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Causal Relationship between Foreign Direct Investment and International Trade in Nigeria

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Abstract:
International Trade and Foreign Direct Investment plays significant role in nation's economic development, especially the developing countries of the world among which we have Nigeria economy. More important to the increasing trend and significance of FDI and Foreign Trade are the concept of substitutability and/or complementarities of these two economic agents and thus the need to examine the nexus between them using the data from 1970 and 2019.
The study adopted Johansen co-integration test to confirm the existence of both long-run relationship among the variables while two different approaches of time and frequency domains were employed to uncover the direction of causality between the variables. The time domain approach used was VECM granger causality test while the frequency domain approach used was Breitung-Candelon causality test.
The Johansen co-integration test outcome reveals the existence of positive long-run relationship between foreign direct investment and export and a negative long-run relationship between foreign direct investment and import. Finding further reveals unidirectional causality between FDI and import in the long run running from FDI to import, but there is bi-directional causality between FDI and export in the long-run. Also a unidirectional causality exists between Export and Import running from Export to import.
This study concluded that FDI in Nigeria is favourable, with the positive long run relationship between FDI and export and negative long run relationship between FDI and import, and therefore suggest that the Government should come up with policies that will help the inflow of FDI into the economy.

Keywords: *International Trade, Foreign direct investment, causality*

1. Introduction

International trade has been regarded by several economists, beginning from Adam Smith (1772) as an engine for growth and development. Ever since the time he wrote his book titled 'an inquiry into the nature and causes of the wealth of nations', international trade has received world class attention. This was based on the belief that economies need to export goods and services in order to generate revenue to finance imported goods and services which cannot be produced indigenously. All countries in the world engage in trade with at least one country or the other, and this was made possible as a result of globalization via the impact of technology. Foreign Direct Investment on the other hand has been seen as another important agent of economic development, especially in the developing countries of the world, because it enhances the supply of funds for domestic investments, increases the rate of technology transfer, promotes export capacity of the host country through improved productivity, integrate the country into the world economy and also gives access to the world market.

The importance of foreign trade and foreign direct investment to nations' economy is reflected in the statistics of the world's trade and FDI. FDI in the world has grown faster than world trade and world output. FDI outflow increases at global level at an average of 13% per year between 1980 and 2015, but declined by 13% in 2016 while both world trade and world output increase at an average rate of 7% per year between 1980 and 2015 at current prices. Furthermore, the world FDI inflows increased significantly from 207 billions' US dollar in 1990 to 1975 billion US dollars in 2007 and 1.5 Trillion US dollars and 1.3 Trillion US dollars in 2015 and 2016 respectively (UNCTAD, 2016). Therefore, Nations that want the development of her economy will certainly focus meticulously on her trade and FDI policies.

Nigeria Government also recognized the importance of FDI and Foreign Trade as an engine and catalyst of growth and development. This was as a result of the fact that capital has a major role in fostering real and sustainable development. In an attempt to tap into the benefits accruing from both Foreign Direct Investment and International Trade by the Nigeria government, several strategies have been employed in order to promote FDI inflow and at the same time boost International Trade. Such strategies include regulatory measures and incentive policies, enactment of investment laws, removal of laws that are inimical to foreign direct investment and foreign trade, transfer of state owned enterprises to public own enterprises etc (Shiro, 2009).

And thus, foreign direct investments and international trade have become the focus of researchers because of the great influence of these phenomena on the overall economy of any nation in the world. No economy can thrive without them, and therefore every nation must pay close attention to them. Nigeria economy was in a critical state between the year 2014 and 2015 that the Government and the policy makers needed tactical approaches and important policy measures to help the economy out of its terrible state. At a time of persistent crises and pressing social and environmental challenges, harnessing economic growth for sustainable and inclusive development is more important than ever (UNCTAD, 2012). If any economy will achieve such growth, investment will be a primary driver. Investment has to be mobilized and ascertained that it contributes to sustainable development objectives in all countries, especially developing ones. Over the previous 2 decades, Nigeria consistently ranked among the top three destinations for FDI in Africa – surpassing South Africa. FDI inflows ranged between $5billion and $7 billion per year, which covers investment in the oil and gas, real estate, communications, and consumer goods sectors of Africa's largest economy, UNCTAD (2012).

But Nigeria recorded dwindling direct capital investment inflow continually from year 2010 till it hit almost zero inflow in quarter 4 of 2015 year. However, international trade which is one of the major determinants of a countries economic growth also suffers a major set-back almost at the same period FDI inflow dwindled. There was a sharp reduction in the volume of Nigeria foreign trade which could be attributed to many reasons like the exorbitant rise in foreign exchange resulting from the sudden fall in oil price, high level of insecurities due to the activities of the BokoHarram sect and other sects in country, among others. But there has ever been high level of insecurity in the country over time, so we cannot conclusively say that was the reason for such dramatic fall in both foreign trade and foreign direct investment. The scenario could suggest a possible linkage and\or causal relationship between foreign direct investment and foreign trade. The experience of this period actually formed one of the bases for this study.

Findings from various researches in Nigeria do not point to the direction of causality between Foreign Trade and Foreign

Direct Investment and due to significant role of them in the growth dynamics of various economies, empirical research works have been focused in this direction. To the best of the knowledge of the researcher, very few studies have been carried out extensively on the nexus between foreign direct investment and international trade in Nigeria unlike other developed and developing economies of the world. Therefore, looking at the importance of foreign direct investment and foreign trade to a nation's economic development, and the concept of substitutability and/or complementarity of these two economic variables, there is need to examine the nexus between the two concepts to enhance our knowledge about their relationship.

The broad objective of the study is to examine the causal relationship between Foreign Direct Investment and International Trade in Nigeria between 1970 and 2019, while the specific objectives are to:examine the trend of Foreign Direct Investment and International Trade in Nigeria, andinvestigate the direction of causality between Foreign Direct Investment and International trade in Nigeria.

The remainder of this paper is structured as follows. The introductory section is followed by review of literature in section two. Section three discusses the methodology, while section four presents the empirical results. Section five concludes and makes recommendations.

