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Foreign Direct Investment and Export Productivity: A Study of Nigerian Manufacturing Sector (1980 – 2015)

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ABSTRACT: *Manufacturing activities are considered to spur growth and development of the economy of a country, especially through export earnings. The potential notwithstanding, underfunded manufacturing sector is subject to sub-optimal productive capacity and thus cannot support sustainable economic growth and development processes. Hence, countries usually augment manufacturing sector funding through foreign direct investment (FDI). This paper examined the effects of FDI on export product productivity of the Nigeria's manufacturing sector during 1980-2015 periods. Variables of interest were total factor productivity (TFP), FDI in manufacturing (MFDI) activities, and manufactured products exports (MXPT). Data on the variables were obtained from Annual Statistical Bulletin of the Central Bank of Nigeria (CBN) and Statistical Abstracts of the National Bureau of Statistics (NBS). Based on a vector error correction mechanism (VECM) of multiple regression model, relevant econometric techniques were employed to analysed the perceived relationship between FDI and performance outcomes of the manufacturing sector. The results showed that FDI had significant positive effects on productivity of the sector, which in turn resulted to considerable levels of export products. The paper concluded that FDI spurred productivity of the sector. The paper emphasised the need for fostered bilateral and multilateral relations between Nigerian manufacturing sector and its foreign counterparts, enabling investment environment as well as FDI-oriented policies in order to engender manufacturing productivity and export product growth.*

Keywords*: Foreign direct investment, Productivity, Manufacturing export, Error correction mechanism, regression model.*

JEL Classification*: C22, C51, F21, F22, L60.*

I. INTRODUCTION

Many countries have identified foreign direct investment (FDI) as an important source of investment financing. Some developing countries use the investment financing to further stimulate competition potentials, develop new knowledge and improve managerial skills. Thus, through spillover effects, FDI induce productivity improvements. Foreign firms demonstrate new technologies, provide technological assistance to local suppliers and customers, and train workers who may subsequently move to local firms. Local firms can also learn by watching. Moreover, the presence of foreign-owned firms increases competition in the domestic market, with the tendency to spur local firms to adopt new technologies and operate more efficiently using new technologies. Essentially, domestic firms benefit from FDI-induced spillover effect (Kokko, 1994).

Spillover effects of FDI on manufacturing firms have been heterogeneous (Seers & Joy, 1971) as well as either horizontal (influence on firms in same sector or industry) or vertical (influence on firms in different sector or industry). These are usually owing to backward or forward trade linkages between foreign and domestic firms; when multinational companies (MNCs) source raw materials and intermediate products from domestic firms or enter into contract arrangements with the local firms. In either case, spillover effects are deemed to be of immense benefits to domestic firms and mechanism through which FDI promotes growth in receiving economies. These and other benefits have induced governments to foster FDI-oriented policies. Increasing flows of FDI across international borders have stimulated intensive debate, academic discourse and research into its role in receiving economies. Despite the increasing inflows into the developing countries in the last few decades, there seems to have been little evidence of productivity improvements. Some explain that the export-oriented countries could benefit more from such investments (Aitken & Harrison 1999) while others suggest that difference in absorption capacities matter for such spillovers.

Manufacturing transforms the economic structure of countries from simple, slow-growing and low-value activities to more productive outputs with potentials for technology-driven greater margins that translate to higher growth prospects (Adelegan, 2000). Technology-driven liberalisation and increased internationalisation of production have made manufacturing the viable alternative for the developing countries to benefit from globalisation and, ultimately, bridge the current income gap with the industrialised world. Experience of the Asian Tigers is worthy of emulation. For instance, 25% of South Korea's GNP derives from manufacturing industry which has recently broadened its scope to become very successful with high-tech manufacturing precision in the consumer electronics, multimedia computers, notebooks, aerospace and defense markets (Greenaway & Kneller, 2004). Manufacturing exports remain economic growth stimulant. The sector accounts for about 10% of Nigeria's annual gross domestic product (GDP) and 12% of formal sector labour force. The National Bureau of Statistics (NBS, 2013) explains that the Nigerian manufacturing sector currently contributes 8.25% of GDP and accounts for about 10 per cent of employment in the formal sector. However, Uzochukwu (2012) notes that the manufacturing sector at present cannot support economic development though it has great potential. Therefore, there is the need to examine FDI in relation to spillover effects on Nigerian economy in terms of total factor productivity and export products of the manufacturing sector.

This paper is structured into five sections. Section one is the introduction, section two is review of literature, the method employed is discussed in section three, data are analysed and results discussed in section four while conclusion and recommendations are the focus of section five.

