Statistics

Statistics	MSG	FDI	FPI	ODA
Mean	2.1864	3.3613	4.7086	2.6502
Median	2.8765	3.0121	3.9492	2.9101
Maximum	4.2009	8.8325	5.4258	3.5421
Minimum	3.8140	0.6426	2.2232	1.6439
Std. Dev.	2.0054	2.2081	1.3368	2.4303
Skewness	1.8654	1.8801	2.9769	2.5863
Kurtosis	2.5779	2.9775	2.2357	2.1707
Jargue-Bera	2.5674	2.4533	1.1046	2.2342
Probability	0.4653	0.5562	0.5126	0.3271
Observation	35	35	35	35

Source: Eviews 9 Output, 2022

This is substantiated by the value of minimum which is 0.6426 and maximum which is 8.8325. This substantial difference in the minimum and maximum values showed level of variances in FDI over the years. The descriptive statistic again indicated that FPI had an average value of 4.7086 with a standard deviation of 1.3368, a value far from the mean signifying high level of fluctuations in the foreign portfolio investment rate in Nigeria. The minimum figure stood at 2.2232 while the maximum was 5.4258. Furthermore, the descriptive statistics in Table 2 depicts a mean of 2.6502 for ODA with a corresponding standard deviation of 2.4303 which was an indication that official development assistance had not significantly changed from 1986 to date. This is substantiated by relatively close minimum and maximum values of 1.6439 and 3.5421 respectively.

The summary statistics result in Table2 reveals a high tendency for normal distribution (mean and median values falling within the maximum and minimum range). The study found positively skewed series and platykurtic distributions with flat tail relative to the normal distribution (values less than 3). The study found the series to be normally distributed consequent upon probability values that were non-significant at 5% level of significance.

The result of the unit root test found first differenced stationarity order across all series in the data set, (see Table 3). The study therefore proceeded to estimate the *two-step* Engle and Granger error correction estimation procedure to gradually adjust from the long-converging characteristics of the variables to the short-run equilibrating position.

Table 3: Unit Root Test (the Augmented Dickey-Fuller Test)

Variables	Level T-Stat	Critical Value @ 5%	First Difference T-Stat	Critical Value @ 5%	Order of Integration
MSG	-0.5773	-3.3737	-4.3332	-1.4334	$I(1)$
FDI	3.5523	-1.8203	-4.6682	-3.5626	$I(1)$
FPI	-1.3772`	-2.9511	-2.6631	-1.57231	$I(1)$
ODA	1.1221	1.0032	-2.3222	-1.3222	$I(1)$

Source: Compilation from Eviews9 Output, 2022
Note: The summary statistics were computed before taking the natural logarithm

The ECM thwarts long-run convergence in the parameterisation of the variables for short-run gradual equilibrium (Engle & Granger, 1987). The error correction model to be estimated is specified below;

$$\Delta MSG_t = \varphi_0 + \sum_{j=0}^{x} \varphi_{li}\Delta MSG_{t-j} + \sum_{j=0}^{x} \varphi_{2i}\Delta FDI_{t-j} + \sum_{k=0}^{y} \varphi_{3i}\Delta FPI_{t-k} + \sum_{i=0}^{z} \varphi_{4i}\Delta ODA_{t-j}$$
$$+ \varphi\lambda ECM_{t-1} + \mathfrak{H}_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(3)$$

All other variables remained as earlier defined except $ECM(-1)$ which is the error correction component of the model that gradually adjusts frontal long-run convergence to short-run equilibrium conditions and λ is the coefficient of the error correction component that gives the speed of adjustment back to short term equilibrium.

Optimal Lag Length Selection
Error correction modeling procedure is sensitive to lag length because of the time-varying parameters of the model adjustment. It relies on the Akaike Information Criteria to choose the optimal lag length for the Manufacturing sector growth model. The information criteria with the lowest statistics in the corresponding lag-order selection gives the optimal.

Table 4: Optimal Lag Length Selection

Lag length	AIC
0	4.7838
1	2.5622*

Source: *Compilation from Eviews9 Output, 2022.*
Notes: * indicates lag order selected by the criterion

Lag length one (1) was optimal based on result presented in table 4; the study proceeded to establish cointegrating level and short-run elasticities.

Cointegration Test stipulates that if variables are integrated of the same order, a linear combination of the variables will be integrated of that same order. This study drew inferences at 5% in the Trace and Maximum Eigen Values Statistics. The study confirmed the existence of a long-run relationship since it rejected the null hypothesis of no cointegration. The study proceeded to estimate the two-step Engle and Granger estimation procedure.

