A REVISIT OF THE EXPORT-LED GROWTH HYPOTHESIS IN NIGERIA: IS FDI AN ALLY OR A FOE?

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Abstract: The export-led growth hypothesis (ELGH) took the centre stage of global economic discourse in the late 1970s when it began to overshadow import substitution as the dominant development policy paradigm at the time. This was reinforced in the 1980s by globalisation, which magnified global interconnectedness via the trade, finance and investment channels. Consequently, the role of FDI towards export-driven growth has remained a contentious issue. In addition to extending the data span and consideration of structural breaks, this paper also departs from previous studies by taking into cognisance oil and non-oil exports and FDI. Predicated on the neoclassical growth model, this study assessed the role of oil and non-oil FDI in the ELGH in Nigeria between 1970 and 2013. Findings reveal the existence of a long-run relationship between exports, growth and FDI in Nigeria. While the causality test show that oil and non-oil FDI play a role in the ELGH through the income channel, impulse response function indicate that both income as well as oil and non-oil export respond positively to changes in oil and non-oil FDI. The paper concludes that measures to enhance non-oil FDI to non-oil export-oriented sectors may be used to complement export promotion policy.

JEL Classification: F14, O40, F21

Keywords: Exports, Growth, Foreign direct investment

1. INTRODUCTION

Export-led growth is a development strategy aimed at expanding domestic output with a view to exploring foreign markets. Export is expected to stimulate growth and this transmission may be influenced by foreign direct investment (FDI). This is because FDI can serve as a vehicle for technology transfer and knowledge spill over from foreign to domestic firms (Grossman and Helpman, 1995; Barro and Sala-i-Martin, 1995). However when such FDI is skewed towards a particular sector, such as oil and gas, its effectiveness is dampened. Notably, Nigeria's oil sector attracted 90% of the FDI inflow (Olayiwola and Okodua, 2013, p. 1480). Therefore, for a small open monoculture economy characterised by investment and foreign exchange gap, the

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role of FDI towards export-driven growth cannot be downplayed particularly in view of government's export promotion drive which, has been at the forefront of economic reforms over the years.

The last three decades witnessed rapid diffusion of the Export-Led Growth Hypothesis (ELGH) following its successful implementation by the East Asian tigers- South Korea, Taiwan, Hong Kong, and Singapore. However, emerging realities such as changing demand and supply conditions in global capital and product markets suggest that other factors may influence this development model. In addition, the emergence of large multinational corporations and their quest to create global production zones in which they could establish export production platforms (Palley, 2011) at minimal cost has further magnified the role of FDIs in the ELGH. However, exogenous factors such as structural breaks and exchange rate fluctuations that have been ignored in previous studies may influence the ELGH-FDI hypothesis. In addition, the hypothesis may be affected by domestic and external disturbances such as oil price shocks, structural adjustment programme (SAP), shift from military to democratic system of governance and global economic recession. The vulnerability of the Nigerian economy to these shocks makes it imperative to re-examine this nexus by taking this issues into account.

Export promotion policy as an industrialisation policy has since the 1970s been pursued in Nigeria. During the 1980s, it was complemented by a number of economic reform measures such as liberalization of the foreign exchange market, pursuit of freer trade, promotion of FDIs, industrial development programmes amongst others in a bid to exploit the country's comparative advantage in global markets. Recent evidence reveals that between 2010-2013, the economy has grown at average of 6% per annum while total exports increased to N17.8 billion up from N7.5 billion recorded for the 2005-2009 period. In the same vein, FDI increased marginally from N6.52 billion in the 2005-2009 period to N6.90 billion in the 2010-2013 period.[2] This lopsided development implies that an examination of the role of FDI within the context of the ELGH could serve as valuable input towards the formulation of trade and investment policies in Nigeria.

Although a number of studies have made attempts to assess the validity of the ELGH (See Ekpo and Egwaikhide, 1994; Awokuse, 2003; Abu-Quarn and Abu-Bader, 2004; Kareem, 2005 and 2008, Arodoye and Iyoha, 2014; etc), they ignored the role of FDI. However, few studies have considered FDI (See Sharma, 2000 for India; Babalola, Dogon-Daji and Saka, 2014 for Nigeria; Yao (2006) for Chinese provinces; Ahmad, Alam and Butt, 2003 for Pakistan, Olayiwola and Okodua, 2013 for Nigeria amongst others). Notably, these studies are deficient in three important aspects: (i) they ignored the role of structural breaks; (ii) they pay no attention to the fact that the effect of oil and non-oil FDI on oil and non-oil ELGH may differ; and (iii) they were oblivious to the impact of exchange rate fluctuations which, has been shown to be a significant determinant of FDI and exports at the aggregate and disaggregated level in Nigeria. It is expected that these changes will shed more light and provide new insights in terms of the FDI-ELGH linkage.

Nigeria has witnessed significant structural shifts induced by oil price shocks in 1970, structural adjustment programme (SAP) in 1986, change from military to democratic system of governance in 1999 and global economic slowdown in 2008. Failure to account for such breaks

may create significant divergence in the time series data leading to biased estimates (Shuaibu and Adebare, 2013). Likewise inferences drawn from the analysis of highly aggregated FDI and export data may be misleading because the effect of oil and non-oil FDI inflows on the ELGH may be different. The literatures suggest that exchange rate can serves as an important stimulant of FDI inflows.[3] This is particularly true in Nigeria where the elasticity FDI and export to exchange rate changes is high. For example, Yang (2008) notes that real exchange rate serves as a good candidate to distinguish between export-driven growth and growth-driven exports.[4] In addition, currency movements affect FDI by altering the relative wealth of firms across countries as a real depreciation favours foreign buyers of domestic assets and is associated with an increase in FDI inflows, while the converse is the case for a real appreciation (Klein and Rosengren, 1992).[5]

The need to account for oil and non-oil FDI, exchange rate fluctuation and structural breaks in the bivariate ELGH framework for Nigeria cannot be downplayed. This is because FDI plays a vital role not only towards stimulating economic growth but indirectly through technology transfer and knowledge spill over to domestic industries which in turn increases output and export. At the same time, exchange rate fluctuations may influence the decision of investors and exporters while structural changes may distort the long run relationship. The study makes use of Johansen co integration test to analyse the long run relationship between the variables whereas the Toda and Yamamoto (1995) Vector Autoregression (VAR)-based MWALD Granger non-causality test is used to assess the causal linkage between the variables in the ELGH. The Toda-Yomamoto procedure is applicable regardless of whether a series is $I(0)$ or $I(1)$; co integrated or not co integrated. This implies that it avoids the potential bias associated with unit root and co integration tests (see Rambaldi and Doran, 1996). In addition, the study departs from others in that it uses more recent data span (1970-2013).