II. LITERATURE REVIEW

2.1 Hindsight from Literature

In the literature, dual effects of FDI on economic growth and development have been documented. First are direct effect, which have been examined in terms of growths of investment volume, factors of production, resource mobilisation cum tax revenues, and trade which allows the receiving country to increase its import level without necessarily increasing export (Seers & Joy, 1971). Increased manufacturing productivity usually elevates export level of FDI-receiving country and most of the firms have expanded marketing channels and institutional links with their overseas counterparts. However, the benefits dwindle as a result of outflows of interest and profits unless there is a constant growth of new capital and reinvestments of profits. Second are the indirect effects have been analysed within the context of productivity, efficiency and competitiveness gains for domestic firms through technologies, skills and knowledge transfer (Kim, 1999; Blomstrom & Kokko, 2001; Odenthal, 2001; UNCTAD, 2005; and Chowdhury & Mavrotas, 2006). Available studies suggest that the extent of FDI spillovers in a domestic country depends on a number of factors such as foreign investment policy of multinational companies (MNCs), investment climate of the receiving country and diversity of the manufacturing sector in the FDI destination. Absorptive capacity and technological gap of the domestic firms are utmost importance. Absorptive capacity entails the ability to internalise knowledge created by others and modify it to fit domestic applications, processes and routines (Narula & Marin, 2003). Essentially, investing MNCs cash in on identified considerable technological gap between foreign and domestic firms. Low technological gap reduces benefits that can accrue to the domestic firms (Kokko, 1994). Size of FDI spillovers is dependent upon technological gap (Findlay, 1978; Jian-Ye, & Blomstorm, 1992; Balasubramanyam et al, 1996). One obvious factor that attracts FDI to developing countries is low labour wage rate. Foreign investors factor in the high wage differentials in their FDI decisions, though they pay relatively higher wages than domestic firms in order to avoid labour turnover (Lipsey & Sjoholm, 2004). FDI can provide new technology, training for staff and managers, and technical assistance to local suppliers. The positive effects on the domestic firms are improved productivity, competitiveness, efficiency and knowledge transfer (Kokko, 1994).

There has been a growing interest in firm-level data examination of the relationship between manufacturing and exports. Some studies have shown that FDI spillovers enhance manufacturing, increase productivity, exports and leads to economic growth in the US, Japan and other developed countries (Globerman, 1979; Borensztein et al., 1998; Okamoto 1999; Roberts & Tybout, 1997; Kalemli-Ozcan et al., 2003; Bernard & Jensen, 2004;). However, Borensztein et al. (1998) noted that productivity and growth-inducing effects of FDI depend on the amount of human capital available in the receiving country. Also, Okamoto (1999) explained that the FDI productivity effects on local firms are spurred by competitive pressures foreign-owned firms. Some other studies employed country-level data to explore the link between FDI-induced productivity and exports (Melitz, 2003; Bigsten & Soderbom 2004; Blalock & Gertler 2004; Kim, Lim & Park, 2005). However, Blalock & Gertler (2004) explain that causality may run in the opposite direction while Bigsten and Soderbom (2006) maintain that exports enhance productivity growth. Yet, Clerides, Lach & Tybout (1998) argue that only relatively efficient firms engage in exports, and that exports do not bring down unit production costs. The basic thrust of all these works is a unidirectional causality from productivity growth to exports. Bernard & Jensen (2004) found that for the U.S., firms with high productivity usually export their products, and exporting firms do not experience productivity and wage increases greater than those of non-exporting firms. On the other hand, a number of studies find either bidirectional causality or absence of causality between exports and productivity. For Korea, some studies support the export-led growth hypothesis whereas other studies either fail to find causality from growth to exports or find bi-directional causality. The evidence on the directional the causality between exports and growth in Korea is thus ambiguous at best, despite the widespread presumption of the validity of the export-led growth hypothesis.

In the literature, some evidence of FDI-spilled productivity and exports are also available for the developing countries. For example, Blomstrom & Kokko (2001) examined the differences in productivity growth between domestic and foreign firms in Mexican manufacturing industries during 1965-1984 periods. The results showed a convergence of productivity levels between local firms in Mexico and foreign-owned firms. Furthermore, productivity growth and catch-up rate of the firms to their foreign counterparts are positively related to the degree of foreign industry ownership. The results thus provide considerable support for positive spill-over effects from FDI. Similar results are valid for Venezuela though robust for small firms; FDI had a dominant negative effect on productivity growth of domestic firms when joint ventures plants without foreign investment are considered (Aitken & Harrison, 1999). Therefore, joint ventures seem to benefit more from foreign investment, thereby suggesting the need for less emphasis on spill-over effects of FDI. Other similar studies are Oyinlola (1995), for some less developed countries, Lawrence & Weinstein (1999) for Korea, Marc-Andreas (2004) for Brazil, Viroj (2007) for Sweden, Le Quoc (2008) and Pham (2008) for Vietnam.

Studies on FDI-manufacturing sector productivity and economic growth for Nigeria have produced varying evidences. Odozi (1995) examined FDI inflows into Nigeria in the pre and post structural adjustment programme (SAP) eras. The author found that macroeconomic policies in place before the SAP were discouraging foreign investors, with attendant proliferation and growth of parallel markets as well as sustained capital flight. Adejumo (2013) explored FDI-manufacturing value-added relationship in Nigeria during 1970-2009 periods. Ayanwale and Bamire (2001) assessed the influence of FD1 on firm level of productivity in Nigeria and found out that foreign firms have a positive effect on the productivity of domestic firms. Similarly, Anowor et al. (2013) employed econometric method on annual time data to examine FDI-manufacturing sector growth in Nigeria from 1970 to 2011. The study showed that FDI, domestic investment, exchange rate and the degree of trade openness were all related to manufacturing sector output growth in Nigeria. FDI, degree of trade openness, exchange rate and the lagged error term were statistically significant in explaining variations in Nigeria's manufacturing output growth.