2. Literature Review

2.1. Empirical Review

Fabry (2001) studied the relationship between foreign direct investment, economic growth and export by means of Johansen co-integration test and Granger causality test. The research was performed on a sample of countries from Central and Eastern Europe. According to the research, the impact of foreign direct investment on economic growth was proved in Albania and Russia. On the contrary, the impact of economic growth on foreign direct investment was proved in case of Hungary, Poland and Romania. The author concluded at the end of the research that export has stronger impact on the economic growth than it has on foreign direct investment in Central and Eastern Europe and, on the contrary, the impact of foreign direct investment on export has not been proved by the research in countries of Central and Eastern Europe.

Mihaela (2014), studied the Relationship between Trade and Foreign Direct Investment in G7 Countries by using a Panel Data Approach. The Granger causality tests for the panel data reflected in period from 2002 to 2013 that there is only short run causality between FDI and exports and FDI and imports. There is unidirectional causal relationship on long run between FDI and trade. Moreover, short run causality in both senses was observed for FDI and trade in G7 countries on the considered horizon.

Rasha et al. (2015), observed a causal relationship between Foreign Direct Investment, Economic Growth and Export in Jordan from Q1.2003-Q4.2013 using Co-integration method and Vector error correction mechanism. Their result showed a positive impact of export on GDP, but FDI has no effect on GDP. They concluded that FDI has negative impact on the economic growth of Jordan.

Alıcı and Ucal (2003), employed Toda-Yamamoto causality analysis in their study 'Foreign direct investment, exports and output growth of Turkey' and concluded that there is no relationship between foreign trade and FDI for Turkey from the period 1987q1-2002q4.

PavlosStamatiou, & Nikolas Dritsakis, (2012)., used VAR autoregressive model to examine the relationships between foreign direct investment, economic growth and export in their study. The research was performed for Greece by means of annual data during1960 – 2002. The results of study point out the two-way relationship between export and

economic growth. Moreover, the impact of foreign direct investment on export, as well as on economic growth in Greece was proven.

Mohammad (2011), examined the relationship between foreign direct investment and international trade in Bangladesh and found out that foreign direct investment granger caused import but similar causality in any other direction did not hold.

Borensztein et al. (1998), used Regression analysis to examine the relationships between FDI, economic growth and export. The research was implemented for 69 developing countries and for a period of 20 years. They found a positive impact of foreign direct investment on economic growth through export.

Renu and Mandeep (2013), examines the causal relationships between FDI and Trade (i.e., Exports and Imports) in India and China. They used Granger causality test to examine the causal relation between FDI and trade by using the data over the period of 1976-2011.The results for China show unidirectional causality running from FDI to imports and FDI to exports, however, there exist bidirectional causality between imports and exports. India gives the results which are not similar to China where bidirectional causality between FDI and imports; FDI and exports; and exports and imports have been found.

Samsu et al, (2008), examined the Causal Links between Foreign Direct Investment and Exports in Malaysia. They employed the methodologies of stationarity of time series and the multivariate Granger concept of causality to carry out the investigation. Their result shows that time series variables are co-integrated which implies that there is a long term relationship between FDI and Export in Malaysia.

Iqbal et al., (2013) examined impact of foreign direct investment on economic growth and export in Pakistan by using VAR autoregressive model. The empirical analysis was carried out with quarterly data for the period 1998 – 2009 and the results confirmed positive effect of foreign direct investment on export and economic growth in Pakistan.

Uğur and Harun, 2016 examined the symmetric and asymmetric causality between the Foreign Direct Investment and Foreign Trade. They carried out the research in Turkey covering the period 1983-2014. The symmetric; {Sims, 1972;

Dolado-Lütkepohl, 1996; Hacker-Hatemi, 2006} and asymmetric; {Hatemi-J, 2012} causality analysis was employed. The results of the empirical analysis show that unidirectional positive and statistically significant causality is going from total (goods and services) and only goods export, import and foreign trade (total import and export) to FDI. The conclusion of their findings point out to the existence of complementary relationship between the variables.

Oyatoye et al (2011), examines the possible impact and relationship between Foreign Direct Investment, Export and Economic Growth in Nigeria. They made use of Secondary data sourced from CBN which cover 20year period from 1987-2006. Regression analysis of ordinary least square was used in analyzing the data and they concluded that there is a positive relationship between FDI and GDP.

Mohammed and Ekundayo (2014) carried out a study on Foreign Direct Investment-Trade Nexus in Nigeria: Do Structural Breaks Matter? Their findings revealed a one-way causal linkage between non-oil imports and oil exports to oil FDI with no reverse causality observed, while non-oil FDI was found to Granger cause non-oil exports.

2.2. Gap Identified from Literature

It has been closely observed that the linkage between foreign direct investment and foreign trade has been grossly understudied in Nigeria as compared with other developed and developing countries of the world which has made it difficult for the government to effectively harmonize her trade and foreign investment policies for optimal economic performance. If extensive research has been carried out on the impact of foreign direct investment on economic growth, and researches carried out comprehensively on the impact of foreign trade on Nigeria Economic growth, and these two important economic agent happens to affect each other, then a clear understanding of the extent of their linkages needed to be known for optimal decision making. This study therefore is carried out to fill this gap.

3. Methodology

3.1. Theoretical Framework

There are several theories linking foreign direct investment and international trade. Some of these theories have been presented under theoretical literature. However, the theory of Multinational Enterprise otherwise known as Electric Paradigm developed by Professor Dunning which is the closest and the most relevant among the theories is employed to provide the foundation for the model of this study. The theory develops its argumentation by concentrating on three major areas as the reason for FDI: First, is the Ownership issue which speaks of advantages that are specific to a particular firm which enable it to take advantage of investment opportunities abroad. Since investment abroad is characterized by several additional costs, any company who will enter foreign market profitably must have monopoly of the advantages that will offset the cost of entering the foreign market. This can be a form of natural limited resources, patents right, trademarks, or discovery of advanced technology not known to others and Economies of large size such as economies of learning, economies of scale and scope, and greater access to financial capital; Second, is the issue of *internalization*, i.e., the replacement of firm's external contracts by direct ownership and internal hierarchies. Market imperfections are the key arguments in models that simulate such behaviour (Dunning 1981, Dunning and Rugman 1985, Hosseini 2005). Third, is the question of *location*, which is directly related to the links between flows of goods and flows of production factors (capital). In other words, taking internalization and the resulting horizontal or vertical structure of an MNE as given, the question that emerges is how to locate the different activities and organizational units in a specific region.