It is against this background that this study seeks to assess the role of FDI in the ELGH by considering a multivariate framework and accounting for exogenous structural breaks. Following this brief introduction, Section 2 provides a background of the study while methodological issues are discussed in Section 4. Section 5 is the empirical analysis and Section 6 concludes, highlighting the implications for policy.

2. PROFILE OF EXPORTS, ECONOMIC GROWTH AND FDI IN NIGERIA

The Nigerian economy has recorded an average growth rate of 6% over the last decade.[6] While several factors such as monetary, fiscal and trade related reform efforts as well as FDI inflows have contributed, modest contributions of the non-oil sector to GDP cannot be downplayed. FDIs serve as an engine of economic growth and development as it increases the opportunity for integration into the global financial and capital markets, creates jobs, promotes export, and drives technology transfer and knowledge spill over for domestic firms (Olayiwola and Okodua, 2013).

Table 1 presents the trend of some key variables over a five-year period. Observably, real GDP has almost doubled from one period to the succeeding period. It increased from about N12.5 billion in the 1970-1974 period to N68 trillion in the 2010-2013 period. The substantial increase may be attributed to amongst others, the telecommunication revolution, and development

of the Nigerian movie industry (Nollywood) in addition to economic reforms, which have translated to the remarkable growth performance recorded. The positive trend of total labour force and gross fixed capital formation has also contributed to the positive GDP trend. The contribution of total exports (predominantly made up of crude oil) has also contributed to the phenomenal growth recording 139.71% between the 2005-2009 and 2010-2013 period.

Table 1
Profile of some key variables

| Period	Real GDP (n' bill)	Total labour force	Gross fixed capital formation (N' mill.)	Total exports (N' bill.)	Foreign direct investment (N' bill.)
1970-1974	12.45	14,536,962	1.81	1.99	0.29
1975-1979	32.82	18,834,111	8.21	7.09	0.35
1980-1984	55.59	23,131,261	10.13	10.87	0.16
1985-1989	127.35	27,428,410	10.96	37.44	0.71
1990-1994	565.37	31,725,560	58.13	183.38	1.10
1995-1999	2,768.57	36,163,049	172.29	958.59	1.25
2000-2004	7,434.26	40,502,486	677.63	2,846.93	1.62
2005-2009	20,857.46	45,781,644	2,037.12	7,479.18	6.52
2010-2013	68,198.08	51,882,920	3,260.66	17,853.70	6.90

Source: World Bank (2013) World Development Indicators (WDIs) Online
Note: All variables were obtained from WDI online except gross fixed capital formation, which was sourced from the International Monetary Fund (IMF) International Financial Statistics, via www.econstat.com.

Figure 1 shows the growth rate of GDP and some selected macroeconomic indicators. It clearly reveals a distinct trend amongst the variables. While exchange rate has continued to depreciate amidst stable growth between 2005 and 2013, inflation has from the 1990-1994 period spiralled downwards just as domestic credit to the private sector as a percentage of GDP (a measure of financial development) peaked in the 2005-2009 period and trended downward thereafter. In Table 2, a different story is presented as revealed by some socioeconomic indicators considered. Although GDP per capita stood at about 9.2% in the 1970-1974 period, it fell in subsequent periods and surged to approximately 8.7% between 2000 and 2004. It fell to 3.5% and 2.7% in the periods 2005-2009 and 2010-2013, respectively.

Table 2 shows that exports and FDI exhibit an upward trend. This may be partly explained by amongst others, prevailing economic conditions, bilateral relations and trade agreements, exploration of crude oil in commercial quantities that led to the influx of multinational companies and huge increases in oil-based exports, and global market condition. Oil FDI increased progressively during the review period indicating a stable investment climate particularly in the oil sector. Contrarily, non-oil FDI increased moderately until the period 2000-2004 during which a substantial jump from N74,597.34 million to N235,771.9 million in 2005-2009 period is recorded. Subsequently, non-oil FDI was relatively stable albeit a marginal increase observed in the period 2010-2013 when it increased to N274,326.05 million. A comparative analysis of the evolution of oil and non-oil FDI and total trade show that oil component of exports and FDI were relatively larger compared with their non-oil counterpart.[7] Evidently, exchange rate persisted upward during the review period.

Figure 1: Real gdp growth and some selected macroeconomic variables
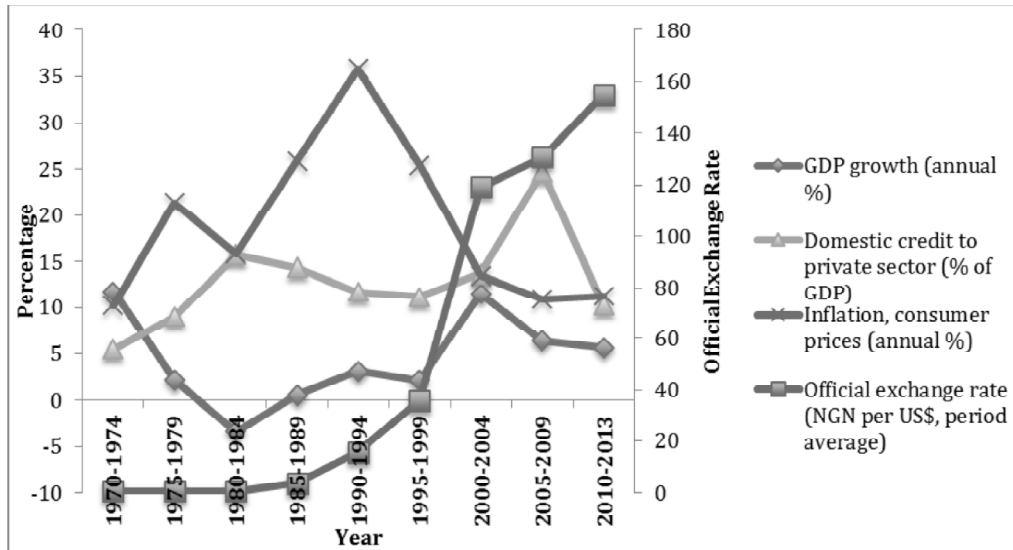
Source: World Bank (2013) World Development Indicators (WDIs) Online