Table 5: Johansen Co-integration test based on Trace Statistic and Max. Eigen value

| No. of CE(s) | Eigenvalue | **Trace Statistic** | | | **Max. Eigen Value** | | |
		Trace Statistic	0.05 Critical Value	Prob.	Max-Eigen Value	Critical Value	Prob.
None *	0.74	138.42	95.75	0.00*	44.52	40.10	0.01*
At most 1*	0.69	93.91	69.82	0.00*	38.61	33.88	0.01*
At most 2*	0.53	55.29	47.86	0.01*	25.50	27.58	0.04*
At most 3*	0.42	29.80	29.80	0.05*	18.17	21.13	0.03*

Source: Compilation from Eviews9 Output, 2022.
Notes: Trace test indicates 4 cointegrating equation(s) at the 5% level; Max-eigenvalue test indicates 5 cointegration at the 5% level; * rejection of the hypothesis at the 5% level; **MacKinnon-Haug-Michelis (1999) *p*-values.

Two-Step Engle and Granger Error Correction Result
The hypotheses were tested using the Two-Step Engle and Granger Error Correction**.** Engle-Granger methodology follows two-step estimations. The first step generates the residuals and the second step employs generated residuals to estimate a regression of first-differenced residuals on lagged residuals. Hence, any possible error from the first step will be carried into second. The Two-Step Engle and Granger Error Correction Result for this study is presented in table 6. From table 6 the estimated coefficient of the error correction vector is 0.4591, and the $ECM(-1)$ of -0.5672 implies that the error correction term gradually adjusts back to the short-run equilibrating position at the rate of 56.72%. The coefficient of the error correction term is appropriately signed and significant at 1% level of significance.

Table 6: Two-Step Engle-Granger Error Correction Result
Dependent Var.*MSGt*

Variable	Coefficient	t-statistic	Prob.
A	0.1440	2.7373	0.0001**
FDI	0.5662	3.6372	0.0432*
FPI	0.6895	2.7237	0.0167*
ODA	-0.4591	-1.0983	0.3014
ECM (−1)	-0.5672	-2.9273	0.0014*
R-squared (R^2)		0.7162	
Adjusted R^2		0.5129	
F-statistic		45.2321	
Prob(F-statistic)		0.0000**	
Durbin-Watson stat		2.0544	

Source: Compilation from Eviews9 Output, 2022
**(1%) *(5%) indicate significance levels

The coefficient of error correction implies that about 57% of the previous year's disequilibrium in the manufacturing sector's economy revolved around its short run equilibrating position. Short-run estimates revealed that all the explanatory variables except official development assistance induced a linear and positive relationship with manufacturing sector growth in Nigeria. Moreso, the value of the adjusted R^2 of 0.5129 indicates that explanatory variables of the model explained 51.29% of variations in manufacturing sector growth in Nigeria, while the remaining 48.71% were captured outside the model. The Durbin Watson value of 2.0544 means the model *is* free from problems of serial correlation since it falls within the acceptance range of 1.5 to 2.5. (See Kayode, et al., 2012). The F-statistics of 45.2321 is statistically significant at the 1% level, indicating that the explanatory variables are jointly significant, suggesting that the model exhibits the desired goodness of fit.

Explicitly, FDI with a coefficient of 0.5662 has a positive significant value (p=0.0432<0,05). It thus shows that a percentage increase in foreign direct investment (FDI) will result in 56.62% increase in manufacturing sector growth in Nigeria, and this is within 5% level of significance and as such we may reject the null hypothesis and accept the alternate that foreign direct investment has significant effect on growth of manufacturing sector in Nigeria. This is in consonance with the works of many scholars, such as Etale and Sawyerr (2020), Okafor, et al. (2015), Afolabi et al. (2019).

Also, a percentage increase in foreign portfolio investment (FPI) would result in 68.95% increase in manufacturing sector growth in Nigeria, and this is within 5% level of significance, and as such the study may reject the null hypothesis, but accept the alternate hypothesis and state that FPI has significant effect on the growth of manufacturing sector in Nigeria. This agrees with the works of Etale and Sawyerr (2020), Okafor, et al. (2015), Afolabi et al. (2019).

However, Official Development Assistance (ODA) was found not to be statistically insignificant, as the *p*-value (0.3014) > 0.05 significance level and as such the study maintained the null hypothesis, thus that: ODA had no significant effect on the growth of manufacturing sector in Nigeria.