3.2. Model Specification

In reference to the theoretical framework and also the work of Mohammed and Ekundayo (2014); trend analysis is conducted on Import, Export, and FDI to achieve objective 1, while equation 3.1 to 3.3 are specified to examine the connection between foreign direct investment and foreign trade to achieve objective 2. A VEC (Vector Error Correction) model of foreign direct investment and trade variables which are export and import is setup.

A VEC model is an extension of simple VAR model. This model could be used with two or more non-stationary series which are known to be cointegrated as it has the cointegration restrictions (Mohammed and Ekundayo, 2014). Also, the VEC model allows for stationary exogenous variables in the data generating process. Another feature of the VEC model is that it can be used to check for causal relationships between the cointegrated variables (Granger, 1989), and thus by estimating the equations for different variables simultaneously, accounts for endogeneity problem which is very likely to suffice between foreign direct investment, export, and import. However, this study accounts for the role of oil price and exchange rate as exogenous factors that can affect the causal relationships among the foreign direct investment and the trade variables; they are included in each of the equation as Δoilp and Δexr so as to be in their stationary form. In the above models, the 'ect' is the error correction term which embedded the long-run or the cointegrating vector. The 'ect' is normalized for foreign direct investment in the cointegrating vector since it will be more reasonable from an economic angle since two trade variables are involved. The value of this error correction term is expected to be between -1 and 0. A positive sign will imply, that the variables are diverging from the equilibrium instead of moving towards it. The closer the value is to -1, the faster the 'errors' correct themselves and the quicker the variable converges to the mean. In the equations, the v*t* represents the white noise, t is the time index and m is a number of lags. The significance of combined lags of endogenous variables can be used to test for the short-run Granger causality using the Wald tests where the lags of the independent variables are restricted in one model and then compared with the unrestricted ones (Brooks, 2014). The joint test of the unrestricted lags of the variables in each equation with the error correction term can be used to test for the long-run causality among the endogenous variables. There are two methods to determine the optimal lag length for the VECM – the cross-equation restrictions and information criteria. However, the information criteria method is applied in this study.

3.3. Source of Data

Secondary data is employed in this analysis as it suits the research nature of the study. The data will cover periods of 50 years i.e. 1970–2019. Historical data on the foreign direct investment, export, import, and exchange rate are sourced from the World Bank Development Index database. The historical data on the oil price is sourced from the OPEC website.

3.4. Estimation Techniques

Unit root test was conducted in order to test for the stationarity of the variables used in this study. Augmented Dickey-Fuller (ADF) unit root tests was adopted. The Johansen cointegration test technique was adopted to test for the long-run relation among the endogenous variables given the exogenous variables. Johansen cointegration test was used because the variables are integrated of the same order. Also, equations 3.1-3.3 are estimated jointly in a vector form using the Johansen's maximum likelihood estimation technique. In order to achieve the causality objective of this study, both the Time domain and the Frequency domain ganger causality test type are adopted. The Frequency domain causality test type is developed by Breitung and Candelon and this test unlike the time domain causality test (VECM based) has the power to detect the short run, medium run and the long run causality simultaneously. These tests are discussed below.

3.4.1. Unit Root Test

In econometrics and statistical analysis involving time-series data, the time-series properties of the variable(s) used for examination are usually required. This is because, unlike cross-section data, time-series data usually have some inherent attributes which, according to Enders (2010) include: the presence of a trend, random drifts, high levels of shock persistence, volatility (especially in high time-frequency series), and co-movement with other series. These attributes, if left untreated, may pose serious challenges to statistical analyses, such as the problem of spurious regression and/or self-correlation in regression estimates. Since the present study uses essentially time series data, it is relevant that the time-series properties of the variables used in the study are particularly relevant to their stationarity/non-stationarity. In an empirical analysis, a spurious regression is readily detected by a very high R-square value and a low Durbin-Watson statistic. Based on the aforementioned factors, it is important to test for stationarity before the analysis continues to carry out an analytical calculation to clarify the underlying data generation mechanism for the implementation of the required methodology. Economic literature has identified three major approaches to test for a unit root in times series variables; graphical analysis, correlogram and unit root test. The test which is the most widely used to check for stationarity is Augmented Dickey-Fuller Test (e.g. Butt et al. 2010; Mohammed and Ekundayo, 2014; Acikalin, Aktas, &Unal, 2008). The ADF test is preferred to Dickey-Fuller (DF) as it solves the potential presence of serial correlation in the data (Tam, 2013). It is very important to determine a correct number of lags. The results of an inappropriate number of lags used for ADF test could lead to the unfavorable performance of this test especially in small samples (Fox, 1997). The number of lags should be selected by using Swartz information criterion (SBIC). The main reason is that SBIC is the most popular criterion used in the literature (Butt et al. 2010). The equation of ADF test with drift and trend could be written (Brooks, 2014):

Where, is the endogenous variable, Δ is a difference operator, β_1 and $\beta_2 t$ are deterministic terms which include the constant or drift and the trend respectively and are coefficients of and respectively, m is the number of lags of the different terms and is a pure white noise error term. is usually added to eliminate serial correlation in the error term . The

number of lagged differentiated terms to be included is often empirically determined by Information Criterion. Test statistics for the estimated coefficient of is then used to test the null hypothesis that the series is non-stationary (has unit root). If the absolute value of the test statistics is higher than the absolute value of the critical value (which could be at 1 or 5 per cent) then the series is said to be stationary, so we reject the null hypothesis, otherwise, it must be differentiated until it becomes stationary.