Table 2
Trend of fdi, exports and exchange rate

Year	FDI (N Million)		Export (N Million)		Exchange
	Oil	Non-Oil	Oil	Non-Oil	Rate (N/USD)
1970-74	762.50	690.18	1,979.60	357.69	0.67
1975-79	771.48	1,695.24	6,705.18	536.52	0.63
1980-84	678.28	4,023.52	9,671.56	329.82	0.67
1985-89	1,910.86	7,264.02	26,250.60	1,782.60	3.71
1990-94	12,213.14	14,253.68	167,871.50	4,501.00	15.86
1995-99	58,317.38	42,577.60	1,062,709.00	25,830.00	35.98
2000-04	61,577.90	74,597.34	2,578,575.00	71,129.83	119.12
2005-09	99,222.70	235,771.90	8,084,610.00	195,160.10	130.64
2010-13	99,993.43	274,326.00	12,287,803.17	455,194.21	154.96

Source: World Bank (2013) World Development Indicators (WDIs) Online

3. REVIEW OF RELATED LITERATURE

The ELGH implies that export is the main driver of economic performance. This is based on the fact that export expansion increases productivity via economies of scale (See Helpman and Krugman, 1985). In addition, exports generate foreign exchange earnings and provide ample opportunity to access global markets. The role of FDI in this hypothesis cannot be downplayed; as FDI involves a significant component of technology transfers and knowledge spill overs in

line with the endogenous growth model (Romer, 1986 and Sala-i-Martin, 1996). Following the rapid rise of ELGH since the 1970s and success of the model in China, the Asian Tigers and some other emerging market economies; clear signs of fraying have emerged. Countries like Mexico have not been as successful in view of the fact that growth has been sluggish. In this regard, Palley (2011) argued forcefully that the financial crisis of 2008 and the consequent global economic slowdown represent a watershed moment and have created a global demand deficit. This is evident given the burgeoning US sovereign debts, fiscal constraints in the EU and Asia as well as economic sanctions by the US on Russia due to the Ukrainian crisis/unrest.

There are three dominant strands of literature that synthesize the linkage between exports, FDI and economic growth. The first is the industrial organization theory that explains the direct effect of exports and FDI on growth (Yao, 2006). The model examines the role of FDI and international trade in the transfer of technology, knowledge diffusion and their effect on market structure and competition (Blomstrom and Sjoholm, 1999). The international trade perspective on the other hand explains why FDI and trade take place as well as how firms choose between exporting, FDI and licensing as an entry mode (Janicki and Wunnava, 2004). The last is the endogenous growth model that considers exports and FDI as import sources of human capital development; technology change and knowledge spill overs across countries and industries (Grossman and Helpman, 1995).

The role of FDI in the ELGH is also discernible from the study by Goldberg and Klein (1997) who assert that FDI promotes exports, substitution of imports and trade expansion in intermediate inputs and this often exist between parent and affiliate producers. This notion has been further underscored in a study by the OECD (2008), which showed that the orientation of investments by multinational corporations is export-oriented, and this serves as a catalyst for the integration of the FDI host economy to a global production network. DeGregorio (2003) finds that FDI leads to diffusion of technology and knowledge that are not readily available. Findlay (1978) noted that FDI increases the rate of technical progress in host country. Wang (1990) incorporates this idea into the neoclassical growth framework by assuming that the increase in knowledge applied to production is a function of FDI.

Many studies have produced mixed results based on causality test and correlation analysis in addition to long run and short run estimations. Ahmed, Alm and Butt (2003) examined the causal linkage between FDI, exports and output using the Granger non-causality test over the period 1972-2011 for Pakistan. The authors find the existence of a unicausal linkage running from exports to growth, validating the ELGH; while FDI had no causal link to exports. Akinlo (2004) assessed the impact of FDI on growth in Nigeria between 1970 and 2001 using error correction model. The study revealed that private capital and lagged foreign capital have marginal effects on growth. The study also showed that export has a positive and statistically significant effect on growth. Evidently, both studies failed to account for structural breaks in their estimations.

Ahci and Ucal (2003) presented results in support of the ELGH but find no evidence of FDI-induced growth. Likewise, Cuadros and Alguacu (2001) found no evidence in support of the ELGH even though FDI was found to have a significant effect on growth and trade. Fontagne (1999) finds evidence indicating that FDI stimulates export growth. Chang (2006) finds the

existence of the positive impact of exports and economic growth on FDI inflow while FDI outflow responded negatively to export expansion. The study also showed that FDI has a positive impact on exports and output.

Kareem (2005) relied on co integration and Granger causality to examine the long run and causal relationship between exports on economic growth in Nigeria. The study reveals the existence of a bi-causal linkage between economic growth and exports. Similarly, Kareem (2008) tried to ascertain the validity of the ELGH based on a Cobb-Douglas production function between 1960 and 2005. Using impulse response function and Granger causality, the study revealed that both oil and non-oil exports contribute significantly to economic growth in Nigeria. Specifically, while feedback causality was found to exist between oil exports and economic growth, unidirectional causality from economic growth to non-oil export is recorded. Observably, these studies failed to account for structural breaks, and this may invalidate the ELGH.

Balasubramanyam, Salisu and Sapsford (1996) using cross section and OLS found that FDI has a positive effect on economic growth in a host country pursuing export promotion strategy. Borensztein, Gregorio and Lee (1998) examined the effect of FDI on growth using cross-country data for FDI flows from industrial countries to 69 developing countries. Their findings suggest that FDI is an important channel for the transfer of technology as it contributed more to growth than domestic investment. Yao (2006) examined the effect of FDI and exports on growth using panel data comprising of 28 Chinese provinces for the period 1978-2000. Using dynamic panel data technique, the author found that both FDI and exports have a strong and positive effect on growth.

Adams (2009) assessed the effect of FDI and domestic investment on economic growth in SSACs for the period 1990-2003. The study revealed that direct investment is positive and significantly correlated with economic growth while FDI is positive and significant only in OLS estimation. Asiedu (2002) investigates whether the factors affecting FDI in developing countries affect sub Saharan African countries (SSACs). The author found that high interest rate and better infrastructure have a positive impact on FDI to non-SSACs, but have significant impact on FDI to SSACs. Openness to trade was found to promote FDI to SSACs and non-SSACs with the impact being relatively smaller for SSACs. Babalola, Dogon-Daji and Saka (2012) examined the relationship between exports, FDI and growth in Nigeria between 1960 and 2009. Utilizing co integration and error correction model, the authors find the existence of a long-run relationship between the variables while the contemporaneous coefficients showed that the deviation from the long-run growth path is corrected by about 40% over the following year.