2.2 Brief Overview of Performance of the Nigerian Manufacturing Sector

Perhaps owing to the complexities in constructing productivity index, there is little or no data on productivity levels in the Nigerian economy in general and the manufacturing sector in particular. Alao (2010) employed Error Correction Mechanism (ECM) to show that interest rate spread and exchange rates have negative effects on growth of the sector. Also, rising index of manufacturing is a reflection of high inflation, which cannot be taken as real growth in the sector. Further, liberalisation of the Nigerian economy promoted manufacturing growth between 1979 and 2008. Ad hoc studies done during 1989 indicated that, on the average, there was little rise in productivity (Akinlo, 1996). Similarly, Udo-Aka (1983) showed that for the food and basic metal industries, only 30% manufacturing respondents experienced rising productivity, about 11% recorded no growth and 57% (more than half of the respondents) recorded declining productivity levels. The Manufacturers Association of Nigeria (MAN) confirmed that the general trend in industry productivity was negative in 1989. Indications suggest that the situation has worsened since then.

Given the absence of productivity data for the sector, other performance indices such as manufacturing production annual growth rate, capacity utilization rate and the sector's share of gross domestic product (GDP) become alternative proxies. Based on these, sub-sector growth rate was relatively high during 1966-1975 at an annual average of 12.9%. This reflected the importance which the government attached to manufacturing activities and the adoption of import substitution industrialisation strategy from independence which resulted in the establishment of many consumer goods industries like soft drinks, cement, paints, soap and detergents. Growth in the sector expanded in the period 1976-1985 with the establishment of more important substitution industries, with an annual average growth of 18.5%. The oil boom of the era, which provided enough foreign exchange for importation of needed raw material inputs, spare parts and machinery, provided the impetus for the phenomenal growth. However, with the collapse of the world oil market from early 1980s and the attendant drastically reduced foreign exchange earning capacity, the sub-sectors were no longer able to import needed inputs. Hence, manufacturing output growth fell drastically to an annual average of about 2.6% during the 1986-1998 periods, even with the introduction of SAP in 1986. Growth was negative during the period 1993-1998 periods. The same downward trend was recorded for capacity utilisation growth rate, which fell from annual average of 53.6% during the 1981-1985 years to 41.1%, 35.4% and 31.8% during 1986-1990, 1991-1995 and 1996-1998 periods. However, increase to 40.42 was recorded between 1999 and 2003. Share of sector in GDP fell persistently from 9.2% in 1981-1985 to 8.3% for 1986-1990, 7.5% and 6.3% during 1996-1998 (CBN, 2003). Obviously, these indicated falling manufacturing productivity which was expected to be at least 8% in order to put the sector on the path of recovery.

III. METHODOLOGY

3.1 Design, Data and Sources

The paper employed time series data on vector error correction mechanism (VCEM) and multiple linear regression model. Variables of interest are manufacturing sector share of foreign direct investment (MSSFDI), total factor productivity (TFP) and manufacture product exports (MPEX). TFP entered the model as response variable, while MSSFDI and MPEX were the causal variables. The model expressed TFP in relation to MSSFDI and MPEX, riding on the proposition that foreign direct investment did not significantly enhance productivity of the manufacturing sector as well as manufactured product exports during the period under study. Secondary data were used for the analysis. The data were extracted from Abstract of Statistics published by the National Bureau of Statistics (NBS) and Statistical Bulletin published by the Central Bank of Nigeria (CBN). Owing to availability, the data sets span 1980-2015 periods.

3.2 Model for the Analysis

Based on econometric principles, we modified the model used by Kalemli-Ozcan et al. (2003) and specified it as follows:

$$\boldsymbol{TFP = \lambda_o + \lambda_1 MSSFDI_t + \lambda_2 MPEX_t + \mu_t}$$

where TFP, MSSFDI and MPEX are as defined above; λ_1, λ_2 and λ_3 are model parameters to be estimated and evaluated. is the model intercept, and λ_1 and λ_2 are response coefficients of MSSFDI and MPEX vectors, respectively. μ is vector of disturbance variables. The model comes with a caveat that interest/banks' lending rate (cost of capital) is neutral since FDI are not subject to banks' lending rates. *t* is the descriptor for the time periods (years).