3.4.2. Johansen Cointegration Test

One of the conditions for applying the VECM is that the variables in the model should be cointegrated (Dritsaki, 2005). Two or more variables are cointegrated, if they move together in a long-term, even if there are deviations in the short-term. If two or more non-stationary variables of the same order of integration are cointegrated and combined in a regression equation, that combination will be stationary. If the variables are cointegrated, we can examine a long-term relationship between them using error correction models (Brooks, 2014). In order to test, if the chosen variables are cointegrated the Johansen cointegration test could be employed. Johansen test is very popular among the researchers because it is more general than Engle-Granger two-step cointegration test as it allows including more than one cointegrated relationship (Brooks, 2014). Based on Hjalmarsson and Osterholm (2007) The Johansen test takes form of a VAR (p) equation:

Where the vector of endogenous variables which are integrated is of order one, is the intercept and is the vector of innovations. The VAR (p) model above can be rewritten as:

Where

If the rank of Π matrix is equal to zero, then the second equation is reduced to a simple VAR (p) model. However, if matrix Π is not equal to zero and its rank is smaller than n then there exists r x n matrixes α and β each of them having a rank r such that $\Pi=\alpha\beta'$ and $\beta' y_t$ becomes stationary. Then we can say that the variables are cointegrated of the same order as the rank of matrix Π. Matrix α contains the adjustment parameters in VECM, β are the cointegrated vector and r is the number of possible cointegration relationships between variables. According to Masuduzzaman (2012), two statistics can be used to conduct the Johansen cointegration test my estimating Π of the unrestricted VAR and also perform a test, if the restrictions imposed by the r < n can be rejected – trace statistic and maximum eigenvalue statistic. The test equation for the trace statistic is:

Where T is the number of observations, is the largest canonical correlation, LR is the likelihood ratio statistic for testing whether the rank of Π is equal to zero and the variables are not cointegrated or smaller than n and the variables are cointegrated. The test equation for the maximum eigenvalue statistic is:

Where T is the number of observations, LR is the likelihood ratio statistic for testing whether the rank of Π is equal to or equal to . The expression is the starting rank for Π which means that it test against at least null cointegration. The number of lags chosen for the Johansen test depends on the lag number optimal for VECM meaning the lag numbers for the test and VECM should be the same.

3.4.3. Granger Causality Test

3.4.3.1. VECM Granger Causality (Time Domain Test)

If cointegration can be identified between variables, then it can be understood that there is at least a single aspect of causality (Granger, 1969). Causality refers to the ability of one variable to predict (and thus cause) the other. The short-run causality of the VECM can be tested using the Wald test (χ2 test), and the long-term causality is tested by examining whether the error-correction coefficient and jointly with the restricted lags in the model is significantly different from zero. Two different null hypotheses for two variables testing for no causality against each other are stated and the null hypothesis is rejected if the test statistics is greater than the critical value under specified confidence level (Gujarati & Porter, 2009). If both null hypotheses are not rejected, the Granger causality does not exist between two analyzed variables. If the first hypothesis is rejected and the second is not then unidirectional causality is present. If both null are rejected, then bidirectional causality occurs between two variables (Tangjitprom, 2012).

3.4.3.2. Breitung-Candelon Granger Causality Test (Frequency Domain)

In a general sense, the hypothesis that does not cause in the Granger sense atfrequency can be proved with the following measure,

Hence the element;

In this way not caused in the frequency following condition is fulfilled.

The condition is fulfilled if the two sums are jointly equal to zero. The hypothesis that is equivalent to prove where:

The hypothesis is tested using the following statistical:

The null hypothesis corresponds to. Where R is a matrix of restrictions of size, is the number of coefficients estimated per equation in the VAR, b is the vector of estimated coefficients of the respective equation, q is a 2x1 zero vector, s^2 is the estimation of the variance error of the corresponding equation and is a matrix with the observations of the independent variables in the model. The statistical only applies to, the extremes of the interval are not included given that in these cases , therefore the inverse of the matrix cannot be computed and the statistical cannot be calculated. On the other hand, to calculate the test it is required that the number of restrictions be strictly lower than the number of

coefficients estimated per equation and per variable in the VAR, that is 2 < p, hence the test can only be performed in systems with lags greater than two.

4. Results and Discussions

4.1. The Trend of Foreign Direct Investment and International Trade in Nigeria between 1970 and 2019

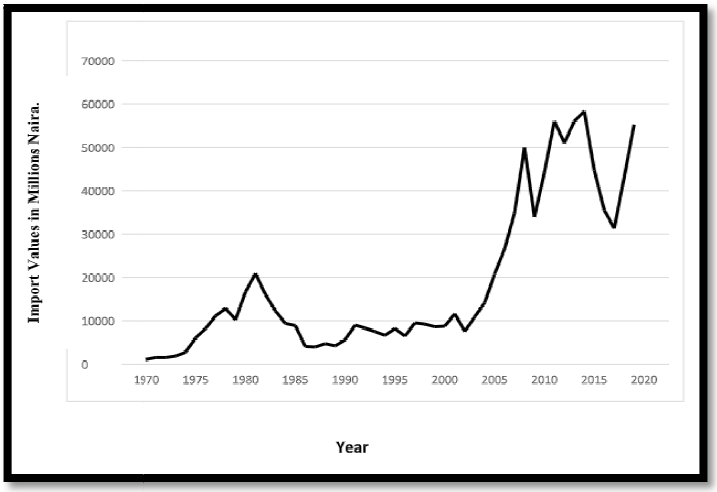

Figure 1: Trend of Import (1970-2019)

Imports in Nigeria as at 1970 was 1407 NGN Millions, even though it dropped by 11.09% the following year but began to increase at an average of 45% until it reached 15945 NGN Millions in 1981. It began to decline again until it reached N2155NGN Millions in 1986 from where it started to fluctuate, even though on the increase till it reached the peak in 2011 with a value of N88378NGN Millions. From where it dropped 23.4 percent year-on-year to NGN 71679 million in 2015, dragged by lower purchases of other crude oil products (-63.6 percent); raw materials (-0.6 percent); agricultural goods (-5.3 percent) and solid mineral (-25 percent). The most important import partners were: China (21.1 percent of total imports), Netherlands (12.1 percent), Belgium (11 percent), the US (6.5 percent) and India (6.3 percent).