Olayiwola and Okodua (2013) examined the relationship between FDI, non-oil exports and economic growth in Nigeria using variance decomposition, impulse response and causality test. The authors found that a unidirectional causality running from FDI to non-oil exports exist while each of the three variables exhibit on average, a dominant response to one standard innovation. However, the authors did not only fail to account for structural breaks but they ignored the fact that the effect of oil and non-oil FDI may be different. Arodoye and Iyoha (2014) examined the trade-growth nexus between 1981Q1 and 2010Q4 using a VAR model. The authors found the existence of a stable long-run relationship between external trade and

economic growth. Findings from the variance decomposition analysis revealed that Nigeria's economic growth is predominantly driven by own shocks and foreign trade innovation.

Yang (2008) noted that if the ELGH is a true explanation of the high economic growth episodes of the Asian Tigers, then this should have been accompanied by real exchange rate appreciation as a result of the influx of foreign exchange occasioned by booming exports. The author goes further to develop a model in which the result of the export led growth induced by an exogenous increase in productivity, high economic growth; export inceases as well as real exchange rate appreciation. The literature provides useful insight for this study. Notably, previous studies have ignored the role of FDI as an important component of the ELGH. In Nigeria, the role of FDI serves as a force for sustainable export promotion and inclusive growth. Therefore, an attempt is made to contribute to the debate by considering a multivariate model that would ascertain whether or not FDI is an ally or foe in the ELGH.

4. MODEL SPECIFICATION, DATA AND METHODOLOGY

4.1. The model

To examine the role of FDI in the ELGH, this study relies on the neoclassical growth model in the spirit of Kareem (2008), Choong and Lim (2009) and Shuaibu and Adebare (2013) but departs from the aforementioned in that we consider the role FDI and exchange rate. The model is specified as follows:

$$Y_t = \alpha_0 + \alpha_1 LF_t + \alpha_2 GFCF_t + \alpha_3 OFDI_t + \alpha_4 NOFDI_t + \alpha_5 ER_t + \alpha_6 HCD_t +$$
$$\alpha_7 OEXPt + \alpha_8 NOEXPt + \alpha_7 DUM1 + \alpha_7 DUM2 + \alpha_8 DUM3 + \alpha_9 DUM_4 + \mu_t \qquad (1)$$

Where Y real gross domestic product, LF denotes labour force, GFCF is gross fixed capital formation, OFDI means oil foreign direct investment, NOFDI represents non-oil foreign direct investment, ER is official exchange rate, HCD means human capital development, OEXP represents oil export and NOEXP is non-oil export. DUM1, DUM2, DUM3, and DUM4 are dummies representing the oil price shock of 1973, structural adjustment programme of 1986, shift from military to democratic governance in 1999 and the 2008 global financial crisis. These events have significant implications on the economy given that Nigeria is a small open economy that is vulnerable to external shocks. This constitutes part of our contribution because introducing these issues is a departure from existing ELGH modelling in Nigeria. Labour force and gross fixed capital formation are expected to exert a positive influence on real GDP while the primary explanatory variable, foreign direct investment, is expected to be a positive function of growth. Exchange rate depreciation retrogresses growth since it reduces the economies purchasing power abroad whereas improvements in human capital development and higher oil and non-oil exports are expected to boost output. Although the theoretical expectations highlighted conform to the new growth perspective, it does not explicitly provide a platform for assessing the role of FDI in the ELGH.

We rely on the causality test proposed by Toda and Yamamoto (1995) that requires the estimation of an augmented VAR. The rationale for suing this technique is that it is robust to the integration and cointegration properties of the process. Therefore, following Rambaldi and Doran (1996), Equation (1) is re-written as a multivariate VAR:

$$
\begin{bmatrix} Y_t \\ LF_t \\ GFCF_t \\ OFDI_t \\ NOFDI_t \\ ER_t \\ HCD_t \\ OEXP_t \\ NOEXP_t \\ DUM1 \\ DUM2 \\ DUM3 \\ DUM4 \end{bmatrix} = \alpha_0 + \alpha_1 \begin{bmatrix} Y_{t-1} \\ LF_{t-1} \\ GFCF_{t-1} \\ OFDI_{t-1} \\ NOFDI_{t-1} \\ ER_{t-1} \\ HCD_{t-1} \\ OEXP_{t-1} \\ NOEXP_{t-1} \\ DUM1 \\ DUM2 \\ DUM3 \\ DUM4 \end{bmatrix} + \cdots + \alpha_k \begin{bmatrix} Y_{t-k} \\ LF_{t-k} \\ GFCF_{t-k} \\ OFDI_{t-k} \\ NOFDI_{t-k} \\ ER_{t-k} \\ HCD_{t-k} \\ OEXP_{t-k} \\ NOEXP_{t-k} \\ DUM1 \\ DUM2 \\ DUM3 \\ DUM4 \end{bmatrix} + \alpha_{k+1} \begin{bmatrix} Y_{t-k-1} \\ LF_{t-k-1} \\ GFCF_{t-k-1} \\ OFDI_{t-k-1} \\ NOFDI_{t-k-1} \\ ER_{t-k-1} \\ HCD_{t-k-1} \\ OEXP_{t-k-1} \\ NOEXP_{t-k-1} \\ DUM1 \\ DUM2 \\ DUM3 \\ DUM4 \end{bmatrix} +
$$

$$
\cdots + \alpha_{k+d} \begin{bmatrix} Y_{t-k-d} \\ LF_{t-k-d} \\ GFCF_{t-k-d} \\ OFDI_{t-k-d} \\ NOFDI_{t-k-d} \\ ER_{t-k-d} \\ HCD_{t-k-d} \\ OEXP_{t-k-d} \\ NOEXP_{t-k-d} \\ DUM1 \\ DUM2 \\ DUM3 \\ DUM4 \end{bmatrix} + \begin{bmatrix} \mu_Y \\ \mu_{LF} \\ \mu_{GFCF} \\ \mu_{OFDI} \\ \mu_{NOFDI} \\ \mu_{ER} \\ \mu_{HCD} \\ \mu_{EXP} \\ \mu_{NOEXP} \\ DUM1 \\ DUM2 \\ DUM3 \\ DUM4 \end{bmatrix} \tag{2}
$$

Based on equation 2, the following hypothesis are tested:

(i)   Ho : OEXP does not cause Y

(ii)   Ho : Y does not cause OEXP

(iii)   Ho : NOEXP does not cause Y

(iv)   Ho : Y does not cause NOEXP

(v)   Ho : OFDI does not cause Y

(vi)   Ho : Y does not cause OFDI

(vii)   Ho : NOFDI does not cause Y

(viii) Ho : Y does not cause NOFDI

(ix)   Ho : OFDI does not cause OEXP

(x)   Ho : OEXP does not cause OFDI

(xi)   Ho : OFDI does not cause NOEXP

(xii)   Ho : NOEXP does not cause OFDI

(xiii) Ho : NOFDI does not cause OEXP

(xiv) Ho : OEXP does not cause NOFDI

(xv)   Ho : NOEXP does not cause NOFDI

(xvi) Ho : NOFDI does not cause NOEXP

It is pertinent to note that the trivariate system made up of exports, economic growth and growth is the focus of this study. However, the paper tilts towards a multivariate analysis on experimental grounds for two reasons. First is to accommodate the traditional control variable in the neoclassical growth model; and second, to account for auxiliary variables such as the official exchange rate which may influence the flow of exports as well as direct investment decisions.