Further, VECM version of the model is considered in order to capture the short-run dynamics and speed in long-run convergence adjustment in the time series data sets. The data sets were subjected to stationarity tests using the Augmented Dickey and Fuller (1981) and Ng-Perron procedure in which the existence of null hypothesis for unit roots were examined baseλ_0d on two test equations models, namely: (1) intercept (2) intercept and trend. Further, Juselius maximum likelihood method of co-integration was employed to obtain the number of co-integrating vector(s). Since result of the test showed at least one co-integration relationship, VECM, a restricted form of VAR, was adopted. The VECM is specified as follows:

$$\Delta Zi = \Gamma 1\Delta Zi\text{-}1 + \Gamma 2\Delta Zi\text{-}2 + ... + \Gamma k\text{-}1\Delta Zi\text{-}k\text{-}1 + \prod Zi\text{-}1 + ui \text{ ……… (1)}$$

$$\Gamma_i = (I - A_1 - A_2 - \ldots\ldots - A_k) \text{ ………………………………………….. (2)}$$

$$(I = 1, 2, \ldots., k - 1)$$

$$\prod = -(I - A_1 - A_2 - \ldots\ldots - A_k) \text{ …………………………………………. (3)}$$

$$Z_t=(Y_{1t}, Y_{2t}, Y_{3t}\ Y_{4t}\ Y_{5t})$$

The error correction term $\prod Z_{t-p}$ is the only difference between equation (3) and a standard VAR. The VECM equation contains information on both the short-run and the long-run adjustment to changes in X_t through the estimates of Γ_t and $\prod$ respectively. The transformation of a VECM model for *I (1)* variables into equation is a co-integrating transformation. $\prod$ is a 5 x 5 matrix that contains information about the long-run relationships among the variables in the system. The non-stationary component can also be factorised to test the null hypothesis of reduced rank or equivalently, the number of co-integrating relationships. That is, H_o: $\prod = \alpha\lambda^I$. If rank($\prod$) = $r < n$, then there are matrices λ^I and α of dimension *nxr* such that H_o: $\prod = \alpha\lambda$ and there are V co-integrating relations among the elements of $\lambda^I X_t$. Matrix λ^I is interpreted as a matrix of co-integration vectors and has the property that elements in $\lambda^I X_t$ are stationary even though X_t is non-stationary. On the other hand, the elements of α indicate the speed of adjustment of a particular variables with respect to a disturbance in the equilibrium relation. However, $\lambda^I X_{t-1}$ is equivalent to the error term. X_t is a vector of non-stationary variables; change in X_{t-1} is 1(0) and $\prod X_{t-1}$ is I(0) so that u_t can be I(0), hence given a well behaved system. The econometric analysis was in three steps, namely: (1) the data sets were subjected stationarity test using Augmented Dickey Fuller (ADF. Dickey and Fuller, 1981) and Ng-P (Ng and Perron, 1995) procedures; (2) testing for the existence of co-integrating relation among the variables. The null hypothesis of *'r'* co-integrating vectors, i.e., H_0(r): rank

(∏) ≤ *r* is tested using Johansen (1998) multivariate cointegrating test. The choice of Johansen cointegration procedure over Engle and Granger technique is because of its greater power to identify cointegration and also evaluate multiple cointegration vectors (Adams & Chadha, 1991 & Ericsson, 1992). However, the number of cointegrating vectors was determined by the maximum Eigenvalue and Trace statistics. Lag length selection test was conducted to ascertain the maximum lag length required for the Co-integration test as well as the Vector Error Correction Model. The Schwarz Information Criterion was adopted, and it indicated two lags for the maximum lag length. (3) estimating the VECM.

IV. ANALYSIS, RESULTS AND DISCUSSION

4.1 Descriptive Statistics

Results of the descriptive statistical analysis of the data on the variables TFP, MSSFDI and MPEX are shown in Table 4.1. MSSFDI and MPEX were transformed into logarithmic form.

Table 4.1: Descriptive Statistics

	Mean	Max.	Min.	Std. Dev.	Jaque-Berra	Prob.	Observations
TFP	0.4178	0.4913	0.3561	0.0433	1.9220	0.3825	36
LnMSSFDI	13.1821	20.5656	8.7545	0.5882	4.1218	0.1273	36
LnMPEX	10.8478	13.0924	8.0894	0.6570	1.5734	0.4553	36

Source: Author's Computation (2016)

As shown in the table, TFP values ranged from minimum of 0.3561 to maximum of 0.4913, with mean value of 0.4178 and standard deviation of 0.0433. The standard deviation, 0.0433, shows moderate spread or fluctuations in from the TFP time series mean value during the 36-year period. Descriptive statistic values of MSSFDI during the period were mean 13.1821, maximum 20.5656, minimum 8.7545 and standard deviation 0.5882. This shows that the logarithmically transformed values of manufacturing sector share of gross domestic product ranged from minimum 8.7545 minimum to 20.5656 maximum during the period. The standard deviation of 0.5882 shows moderately high spread or fluctuations from time series mean value of MSSFDI during the period. Descriptive statistic values for MPEX during the period were mean 10.8478, maximum 13.0924, minimum 8.0894 and standard deviation 0.6570. These shows transformed values that ranged from 8.0894 minimum to 13.0924. The standard deviation, 0.6570, shows considerably high spread or fluctuations from the mean of MPEX time series values during the 36-year period. The Jarque-Bera statistic with associated probability shows that the residual of each of the variables in the data sets was normally distributed. Null hypothesis for the test is that the residual of the series is normally distributed. Considering the conventional 1% (0.01), 5% (0.05) and 10% (0.10) levels in statistical econometrics, each computed p-value (0.3825, 0.1273 and 0.4553) of the Jarque-Bera statistic (1.9220, 4.1218 and 1.5734) employed for normal distribution test exceeded the conventional threshold values 0.01, 0.05 and 0.10. Therefore, the null hypothesis is accepted.