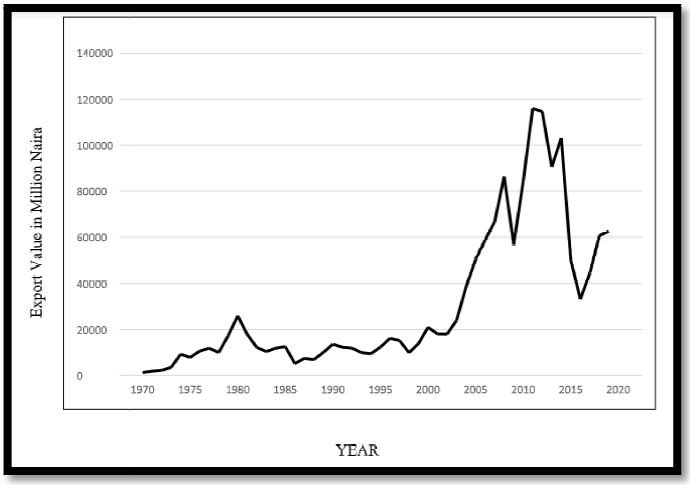

Figure2: Trend of Export (1970-2019)

Exports in Nigeria rose 55.5 percent year-on-year (even not on stable increase) to NGB 107804 million in 2012, mainly due to higher sales of crude oil (59.3 percent); raw material (105.6 percent) and mineral goods (519.4 percent). Main export partners were: Netherlands (20.5 percent of total exports), India (18.2 percent), Spain (8.3 percent), the US (8.2 percent) and France (6.3 percent). Exports in Nigeria averaged 1055NGN Millions from 1970 until 2015, reaching an all-time high value of 144918NGN Millions in 2012 and a record low of 995 NGN Millions in 1971.

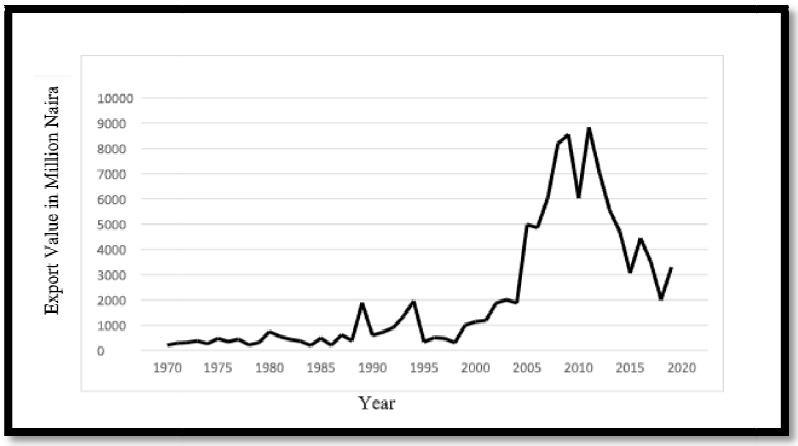

Figure 3: Trend of FDI (1970-2019)

Real foreign direct investment into Nigerian has been unstable over the years. Following the adoption of Structural Adjustment Programme (SAP) in 1986, and the subsequent liberalization of some aspects of the Nigeria economy, FDI continue to be on an increasing trend ranging from N193 NGN Millions in 1986 to as high as N1140 NGN Millions in the year 2000. The increasing trend continued to the peak of N8555NGN Millions in 2009, although a decline was observed between 1994 and 1999. The dwindling trend so noticed between 1994 and 1999 and the attendant slow growth in 1997 and 1998 was attributed to the reversal of the Structural Adjustment Programme (SAP) policies by government in 1994 specifically and partly to the political instability in Nigeria during these periods. Another sharp decline was observed from 2011 at an average percentage of 21.96% per year from N 8441 NGN Millions in 2011 to a record low of N3064 NGN Millions in 2019. This can be attributed to the high level of insecurity in the country within these periods.

4.2. Descriptive Statistics of Data

Mean	30.35880	18.62302	2.126763	35.38480	73.57282
Median	14.53150	9.859500	0.817756	25.68500	21.88603
Maximum	116.0000	58.30000	8.841062	109.4500	306.9210
Minimum	1.240000	1.059000	0.189165	1.210000	0.546781
Std. Dev.	31.31241	17.56502	2.483247	29.44038	90.62339
Skewness	1.377453	1.089640	1.364208	1.186192	1.124063
Kurtosis	3.791291	2.744761	3.688603	3.421219	3.394842
Jarque-Bera	17.11593	10.03002	16.49672	12.09506	10.85411
Probability	0.000192	0.006638	0.000262	0.002364	0.004396
Observations	50	50	50	50	50

Table 1: Descriptive Statistics of Variables
Source: Authors Computation, 2021

Table 1 above shows the descriptive statistics for export, import, foreign direct investment, oil price, and exchange rate respectively. The data has 50 observations covering the period of 1970 to 2019. The value for export, import, and foreign direct investment are in billions. The table shows the unexpected means for the variables are positive in sign, and they all have positive skewness and the implication of this is that they have more rise than falls. None of the variables has negative values as the values in the minimum row are all positive. The standard deviation for the foreign direct investment is relatively small which implies that it is less dispersed compared to the other variables. However, the probability value of the Jarque-Bera normality test is statistically significant for all the variables and this implies that they are not normally distributed; however, this issue of non-normality may be ignore due to the asymptotic theory or the law of a large number.

4.3. Unit Root Test

Variable	Deterministic Term	Level	Diff.	Remark
Log export (expt)	Constant	-2.35	-6.44***	*I*(1)
	Constant and Trend	-2.72	-6.46***	*I*(1)
	None	1.52	-6.25***	*I*(1)
Log import (impt)	Constant	-1.87	-5.91***	*I*(1)
	Constant and Trend	-2.13	-5.86***	*I*(1)
	None	1.84	-5.66***	*I*(1)
Log FDI (fdi)	Constant	-1.26	-11.54***	*I*(1)
	Constant and Trend	-2.09	-11.43***	*I*(1)
	None	0.87	-11.51***	*I*(1)
Log oil price (oilp)	Constant	-3.06**	-6.31***	*I*(0)
	Constant and Trend	-2.92	-6.47***	*I*(1)
	None	0.73	-6.10***	*I*(1)
Log exchange rate (exr)	Constant	-0.27	-5.60***	*I*(1)
	Constant and Trend	-1.55	-5.53***	*I*(1)
	None	2.07	-4.82***	*I*(1)

Table 2: ADF Unit-Root Test Result for Variables
Source: Author's Computation, 2021
**** P < 0.01; ** P < 0.05; * P < 0.1*

Table 2 above show the Augmented Dickey-Fuller (ADF) unit root tests results for the export, import, foreign direct investment, oil price, and exchange rate respectively. It can be deduced from the result that the variables are integrated of order one i.e. they contain unit root but become stationary after the first difference. However, there is a mixed result for the oil price; but since the oil price has likely been rising over the year, it is accepted to be an integrated variable. The statistical implication of this result is that these variables are likely to contain long-run information and differencing them might lead to loss of this information. Likewise, the estimation with the variables in their level form may likely yield a spurious result. The three major variables of interest are the export, import, foreign direct investment and oil price and exchange rate are assumed to be exogenous variables affecting the data generating process of these major variable. It is thus required that a cointegration relationship among export, import, and foreign direct investment is tested for with oil price and exchange rate acting exogenously.