4.2. Data

This study uses annual data between 1970 and 2013. The summary statistics for the variables are presented in Table 3. The average value of income (Y) is N9.82 trillion, indicating that real income has been increasing during the review period. Real GDP ranged from a maximum of N81 trillion to a minimum of N8.96 billion. The high standard deviation of about N20.1 trillion suggests that real income in Nigeria is spread over a large range; indicating significant disparity. This implies that real GDP recorded low and high values at different points in time.

Average oil and non-oil exports from Nigeria to the rest of the world are N2.3 trillion and N79.4 million while the standard deviations (SDs) are N3.7 trillion and N152.1 million, respectively. The high SD highlights the large difference in export performance during the period under review. Oil and non-oil FDI inflow, recorded an average of N35.8 and N69.1 million while the high SD of N40.9 million and N101.7 million indicate significant direct investment inflow from abroad. This may perhaps be attributed to favourable domestic investment climate. Average exchange rate stood at N49 per dollar while maximum and minimum exchange rates of N157 and N1 respectively were recorded.

The correlation between the variables is presented in Table 4. The correlation between real output (Y) and export (EXP) is 96%, and this suggests that export might be growth enhancing in Nigeria. A positive correlation (greater than 70%) between oil (OFDI) and non-oil FDI (NOFDI) and oil (OEXP) and non-oil export (NOEXP). Likewise, economic growth (Y) also recorded relatively high level of correlation with the oil and non-oil component of FDI and exports. This indicates the existence of a positive relationship and a prominent role for FDI in the ELGH. Table 5 shows the sources and unit of measurement of data used in the empirical analysis.

4.3. Methodology

Unit root tests

The study uses Augmented Dickey Fuller (ADF) and Philip Perron (PP) unit root test to ascertain the presence of unit root or otherwise of the variables. The PP tests uses models similar to the ADF tests but employs the Newey-West non-parametric method to control for serial correlation

Table 3
Descriptive statistics of variables used in estimation

	ER	GFCF	HCD	LF	NOEXP	NOFDI	OEXP	OFDI	Y
Mean	49.01	635000000	3744997	31773843	79461.48	69096.04	2323126.00	35863.99	982000000000000
Median	13.60	47032000	3160970	31264942	4452.55	12892.75	158784.20	4910.10	442000000000
Maximum	157.50	3670000000	10755377	53990123	608199.20	316492.90	10991633.00	132085.50	81000000000000000
Minimum	0.55	882700	356565	12818102	203.20	470.20	509.62	-810.00	8960000000
Std. Dev.	60.97	1080000000	2732693	11758020	152130.20	101745.10	3709456.00	40928.89	2010000000000000
Observations	44	44	44	44	44	44	44	44	44

Notes: All values are in million naira except exchange rate (ER), which is in percentage and Labour force (LF) measured by the total number of working population.

Table 4
Correlation analysis

	ER	GFCF	HCD	LF	NOEXP	NOFDI	OEXP	OFDI	Y
ER	1.00	0.87	0.90	0.90	0.79	0.89	0.89	0.91	0.76
GFCF	0.87	1.00	0.92	0.82	0.97	0.97	0.99	0.83	0.95
HCD	0.90	0.92	1.00	0.95	0.89	0.91	0.91	0.85	0.87
LF	0.90	0.82	0.95	1.00	0.76	0.85	0.84	0.91	0.73
NOEXP	0.79	0.97	0.89	0.76	1.00	0.90	0.93	0.75	0.99
NOFDI	0.89	0.97	0.91	0.85	0.90	1.00	0.98	0.90	0.88
OEXP	0.89	0.99	0.91	0.84	0.93	0.98	1.00	0.88	0.90
OFDI	0.91	0.83	0.85	0.91	0.75	0.90	0.88	1.00	0.72
Y	0.76	0.95	0.87	0.73	0.99	0.88	0.90	0.72	1.00

Table 5
Description and sources of data

S/N	Variable	Description	Source
1	Y	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Data are in naira.	The World Bank World Development Indicators
2	LF	Total labor force comprises people ages 15 and older who meet the International Labour Organization definition of the economically active population: all people who supply labor for the production of goods and services during a specified period.	The World Bank World Development Indicators
3	HCD	The total number of pupils enrolled at secondary level in public and private schools.	The World Bank World Development Indicators
4	ER	Annual average based on monthly averages (naira units relative to the U.S. dollar).	The World Bank World Development Indicators
5	OFDI and NOFDI	It is the sum of cummulative capital inflows for the oil and non-oil sector. Data are in local currency unit (naira).	The Central Bank of Nigeria Statistical Bulletin
7	OEXP and NOEXP	Total oil and non-oil exports show the f.o.b. value of goods and services provided to the rest of the world valued in naira.	The Central Bank of Nigeria Statistical Bulletin
8	GFCF	Gross fixed capital formation in naira	The International Monetary Fund International Financial Statistics (via www.econstat.org)

rather than the inclusion of the lagged dependent variable method of the ADF test. For both tests, the null hypothesis is that the variables being considered have a unit root against an alternative that they do not and the test equations are specified as follows:

$$ADF : \Delta y_t = \alpha_0 + \alpha_1 T + \gamma y_{t-1} + \beta_i \Sigma_{i=1}^{p} \phi_t \Delta y_{t-1} + \mu_t \tag{3}$$

$$PP : \Delta y_t = \alpha y_{t-1} + x_t' \delta + \mu_t \tag{4}$$

Where y_t is the variable considered, T is the time trend, x_t' are exogenous regressors, and μ_t is the error term. $\alpha, \delta, \beta_i, \phi_t$ are estimable parameters. Several studies have found that the conventional unit root tests fail to reject the unit root hypothesis for the series that are actually trend stationary with a structural break (Binh, 2011).[8] Thus, unit root test developed by Zivot and Andrew (1992) is also utilized. The authors modified the Perron unit root test that considers a breakpoint as endogenous. Thus, to test for unit root against the alternative of trend stationarity process with a structural break both in slope and intercept, the following regressions are used:

$$Y_t = \mu + \phi DU_t(\tau_b) + \beta T + \lambda DT_t(\tau_b) + \alpha Y_{t-1} + \sum_{i=1}^{p} \varphi_i \Delta Y_{t-i} + e_t \tag{5}$$