4.2 Correlations Matrix

Partial and cross-partial correlation coefficients of the variables data sets are show in Table 4.2.

Table 4.2: Partial and Cross-Partial Correlation Coefficients

	TFP	MSSFDI	MPEX
TFP	1.0000	0.6713	0.7713
MSSFDI	0.6713	1.0000	0.8640
MPEX	0.7713	0.8640	1.0000

Source: Author's Computation (2016)

The correlation results show that each of MSSFDI and MPEX is positively correlated with TFP. These indicate existence of high positive relationship (0.6713 and 0.7713) between manufacturing sector productivity (TFP as proxy) and manufacturing sector share of gross domestic product (MSSGDP) and manufacturing product exports (MPEX), respectively. The partial correlation coefficient (0.8640) indicates high degree of correlation between the causal variables, MSSFDI and MPEX. This implies that manufacturing sector product exports increase as more foreign direct investment inflows into the sector increases. This is expected and therefore, within the context of this analysis, is not seen as serial multicollinearity issue. That is, MSSFDI and MPEX ought not to be relatively independent of each other in real life finance, investment, export trade and economic experience.

4.3 Unit Root Tests

Results of unit root test at level and intercept for data sets of the variables are show in tables 4.3 and 4.4.

Table 4.3: Unit Root Test Results at Level: Intercept

	ADF statistic			Ng-Peron statistic	
	ADF	5%	p-value	Ng-Peron	5%
TFP	-1.8073	-2.9919	0.3681	-3.4948	-8.1000
MSSFDI	-1.4906	-2.9919	0.5211	-4.0705	-8.1000
MPEX	1.3018	-2.9919	0.9978	-0.9421	-8.1000

Source: Author's Computation (2016)

Table 4.4: Unit Root Test Results at Level: Trend and Intercept

	ADF statistic			Ng-Peron statistic	
	ADF	5%	p-value	Ng-Peron	5%
TFP	-5.2000	-3.6122	0.0017	-5.1542	-17.3000
MSSFDI	-2.7133	-3.6122	0.2402	-8.5816	-17.3000
MPEX	-1.7274	-3.6122	0.7058	-5.6729	-17.3000

Source: Author's Computation (2016)

The results indicate that the variables were not stationary. That is, the variables were trended meaning that there is a violation of the assumption that the mean value of error term is zero and the variance is constant. This makes the use of Ordinary Least Squares (OLS) inappropriate.

Table 4.5: Unit Root Test Results at First Difference: Intercept

	ADF statistic			Ng-Peron statistic		
	ADF	5%	p-value	Ng-Peron	5%	Order
TFP	-6.8000	-2.9981	0.0000	-1.7303	-8.1000	*I(1)*
MSSFDI	-6.7175	-2.9981	0.0000	-7.9553	-8.1000	*I(1)*
MPEX	-2.8287	-2.9981	0.0698	-8.8868	-8.1000	*I(1)*

Source: Author's Computation (2016)

Table 4.6: Unit Root Test Results at First Difference: Trend and Intercept

Variable	ADF statistic			Ng-Peron statistic		
	ADF	5%	p-value	Ng-Peron	5%	Order
TFP	-6.4788	-3.6220	0.0001	-8.1814	-17.3000	*I(1)*
MSSFDI	-3.8501	-3.6908	0.0376	-9.9478	-17.3000	*I(1)*
MPEX	-3.0268	-3.6220	0.1466	-10.3023	-17.3000	*I(1)*

Source: Author's Computation (2016)

The results in tables 4.5 and 4.6 show that time series values of the variables became stationary at first difference, with all p-values below 5% significance level. That is TFP is *I(1)*, MSSFDI is *I(1)* and MPEX is *I(1)*.

4.4 Lag-Length Selection

Lag-length selection results of the data variable sets are shown in tables 4.7.

Table 4.7: VAR Lag Selection Results: VAR Lag Order Selection Criteria

Endogenous variable: TFP
Exogenous variables: MSSFDI MEXP C
Included observations: 34

Lag	LogL	LR	FPE	AIC	SIC	HQIC
0	-715.7908	NA	2.80e-23	62.5034	62.6517	62.5408
1	-663.1445	86.9809*	6.37e+21*	58.7082*	59.3007*	58.8572*
7	-659.0963	5.6322	1.03e+22	59.1388	60.1756	59.3996

*indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion
SIC: Schwarz information criterion; HQIC: Hannan-Quinn information criterion
Source: Author's Computation (2016)

4.5 Co-integration Test Results

Since all the variables have the same order of integration, I(1), and the Schwartz information criterion indicated maximum of two lags, the next step is to determine whether the variables are co-integrated. Johansen-

Juselius maximum likelihood method of co-integration was employed for the test. If the model is co-integrated, Vector Auto-regressive (VAR) model is used. Otherwise, unrestricted model is used. The implication of the variables being co-integrated is that all share common stochastic trend and grow proportionately and, thus, a long-run relationship exists among the variables. The results are shown in tables 4.8 and 4.9. ** Lag-length selection results of the data variable sets are shown in tables 4.7. the unit root test at level and intercept for data sets of the variables are show in Table 4.3.