4.4. Lag Selection

Lag	FPE	AIC	SIC	HQ
1	0.000311*	0.431679*	1.266494*	0.744406*
2	0.000402	0.672425	1.865017	1.119177
3	0.000490	0.845193	2.395563	1.425971
4	0.000600	1.004935	2.913083	1.719739

Table 3: Lag Selection by Information Criteria
** Indicates Lag Order Selected by the Criterion*

The estimation and of dynamic system models are highly sensitive to the nature of the data generating process (DGP), and the choice of lag length; hence it requires that a nested likelihood ratio tests on level VARs is carried out to determine the optimal lag length (p) before proceeding to the final estimation. The lag selection result is presented in Table 3 above. It can be shown from the result that FPE, AIC, SIC, and HQ selection criteria chose optimal lag of one for the VAR model in level. This implies that a VECM with a zero lag should be estimated; however, we shall estimate a VECM of order one to enable the testing for the short-run causality among export, import, and foreign direct investment. However, in the Breitung and Candelon test, the theoretical minimum required lag for the testing procedure is three. This is done to possibly adjust for possible cointegration among the variable.

4.5. Cointegration Test

H_0	Eigenvalue	Trace Test	LmaxTest
r = 0	0.34	29.7*	0.35*
r = 1	0.17	9.02	8.85
r = 3	0.00	0.17	0.17

Table 4: Johansen Tests Result with VAR (1)
Source: Author's Computation, 2021
**** P < 0.01; ** P < 0.05; * P < 0.1*

Table 4 above depicts the Johansen cointegration test result for testing the long-run relationship among export, import, and foreign direct investment with oil price and exchange rate as exogenous variable. Oil price and exchange rate enter the testing equation contemporaneously in first difference form; this is to meet the stationarity requirement of

exogenous variable(s) in the VEC model and to make sure that the residuals are stationary (stationary of the residuals implies cointegration). At 10% level, it can be seen that the null hypothesis of no cointegration among export, import, and foreign direct investment is rejected in the Johansen cointegration test and it may be deduced that one cointegrating vector exist among the variables. In order to identify the long-run vector space, the long-run relationship is normalized on the foreign direct investment. This makes more sense than using export or import as the normalized variable. The interpretation becomes clearer and comparable using foreign direct investment as the normalized variable.
Once this has been established, hence the need to conduct the VECM long-run and Short-run relationship.

4.6. Long-run Analysis

B	1	-4.142*** (-6.416)	3.269*** (4.678)
A	-0.183** (-1.953)	0.009 (0.292)	-0.139*** (-3.478)

Table 5: Long-Run and Adjustment Coefficients
Source: Authors Computation, 2021
( ) Contains the T-Stat
**** p< 0.01; ** p < 0.05; * p < 0.1*

The result for the long-run relationship is presented in Table 5 above. Below the beta row is the alpha vector which shows the speed of adjustment towards equilibrium for each of the variables. The sign of the betas are reversed since the Johansen test is normalized on the foreign direct investment. It can be seen from the result that export and import have a significant impact on the foreign direct investment. The result shows that if foreign direct investment increases by one percent, the average value of export goes up by 4.142% units in the long-run. Meanwhile, if foreign direct investment increases by one percent, the average value of import goes down by 3.269% units in the long-run.

The alpha row shows the speed of adjustment coefficients towards the long-run path. It can be seen from the table that the error correction term for export is not statistically significant. As such, the contemporaneous change in foreign direct investment is below 18.3% (i.e. about 18.3% error is corrected within a year) of any deviation from the long-run foreign direct investment equilibrium. For import, contemporaneous change in it is below 13.9% (i.e. about 13.9% error is corrected within a year) of any deviation from the long-run foreign direct investment equilibrium**.**

4.7. Short-Run Analysis

-0.183* (-1.952)	0.009 (0.292)	-0.139*** (-3.478)
-0.402*** (-3.161)	-0.021 (-0.509)	0.043 (0.798)
-0.123 (-0.335)	0.065 (0.558)	0.047 (0.302)
0.097 (0.349)	-0.1266 (-1.421)	-0.042 (-0.351)
0.463** (2.074)	0.912*** (12.916)	0.343*** (3.619)
0.745** (2.388)	-0.031 (-0.314)	-0.2667** (-2.012)
-0.057 (-0.609)	0.014 (0.472)	0.080** (2.019)

Table 6: Short-Run Coefficients
Source: Author's Computation, 2021
( ) Contains the T-Stat
**** P < 0.01; ** P < 0.05; * P < 0.1*

Table 6 above depicts the lag and the short-run estimates of foreign direct investment, export, import, oil price and exchange rate respectively. The first row depicts the error correction terms which is also the same as in Table 5. It can be deduced from the result that oil price contemporaneously affect foreign direct investment, export, and import, whereas exchange rate contemporaneously affect only foreign direct investment and import. The lags effect are mostly insignificant; only the lag effect of foreign direct investment is significant. The result shows that if oil price increases by one percent, the average value of foreign direct investment increases by about 0.46% in the short-run. Also, if one Dollar appreciate against Naira by one percent, the average value of foreign direct investment increases by about 0.75% in the short-run. In the export equation, it can be deduce that if oil price increases by one percent, the average value of export increases by about 0.91% in the short-run. In the import equation, it can be deduce that if oil price increases by one percent, the average value of import increases by about 0.34% in the short-run. Also, if one Dollar appreciate against Naira by one percent, the average value of import decreases by about 0.27% in the short-run.