Where DU_t and DT_t are dummy variables for a mean shift and a trend shift respectively; $DU_t(\tau b) = 1$ if $t > \tau_b$ and 0 otherwise, and $DT_t(\tau_b) = t - \tau_b$ if $t > \tau b$ and 0 otherwise. *DUt* is a sustained dummy variable that captures a shift in the intercept, and *DTt* represents a shift in the trend occurring at time τ_b.[9]

Cointegration and causality tests

To ascertain the existence of a long-run relationship between the variables, the Johansen and Juselius as well as the Engle and Granger residual-based co integration test is used. This study makes use of the T-Y Granger non-causality technique.[10] The T-Y approach fits a standard VAR model on levels of the variables and therefore makes allowance for the long-run information often ignored in systems that require first differencing and pre-whitening (Clarke and Mirza, 2006). The approach employs a modified Wald test for restrictions on the parameters of the VAR (k) where k is the lag length of the system. The basic idea of the T-Y approach is to artificially augment the correct order, k, by the maximal order of integration, say d_{max}. Once this is done, a $(k+d_{max})^{th}$ order of VAR is estimated and the coefficients of the last lagged d_{max} vectors are ignored (Caporale and Pittis, 1999). The robustness and stability of the VAR model used to compute the T-Y causality test is checked using the inverse root of the AR characteristic polynomial.

5. EMPIRICAL ANALYSIS AND DISCUSSION OF RESULTS

The unit root test results are presented in Table 6. The variables are transformed to logarithms because the variables are skewed and hence their approximation to a lognormal distribution. Further, log conversion stabilizes the variance of the underlying time series as well. The transformation is motivated by the non-linear relationship between the variables and using the logarithm of one or more variables instead of the unlogged form makes the effective relationship

non-linear, while still preserving the linear model (See Lütkepohl and Xu, 2009). The ADF and PP test show that all the variable are stationary at first difference, which implies that they are I(1) variables. While the ADF test reveals that lnOFDI and lnLF are non-stationary at level and first difference, the PP test result shows that lnLF and lnOFDI are stationary at levels and first difference, respectively. The result in Table 5 shows sufficient evidence of rejecting the null hypothesis for ER, lnLF and lnNOEXP based on the critical values provided by Zivot and Andrews (1992). Thus, we conclude that the endogenously identified structural breaks in the series are not sturdy enough to generate any divergence with the results of conventional unit root tests. Having established the order of integration of the variables, an examination of the long-run relationship amongst the variables was carried out.

Table 6
Unit root test result

Variable	ADF		PP		ZA		
	Level	*First diff.*	*Level*	*First diff*	*t*	*Breakpoint*	*Lag*
lnY	-1.96	-6.16**	-1.99	-6.16**	-3.30	1992	0
ER	-1.73	-6.20**	-1.74	-6.20**	-10.49*	1999	0
lnGFCF	-2.11	-4.08**	-1.93	-4.06**	-4.03	1982	1
lnHCD	-2.26	-3.29***	-1.89	-3.27***	-3.37	1981	1
lnLF	-2.44	-2.34	-8.48**	-2.42	-4.89**	2005	1
lnOFDI	-0.54	-2.28	-0.94	-17.64**	-2.23	1995	4
lnNOFDI	-2.66	-6.20**	-2.84	-6.20**	-4.44	2006	2
lnOEXP	-2.19	-7.11**	-2.19	-7.17**	-3.54	1989	0
lnNOEXP	-2.44	-6.79**	-2.52	-6.89**	-4.72***	1987	0

Note: *, ** and *** denote significance at 1%, 5% and 10%, respectively.

In Table 7, the result of the Johansen cointegration test revealed the presence of cointegrating relationships as revealed by the trace and maximum eigen value statistic which rejects the null hypothesis at the 5% level. Specifically, both the trace and maximum eigen value statistic reveal the existence of at least 5 cointegrating vectors which, suggests the existence of a long run relationship amongst the variables. Likewise, the Engle and Granger long run test, carried out for comparative purpose, shows the existence of a long-run relationship between the variables. The ADF unit root test of the estimated model's residual recorded a t-statistic of -5.75 and this was found to be significant at the 5% level. Our findings suggest that the ELGH holds in the long term and the potency of FDI in this hypothesis is evident. This means that FDI can bring in the much-needed capital that can spur domestic output.

The result of the VAR-based granger non-causality test presented in Table 8 shows that there is a bi-causal linkage between real GDP and oil export while a unicausal relationship running from GDP to non-oil export is observed. This suggests that output in Nigeria is primarily driven by oil exports. The relationship between oil and non-oil FDI and real GDP is bi-causal and this implies that FDI inflows in the oil and non-oil sector have contributed to Nigeria's economic growth. While a unicausal link running from oil FDI to oil export is observed, oil export did not granger cause oil FDI. This may be partly explained by the fact that increased direct capital inflows to the oil and gas sector have increased domestic output of the sector. Findings also showed that higher FDI inflows to the oil and gas sector did not granger cause the

Table 7
Johansen cointegration test result

Hypothesized No. of Cointegrating Equations	Eigenvalue	Trace Statistic	Critical Value (5%)	P-Value
None *	0.9713	478.4503	197.3709	0.0001
At most 1 *	0.9140	325.7252	159.5297	0.0000
At most 2 *	0.8633	220.2077	125.6154	0.0000
At most 3 *	0.7023	134.6320	95.7537	0.0000
At most 4 *	0.6794	82.5365	69.8189	0.0035
At most 5	0.3650	33.6178	47.8561	0.5228
At most 6	0.2058	14.0919	29.7971	0.8354
At most 7	0.0877	4.1827	15.4947	0.8882
At most 8	0.0055	0.2367	3.8415	0.6266

Note: (*) denotes rejection of H_0 at 5%

much needed increase in non-oil exports. However, non-oil export was found to granger cause oil export suggesting intersectoral linkages and complementarities.