Table 4.8: Unrestricted Co-integration Rank Tests Results (Trace)

Hypothesised No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.2485	38.8183	29.7971	0.0245
At Most 1	0.3997	11.3237	15.4947	0.1924
At Most 2	0.0043	0.0950	3.8415	0.7579

Trace Test indicates 1 co-integrating eqn(s) at the 0.05 level
*Denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug-Michelis (1999) p-values
Source: Author's Computation (2016)

For the unrestricted co-integration rank test (trace), H_0 is rejected given the "No Co-integration Equation" (CE), while we did not reject the H_0 on "At most I CE". The Trace test indicates one co-integrating equation (CE) at 0.05 level.

Table 4.9: Unrestricted Co-integration Rank Tests Results (Maximum Eigenvalue)

Hypothesised No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.5485	17.4947	21.1316	0.0439
At Most 1	0.3997	11.2289	14.2646	0.1431
At Most 2	0.0043	0.0947	3.8415	0.7579

Max-eigenvalue test indicates 1 co-integrating eqn(s) at the 0.05 level
*Denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug-Michelis (1999) p-values
Source: Author's Computation (2016)

For unrestricted co-integration rank test (Maximum Eigenvalue), the *H0* on "No Co-integration Equation" (CE) is rejected, but accepted for "At most 1 CEs". The Maximum Eigenvalue test indicates 1 CEs at 0.05 level. Other ways to conclude on this test would be to follow the number of CEs determined or to identify the number of rejections (*) from both tests. Equal number of CEs or equal number of rejections supports for VECM while unequal number of CEs or rejections supports VAR. It is deduced that the variables do have a stochastic trend, and there exists a long run relationship and, thus, the use of VECM technique is justified.

4.6 Estimation of VECM Results

After establishing long-run relationship among the variables, the VECM is estimated. Results of the estimation are shown in Table 4.10.

Table 4.10: Results of Estimated VECM M

Table 4.10: VECM Estimation Results

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.5735*	0.2189	2.6197	0.0186
C(2)	-0.1216	0.1501	-0.8098	0.4299
C(3)	4.59E-12	3.91E-11	0.1174	0.9080
C(4)	-3.65E-11	3.55E-11	-1.0268	0.1980
C(5)	2.86E-07	2.10E-07	1.3580	0.1933
C(6)	-1.29E-07	1.88E-07	-0.6870	0.5019
C(7)	0.2109*	0.0870	2.4263	0.0275
R-squared	0.8577	Mean dependent variable	0.4178	
Adjusted R-squared	0.8043	S. D. dependent variable	0.0433	
Log Likelihood	62.5129	Akaike info criterion	-4.8272	
F-statistic	16.0734	Schwarz criterion	-4.4816	
Prob(F-statistic)	0.0000	Hannan-Quinn criterion	-4.7403	

**Significant at the 5% level*
Source: Author's Computation (2016)

From the VECM result, The significant negative value of the coefficient (-0.5735) of the Cointeq(1) of the VECM result shows that the variables are co-integrated in the long-run and, thus, re-enforces the Johansen co-integration result that there exists a co-integrating relationship among the variables. It is also a measure of speed of adjustment to long-run equilibrium from short-run disequilibrium. The magnitude of the error term indicates that 3.2% of the deviation from long run equilibrium is corrected in the first quarter. On the aggregate, the estimation results provide empirical evidence that FDI inflows to the manufacturing sector and exports considerably enhanced productivity of the manufacturing industry during the period, as indicated by the F-statistic value of 16.0734 with its associated probability of 0.0000 which is less than the threshold level for statistical significance (p-value 0.000 < 0.05). Further, foreign direct investment and manufacture product exports exhibited very high power (adjusted R-squared = 0.8043) in explaining total variations in productivity of the sector during the period. This supports kalemli-Ozcan’s (2003) finding that FDI convey great advantages to host countries, and that the benefits can vary greatly across sectors, but that the effect of FDI on productivity in the manufacturing sector is a positive one. Hence, productivity in the manufacturing sector serves a positive signaling effect of production efficiencies thereby attracting inward FDI into the sector and ultimately enhancing production of export products. This finding also lends credence to Viroj (2007). However, the finding is at variance with the study by Kim, Lim & Park (2005) which found no significant positive effect of TFP on export.

V. CONCLUSION AND RECOMMENDATIONS

This paper considered FDI in relation manufacturing sector productivity and manufacture product exports.