4.8. VECM Granger Causality Test

	short-run causality			long-run causality		
					export	**import**
	NA	0.259	0.637	NA	0.28	12.16***
	0.112	NA	0.091	5.98*	NA	27.25***
	0.122	2.019	NA	3.81	2.02	NA

Table 7: VECM Granger Causality Test Result
Source: Author's Computation, 2021
**** P < 0.01; ** P < 0.05; * P < 0.1*

Granger causality implies precedence. In a statistical sense, it means that a variable could help in predicting the future of other variables if it occurrence precede the variable, and hence granger cause it. Table 7 above shows the VECM based granger causality test result. The values in the table are the chi-square values for the test and the asterisks denote the level of their respective significance. Also, the column variables granger caused the successive row variables. The diagonal is not available (NA) since the lag(s) of the concerned variables is/are excluded in testing the hypothesis. At glace, it can be deduced from the result that none of the variables granger cause each other in the short-run. However, export is shown to granger cause foreign direct investment in the long-run. Likewise, foreign direct investment and export is shown to granger cause import in the long-run.

But to make the research more robust and revealing, we double check with another causality method which is frequency based, VECM being Time domain. The Frequency domain causality test adopted was developed by Breitung and Candelon and this test unlike the time domain causality test has the power to detect the short run, medium run and the long run causality simultaneously.

4.9. Frequency Domain Granger Causality

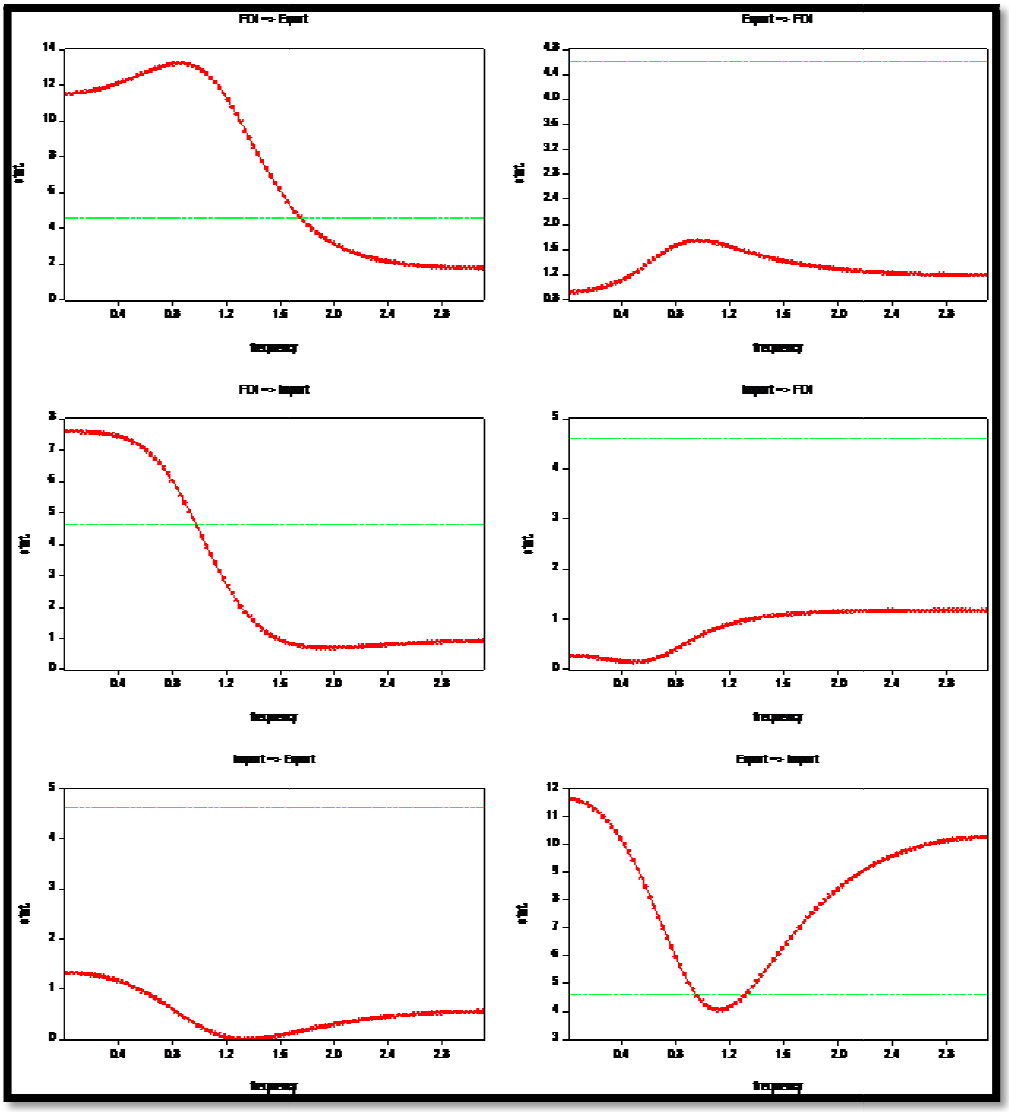

Figure 4: Breitung-Candelon Granger Causality
Source: Author's Computation, 2021

In interpreting the Breitung-Candelon test result in Figure 4 above, it should be noted that a lower frequency corresponds to a longer time span, and a higher frequency corresponds to a shorter time span. In another word, there is an inverse relationship between the time frequency and the spectral frequency and this can be converted using T= $2\pi/\acute{\omega}$, where T is the periods (yearly, daily, monthly etc.) and ώ is the spectral frequency which ranges from zero to π (3.142). For example, a frequency of 0.1 translates into 62 periods (may be months, quarters, or years depending on the frequency of data used). In addition, the null hypothesis of the Breitung-Candelon test is that one variable does not granger cause the other at any frequency. In the figure above, the green dashed line is the critical value while the red line is the dynamic movement of the test statistics. The decision is that the red line must be above or at least cut off the green line (the critical value) at some frequencies to granger cause the target variable. On the other hand, the test becomes insignificant if the red line falls below the green line (the critical value) and hence does not granger cause the target variable.