The result also shows that a bi-causal link exists between non-oil FDI and oil exports; and non-oil export and non-oil FDI. Notably, oil and non-oil FDI play a vital role in the export-led growth hypothesis prominently through the growth channel; however, the null hypothesis that oil FDI does not cause non-oil export was accepted. This implies that the effect of FDI on the ELGH is relatively more pronounced through the output channel. The finding that export causes output expansion concurs with the findings of Kareem (2008) for Nigeria and Ahmad, Alam and Butt (2003) forPakistan. The finding of the former may be attributed to the conventional granger causality test employed in addition to the fact that it failed to consider the role of FDI whose inclusion might have revealed a more prominent role for output in the hypothesis. Furthermore, the departure of our empirical findings from some previous studies may also be partly explained by our inclusion of dummy variables representing the 1973 oil price shock, SAP in 1986, shift from military to democratic governance in 1999 as well as the global financial crisis in 2008. Our findings also conform to that of Okodua and Olayiwola (2013) and Akinlo (2004) for Nigeria who presented evidence of FDI-driven output growth even though the focus of these studies was not on the ELGH.

The response of a variable to a unit shock (forecast error) in other variables (and vice versa) is depicted graphically to get a visual impression of the dynamic interrelationships within the system. In Figure 2, the output of the impulse response function is presented. The response of oil and non-oil exports to a shock from oil and non-oil FDI over the ten-year period is positive reaching its peak between the third and fourth year. However, the response of oil export to non-oil FDI is relatively constant but declines marginally from the ninth year. Oil and non-oil export respond positively to changes in output, hovering around zero over the remaining period. While the response of non-oil FDI to income was positive and approaching but not reaching zero throughout the period considered, the response of oil FDI to changes in income was initially negative at the first year before rising gradually and reaching its peak between the third and fourth year, it hovered between the zero and negative bound from the seventh period onwards.

Table 8
Toda-Yamamoto granger non-causality test

Null Hypothesis	MWALD	P value	Decision
Ho : OEXP does not cause Y	82.6241	0.0000	Reject
Ho : Y does not cause OEXP	129.4040	0.0000	Reject
Ho : NOEXP does not cause Y	3.5157	0.1724	Accept
Ho : Y does not cause NOEXP	58.2845	0.0000	Reject
Ho : OFDI does not cause Y	7.2392	0.0268	Reject
Ho : Y does not cause OFDI	10.9200	0.0043	Reject
Ho : NOFDI does not cause Y	64.7694	0.0000	Reject
Ho : Y does not cause NOFDI	49.8183	0.0000	Reject
Ho : OFDI does not cause OEXP	38.6066	0.0000	Reject
Ho : OEXP does not cause OFDI	3.0223	0.2207	Accept
Ho : OFDI does not cause NOEXP	2.0549	0.3579	Accept
Ho : NOEXP does not cause OFDI	6.4002	0.0408	Reject
Ho : NOFDI does not cause OEXP	124.0775	0.0000	Reject
Ho : OEXP does not cause NOFDI	16.2285	0.0003	Reject
Ho : NOEXP does not cause NOFDI	67.9555	0.0000	Reject
Ho : NOFDI does not cause NOEXP	68.4827	0.0000	Reject

Notably, income responds positively to changes in oil and non-oil exports and FDI from the first to the tenth year. This supports the ELGH and underscores the prominent role of FDI inflows. The impulse response function result also shows that oil and non-oil FDI play a more pronounced role in the ELGH primarily through the growth relative to the export channel in contrast to the granger non-causality test result that revealed the potency of oil and non-oil FDI through the growth channel in the ELGH. Perceptibly, the estimated VAR model is dynamically stable as indicated by the inverse root of the AR characteristic polynomial as no root was found to lie outside the unit circle (See Figure 3).

6. CONCLUSION AND POLICY IMPLICATIONS

The purpose of this study was to ascertain the role FDI in the ELGH in Nigeria between 1970 and 2013 in Nigeria. This period coincides with significant structural changes in the economy such as oil price shocks, structural adjustment programme and global financial recessions. The pursuit of export-driven growth has been at the heart of government's development policy agenda. In addition, reduced government participation in economic activities, enhanced domestic and foreign private investments, poverty alleviation and job creation as well as other policies geared towards efficient allocation of resources have occupied the center stage of policy debate.