From the analysis and results thereof, this paper concludes that foreign direct investment inflows to manufacturing sector of the Nigerian economy enhanced productivity and export products. It is also obvious that there are significant short-run and long-run relationships between foreign direct investment and manufacturing sector productivity which induce great potentials for exports of manufactured products. Consequently, the paper underscores the need for firms in the Nigerian manufacturing sector to ensure that foreign direct investment inflows into the sector and deployed to processes that enhance sustained productivity and ultimately the production of export products. Firms in the sector should also engage in mutual bilateral and multilateral relationships with stronger foreign firms in order to attract more financial resources, tap deeper into their production processes and techniques. The firms should negotiate with their foreign counterparts for technology, skills and knowledge transfers via mutual bilateral and bilateral arrangements for enhanced productivity and export product-oriented activities. In addition to export-oriented product activities, the firms should tap into the value chain management prowess of their well-established foreign manufacturing companies for beneficial export management practices. The effects of FDI on productivity and export products of other sectors in the Nigerian economy such as the hospitality, services, and solid minerals industries can be examined as an extension of the current research effort.

REFERENCES

[1.] Adams, C. and Chadha, B. (1991). Structural Models of the Dollar. International Monetary Fund Staff Papers No. 38, pp. 525-559.

[2.] Adejumo, A. V. (2013). Foreign Direct Investment and Growth in Nigeria: An Empirical Investigation. *Journal of Policy Modeling*, Vol 27, pp. 401-413.

[3.] Adelegan, J. O. (2000). Foreign Direct Investment and Economic Growth in Nigeria: A Seemingly Unrelated Model. *African Review of Money, Finance and Banking, Supplementary issue of “Savings and Development*, pp. 401-413.

[4.] Aitken, B. J., & Harrison, A.E. (1999). Do Domestic Firms Benefit from Direct Foreign Investment?: Evidence from Venezula. *American Economic Review*, Vol. 89 No. 3, pp. 605-618

[5.] Akinlo, E. A. (1996). Improving the Performance of the Nigerian Manufacturing Sub-Sector after Adjustment. *The Nigerian Journal of Economic and Social Studies*, Vol. 5, pp. 1-23

[6.] Alao, R. O. (2010). Productivity in the Nigerian Manufacturing Sub Sector: Error Correction Model (ECM).

[7.] *European Journal of* Economics, Finance and Administrative Sciences. Issue 20, pp. 25-34.

[8.] Anowor, O. F., Ukweni, N. O., Ibiam, F. O. & Ezekwem, O. S. (2013). Foreign Direct Investment and Manufacturing Sector Growth in Nigeria. *International Journal of Advanced Scientific and Technical Research*, Vol. 3 No. 5, pp. 231-254.

[9.] Ayanwale, A. B. & Bamire, A. S. (2001). The Influence of FDI on Firm-Level Productivity of Nigeria’s Agro/Agro-Allied. Final Report Presented to the African Economics, University of Ibadan: Ibadan.