Granger Causality Test
In gauging the causation lag order of the capital inflow-industrial output relationship, the study regressed the dependent variable "MSG*t*" on its own one period lag and the one-period lag of the regressors.

Table 7: Granger Causality Result

Null hypothesis: X does not Granger Cause Y	F-Statistics	Probability
MSG*t*→FDI*t*	1.4526	0.1238
FDI*t* →MSG*t*	4.5623	0.0004**
MSG*t*→ODA*t*	2.9213	0.5366
ODA*t* →MSG*t*	2.6782	0.3521
MSG*t*→FPI*t*	0.6342	0.9882
FPI*t*→MSG*t*	2.8821	0.0234*

Source: Compilation from Eviews9 Output, 2022.
**(1%) *(5%) indicate significance levels

The study also, tested the null hypothesis of joint zero coefficients in the lagged regressors. By inference, failure to reject the null hypothesis is equivalent to failure to reject the hypothesis that one-period lag of the regressors do not Granger cause manufacturing sector growth in Nigeria. To test the non-Granger causality from FDI_t, FPI*t* and ODA_t to MSG_t, the study tested the nullity of all coefficients. The pairwise Granger Causality test results are given in table 7. From the table it can be seen that there was unidirectional causality from FDI and foreign portfolio investment to the growth of manufacturing sector in Nigeria. Hence, FDI and foreign portfolio investment granger cause manufacturing sector growth in Nigeria.

Table 8: Serial Correlation Test for short-run model

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.5262	Prob. F (7,24)	0.2312
Obs*R-squared	2.6263	Prob. Chi-Square (7)	0.4552

Source: Compilation from Eviews9 Output, 2022.

Given the probability value of 45.52%, as in table 8, the study failed to reject the null hypothesis and concluded that the short-run model was free from problems of serial correlation.

Table 9: Breusch-Pagan-Godfrey Heteroscedasticity Test

F-statistic	0.565126	Prob. F (7,24)	0.5357
Obs*R-squared	10.75370	Prob. Chi-Square (7)	0.9273

Source: Compilation from Eviews9 Output, 2022.

Given the probability value of 92.73 per cent, the study failed to reject the null hypothesis and conclude that our short-run model was free from problems of heteroskedasticity.

Conclusion

This study relied on aggregate indices of capital inflows (FDI, foreign portfolio investment and official development assistance) and manufacturing sector growth from 1986 through 2020 to lend empirical credence to the relationship. The study relied on the *two-step* Engle and Granger estimation procedure to establish a baseline asymptotic relationship between capital inflow and manufacturing sector growth in Nigeria. The study found that, a percentage increase in foreign direct investment will result to increase in the growth of the manufacturing sector in Nigeria. Also, a percentage increase in portfolio investment will result to increase in manufacturing sector growth in Nigeria. Conversely, official development assistance was found not to statistically determine manufacturing sector output growth in Nigeria at any level of significance. This implies that official development assistance does not predict variations in manufacturing sector growth in Nigeria. Basically, official development assistance is an anathema to manufacturing sector output growth in Nigeria, mainly owing to the unproductive role remittances plays in the African space. for the fact that Official Development Assistance (ODA)was returned insignificant in this study seriously portrays suspicion that remittances and other Development assistance cannot be accounted for, perhaps mismanaged owing mainly to the political motives that are associated with this factor.

Recommendations

Based on the findings, the following recommendations were made:

1. The Nigerian government should see inflows of foreign capital as a viable catalyst that can propel the expansion of the country`s manufacturing sector. This it can do by striving to improve on the monetary policies involving inflation rates, tax rates, as well as reducing the unbearable conditions for foreign direct investment to be attractive in Nigeria.

2. The positive significance of the Foreign Portfolio Investment to the growth of the manufacturing sector is an indication that more should be done in that area without fear of risks. Motivation (in areas of openness, reduced taxes and increased incentives) should be given in the areas of acquisition of assets of stocks, equity shares, debentures, bonds, promissory notes etc. by foreign nationals or companies. Such can boost capital flows into production sectors of the country, and enhance Foreign Portfolio Investment

3. Since Official Development Assistance (ODA) was found not to be statistically insignificant, points to the fact that its contribution to the growth of the manufacturing sector was insignificant. Factors that hinder ODA into the

manufacturing sector should be well studied so as to make improvement in this area. Specifically, the quantum of official remittances inflow should be analysed with the manufacturing sector in favourable consideration.

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