It can be deduced from Figure 4 that export and import do not granger cause foreign direct investment, and import does not granger cause export respectively at any frequency. However, the first figure in the first row shows that the foreign direct investment granger cause export at frequencies less than 1.73 (about 4years to a very long run). Also, the first figure in the second row shows that the foreign direct investment granger cause import at frequencies less than 0.98 (about 6years to a very long run). The second figure in the last row shows that export granger cause import both in the short-run and long run; however, in the medium-run, the red line falls below the critical value and hence does not granger cause it.

4.10. Summary of the Causality Test

The direction of causality was empirically investigated between trade and foreign direct investment and the role of oil price and exchange rate is taken into account exogenously in the testing procedure. Two different approaches of time and frequency domains are employed to uncover the direction or causality between the variables. The Johansen cointegrationtest confirm the presence of long-run relationship between foreign direct investment, export and import. The results from the two approaches almost agree with each other. In the time series domain, the VECM granger causality shows that none of the variables granger cause each other in the short-run. However, foreign direct investment is shown to be granger caused by export in the long-run. Also, foreign direct investment and export granger cause import in the long-run. In the frequency domain approach, the Breitung-Candelon causality test revealed that trade (both export and import) does not granger cause foreign direct investment neither in the short-medium run, nor in the long run. Just like in the time domain approach, the direction of causality among the trade variables is shown to run from the export towards the import in the short and long-run. The result also reveal that the foreign direct investment granger cause trade (both export and import) in the long run.

Comparing the two results, we conclude that there is unidirectional causality between FDI and import in the long run running from FDI to import because the two methods produced the same result, but there is bi-directional causality between FDI and export in the long-run. Also a unidirectional causality exist between Export and Import running from Export to import. This is in line with the outcome of the study of Renu Sharma and Mandeep Kaur, (2013) that there is unidirectional causality running from FDI to import in China. However, this result is contrary to the result of Mihaela (2014) which establishes only short run causality between FDI and exports and FDI and imports in the G7 countries and Pacheco and Lopez (2005) which identified a two-way causality relationship between import, export and FDI.

5. Conclusions and Recommendations

This study examined the causal relationship between Foreign Direct Investment (FDI) and International trade in Nigeria using the Data from 1970 to 2019. However, in order to achieve this, the following specific objectives were pursued;(i) examine the trend of Foreign Direct Investment and International Trade in Nigeria, and (ii) investigate the direction of causality between Foreign Direct Investment and International trade in Nigeria.

Some conceptual issues on FDI and International Trade were discussed as opined by various authors, while the theoretical issues as developed by various scholars overtime and their weaknesses were also discussed. The empirical literatures studied in both developed and developing countries revealed a varying direction of causality between FDI and International trade. Some stating that it is Foreign Direct investment that granger cause Foreign Trade (e.gMihaela (2014) and Renu and Mandeep (2013)), some concluded on unidirectional causality from foreign trade to FDI (e.gUgur and Harun (2016)), others concluded on two way causal relationship between the variables (e.g Pacheco-Lopez (2005)), but Alici and Ucal (2003) concluded that no relationship exist between the variables. All these conflicting results were due to different econometrics method used and the fact that the researches were country specific with different economic situations in those countries.

The model specification in this study was developed as necessitated by the objectives of the study. Cointegrated Vector Auto-Regressive (VECM) model was used to establish the Short Run dynamics and Long Run relationship among the variables, and the result shows that export and import have a significant impact on the foreign direct investment. If export increases by one percent, the average value of foreign direct investment goes up by 4.142% units in the long-run. Meanwhile, if import increases by one percent, the average value of foreign direct investment decreases by 3.269% units in the long-run. On the speed of adjustment coefficients towards the long-run path, that the error correction term for export is not statistically significant. As such, the contemporaneous change in foreign direct investment is below 18.3% (i.e. about 18.3% error is corrected within a year) of any deviation from the long-run foreign direct investment equilibrium. For import, contemporaneous change in it is below 13.9% (i.e. about 13.9% error is corrected within a year) of any deviation from the long-run foreign direct investment equilibrium**.** On the other hand, oil price contemporaneously

affect foreign direct investment, export, and import, whereas exchange rate contemporaneously affect only foreign direct investment and import. The result shows that oil price positively impact foreign direct investment, export and import in the short-run while exchange rate impact foreign direct investment positively but has negative impact on import in the short-run.

Granger causality test was perused in this study to achieve some set of objectives. We are able to deduce from the result that, FDI and Trade in Nigeria are complementary and not substitute. The complementarity between trade and FDI can be explained by the fact that most of the FDI coming in are vertical in nature, the parent company supplying input to its affiliate here or exporting part of their output to other countries for completion of manufacturing process which will later be imported back into the country. Examples of such multinationals in Nigeria are Coca-Cola Bottling Company PLC, Nigeria Brewery Plc, Cadbury Nigeria Plc, Shell Petroleum Plc, and most Pharmaceutical Companies in Nigeria.

6. Conclusion

Based on the findings from this study, we are able to conclude that, there is positive long-run relationship between foreign direct investment and export and a negative long-run relationship between foreign direct investment and import. Also, oil price positively affect the short-run dynamics of FDI, import and export respectively. Exchange rate has positive impact on foreign direct investment short-run dynamics and negative impact on import short-run dynamics. In addition, there is unidirectional causality between FDI and import in the long run running from FDI to import, but there is bi-directional causality between FDI and export in the long-run. Also a unidirectional causality exist between Export and Import running from Export to import.

This study therefore concluded that FDI in Nigeria is favourable, with the positive long run relationship between FDI and export and negative long run relationship between FDI and import, and therefore suggest that the Government should come up with policies that will help the inflow of FDI into the economy.

7. Recommendations

This topic has a considerable importance for practitioners, policy-makers and academic environment. Therefore, the following recommendations are worthwhile based on the findings of this study;

- The Government should come up with policies that will help the inflow of FDI into the economy.
- The Nigerian Government should embark on capital project aimed at enhancing the infrastructural facilities with which foreign investors can build on.
- Efforts must be made to manage the exchange rate through effective exchange rate management policy in as much it has negative effect on Export and Import in Nigeria.
- Another crucial area that needs much attention is the issue of insecurity that is currently affecting some parts of the country, thus requiring the government to review and implement a stronger and more vibrant policy to ensure maximum security and peace in the country and consequently attract more foreign investors.

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