[10.] Balasubramanyam, V. N., Salisu, M. A., Sapsford, D. (1996). Foreign Direct Investment and Growth in EP and IS Countries. *Economic Journal*, Vol. 106, pp. 92-105.
[11.] Bernard A. & Jensen, J. (2004). Exceptional Exporter Performance: Cause, Effect or Both? *Journal of international Economics*, pp. 47:1-26
[12.] Bigsten, A & Soderbom, M (2006). What have we Learned from a Decade Manufacturing Enterprise Surveys in Africa? *The World Bank research observer*, Vol. 21 No. 21, pp. 241-265
[13.] Blalock, G. & Gertler, P. (2004). Welfare Gains from Foreign Direct Investment through Technology Transfer to Local Suppliers. Unpublished manuscript, Cornellc University.
[14.] Blomstrom, M. & Kokko, A., (2001). Foreign Direct Investment and Spillovers of Technology. *International Journal of Technology Management*, Vol. 22, pp. 435-454.
[15.] Borensztein, E., J. De Gregorio, J. & Lee, J-W. (1998). How does FDI affect Economic Growth? *Journal of International Economics*, Vol. 45 No. 1, pp. 115-135.
[16.] CBN (2003). Annual Report and Accounts. Central Bank of Nigeria, Abuja.
[17.] Chowdhury, A. and Mavrotas, G (2006). FDI and Growth: What Causes What? *The World Economy*, Vol. 29, pp. 9-
[18.] 19
[19.] Clerides, S., Lach, S. and J. Tybout (1998), "Is Learning by Exporting Important? Micro-Dynamic Evidence from Colombia, Mexico and Morocco," Quarterly *Journal of Economics*, Vol. 103, pp. 903-947.
[20.] Dickey, D. A. & Fuller, W. A. (1981). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Econometrica*, Vol. 49, pp. 1057-1072.
[21.] Ericsson, N. R. (1992). Cointegration, Exogeneity and Policy Analysis: An Overview. *Journal of Policy*
[22.] *Modeling*, Vol. 14, pp. 251-280.
[23.] Findlay, R. (1978). Relative Backwardness, Direct Foreign Investment, and the Transfer of Technology: A Simple Dynamic Model. *The Quarterly Journal of Economics*, Vol. XCII No. 1, February, pp. 1-16.
[24.] Globerman, S. (1979). Foreign Direct Investment and Spillover Efficiency Benefits in Canadian Manufacturing Industries. *Canadian Journal of Economics*, Vol. 12, pp. 42- 56.
[25.] Greenway, D., & Kneller, R. (2004). Industry Differences in the Effect of Export Market Entry: Learning by Exporting? Paper for the Leverhulme Trust under Progamme Grants\ F114/BF.
[26.] Jian-Ye, W. & Blomstrom, M. (1992). Foreign Investment and Technology and Technology
[27.] Transfer: A Simple Model, *European Economic Review*, 36, pp. 137-155.
[28.] Kalemli-Ozcan, S., Alfaro, L., Chanda, A., & Sayek, S. (2003). FDI and Economic Growth: The Role of Local Financial Markets, *Journal of International Economics*, February 2003.
[29.] Kim, J. D. (1999). Inward Foreign Direct Investment Regime and some Evidence of Spillover
[30.] Effects in Korea. KIEP.
[31.] Kim, S., Lim, H. & Park, D. (2005). The Effect of Imports and Exports on Total Factor Productivity in Korea. RIETI Discussion Paper Series 07-E-022, The Research Institute of Economy, Trade and Industry.
[32.] Kokko, A., (1994). Technology, Markets Characteristics, and Spillovers. *Journal of Development Economics*, Vol. 43, pp. 279-293.
[33.] Lawrence, R. Z. & Weinstein, D. E. (1999). Trade and Growth: Import-led or Export-led? Evidence from Japan and Korea". NBER Working Papers No. 7264
[34.] Le Quoc H. (2008). Technology Spillovers from Foreign Direct Investment in Vietnam: Horizontal or Vertical Spillovers. Vietnam Development Forum, Hanoi, Vietnam. http://www.vdf.org.vn/workingpapers/vdfwp085.pdf. Accessed on 2 August 2016.
[35.] Lipsey, R and F. Sjoholm (2004), "Foreign Direct Investment, Education and wages in Indonesian Manufacturing. *Journal of Development Economics*, Vol. 73, pp. 415-422.
[36.] Melitz, B. O. (2003). Export Performance and the Role of Foreign Direct Investment. London School of Economic and Social Studies, Vol. 66, pp. 26-68.
[37.] Marc-Andreas, M. (2004). "Trade, Technology and Productivity: A Study of Brazilian Manufacturers 1986-98, CESIFO Working Paper No.1148.
[38.] Narula, R. & Martin, A (2003). FDI Spillovers, Absorptive Capacities and Human Capital
[39.] Development: Evidence from Argentina. *MERIT Research Memorandum*, 2003-016.
[40.] National Bureau of Statistics (2013). Statistical Abstract.
[41.] www.nbs.go.tz/nbs/.../Statistical%20Abstract%20Report%202013.pdf. Accessed on 2 August 2016.
[42.] Odenthal, N. (2001). FDI in Sub-Saharan African, OECD Economic Development in Africa: Rethinking the Role of

[43.] Foreign Direct Investment. United Nations Publications.
[44.] Odozi, V. A. (1995). An Overview of Foreign Investment in Nigeria 1960-1995. Occasional Paper No. 11. Research Department, Central Bank of Nigeria.
[45.] Okamoto, Y. (1999). Multinationals, Production Efficiency, and Spillover Effects: The Case of the US Auto Parts Industry. *Weltwirtschaftliches Archiv*, Vol. 135 No. 2, pp. 241-60.
[46.] Oyinlola, O. (1995). "External Capital and Economic Development in Nigeria (1970-1991). *The Nigerian Journal of Economic and social studies*, Vol. 37 Nos. 23, pp. 2005-22.
[47.] Pham, X. K. (2008). The Impact of Foreign Direct Investment on the Labour Productivity in Host Countries: The Case of Vietnam. Vietnam Development Forum, Hanoi, Vietnam. http://www.vdf.org.vn/workingpapers/vdfwp0814.pdf. Accessed on 2 August 2016.
[48.] Roberts, M. J. & Tybout, R. J. (1997). The Decision to Export in Columbia: An Empirical Model of Entry with Sunk Costs. *American Economic* Review, Vol. 87 No. 4, pp. 545-564.
[49.] Seers, D & Joy, L. (1971). Development in a Divided World. Penguin.
[50.] Udo-Aka, U. (1983). Measuring Productivity: Issues and Problems in Productivity in Nigeria. In A. M. Osoba (ed.), *Proceedings of a National Conference*, organised by PPIPB and NISER.
[51.] UNCTAD (2005). Economic Development in Africa: Rethinking the Role of Foreign Direct Investment. United Nations Publications.
[52.] Uzochukwu, A. (2012). Manufactured Exports in Sub-Saharan African Economies: Econometric Hypothesis. *American International Journal of Contemporary Research*, Vol. 2 No. 4
[53.] Viroj, J. (2007). Effects of Productivity and Import on Firm-Level Export. Ratio Working Paper N0. 225. The Ratio Institute, Stockholm, Sweden.