Previous studies have examined the validity of the ELGH and the role of FDI in this hypothesis in Nigeria without considering the role of structural breaks as well as disaggregated FDI and exports. This may have an implication for the empirical analysis particularly within the context of a small open monoculture economy like Nigeria. Therefore, this paper used the
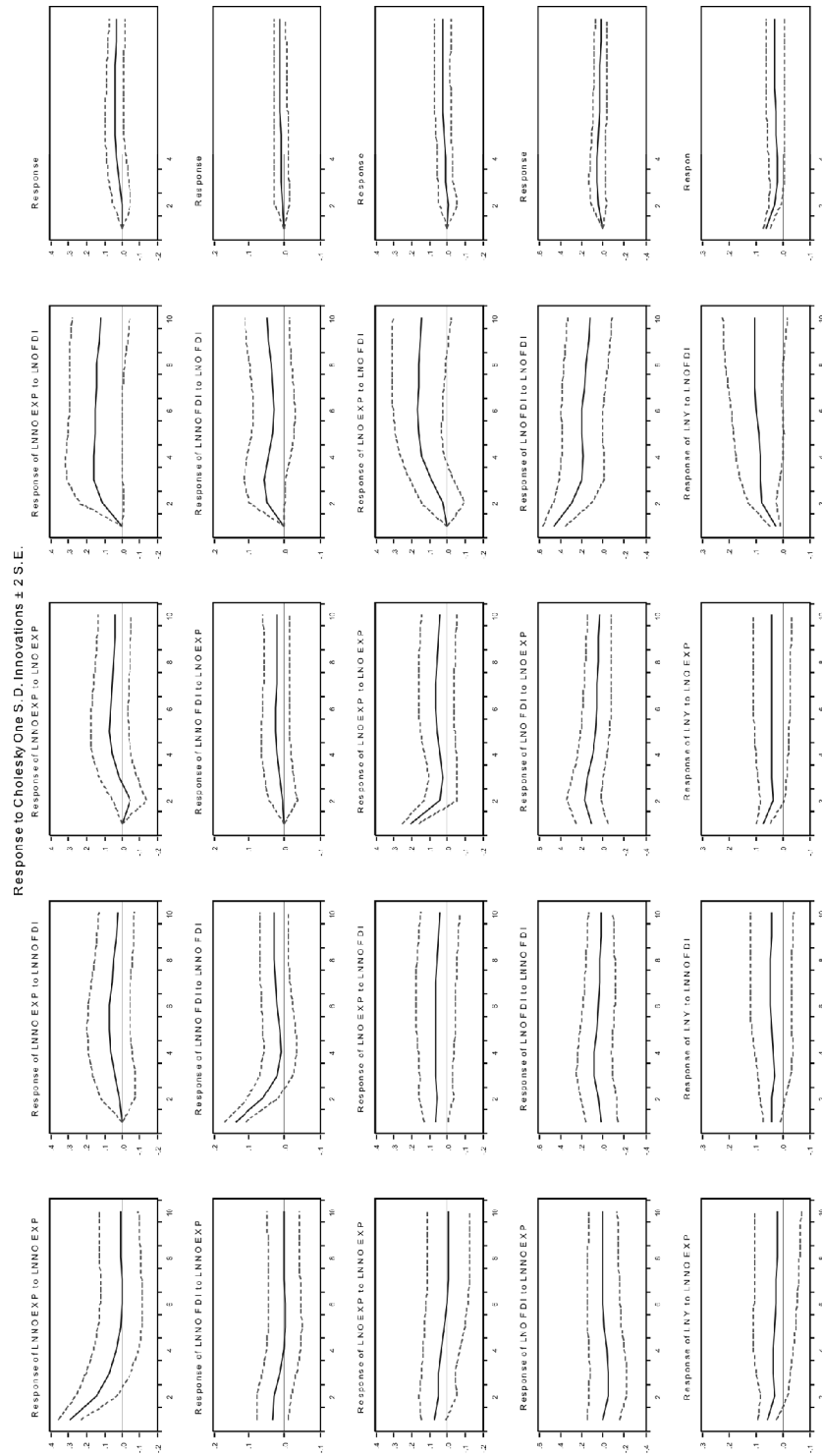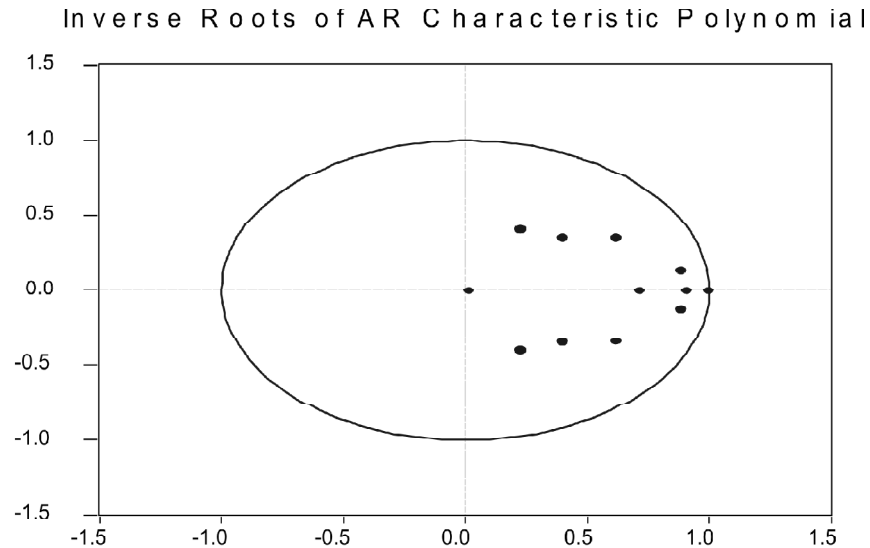
Figure 2: Impulse response function result

Response to Cholesky One S.D. Innovations ± 2 S.E.

Figure 3: Stability test

Inverse Roots of AR Characteristic Polynomial

neoclassical growth framework to formulate a model that was estimated using causality and impulse response function. Unit root and cointegration tests were used to ascertain the stationarity of the variables as well as their long-run relationship.

The study observed that the data used for the study where stationary after the first difference were taken and found the existence of a long-run relationship between exports, growth and FDI. This suggests that the underlying series are characterised by shocks that have transitory effects; and at the same time exhibit trending behaviour with non-stationary mean. The long run relationship observed suggest that the ELGH in Nigeria holds and that oil as well as non-oil FDI complement export promotion strategies. This coincides with the government's vision 2020:20 development policy plan that seeks to promote ELGH. Our findings suggest that encouraging FDI inflows remains critical in view of its long-term impact on domestic output and export expansion.

The disaggregation of FDI into oil- and non-oil components with a view to understanding its role in the ELGH is desirable as it provides insightful information towards sustained export policy formulation and implementation. For instance, while the causality test revealed that oil and non-oil FDI play a role in the ELGH through the income channel, the impulse response function result showed that both income and oil and non-oil export respond positively to changes in oil and non-oil FDI. The estimated model was found to be stable based on the inverse root of characteristic polynomial.

The impulse response functions used to investigate the response of the system to economic disturbances showed that shocks to exports lead to a significant positive response of GDP over a ten-year period. This is concurs to the ELGH. On the other hand, response of non-oil and oil exports to non-oil FDI and oil FDI is positive over the ten-year horizon with the magnitude of

the oil export shocks being relatively smaller. This suggests that the prospect for export diversification is quite high and an enabling environment will skew FDI inflows towards the non-oil export sector in Nigeria. Outward industrialization as a non-oil export promotion strategy remains critical to long-run sustainable income growth while the provision of a favourable investment climate for FDIs into non-oil export oriented sectors is imperative for sustained growth

Furthermore, the outcome from disaggregating export of goods and services reveals that exports of goods (particularly oil export) remain an important source of economic growth and incentives for FDI flows to the oil and gas sector in Nigeria. While government policies towards private sector investment and promotion of non-oil exports remain critical, least comparative disadvantage output that can compete favorably in international markets in terms of quality and prices is imperative. This may be complemented by further liberalization of trade in capital inputs such as machines and equipment needed to boost domestic output. The pursuit of exchange rate stability is also expected to provide ample opportunity for sustained export promotion and FDI inflows as well.

Some questions remain to be addressed in future research. One relates to the consideration of disaggregated FDI by industry as well as exports by SITC classification. This was not considered in the present study due to data limitations. Alternative frameworks that provide a platform for integrating the ELGH with FDI using highly disaggregated data and relatively longer time span could be employed. Another issue pertains to the use of other estimation methods for comparison.

Notes

1. N stands for naira represents Nigeria's national currency. The exchange rate (N/US dollar) in the 2005-2009 and 2010-2013 periods are 130.63 and 154.96.

2. Kohlhagen (1977) and Cushman (1985) show that foreign currency depreciation lowers foreign production cost and thus stimulates FDI.

3. In the case of export-driven growth, real exchange rate appreciates due to increased supply of exports while in the case of the latter; it depreciates as a result of increased demand for imports.

4. Also see Froot and Stein (1991) for an imperfect capital market approach to the linkage between exchange rate and FDI.

5. A high growth episode is defined as one where GDP growth averaged over 4% a year for a period of at least 5 years (Harberger, 2003) and, throughout the whole high growth episode, there cannot be any negative growth rate for any year (Yang, 2008).

6. This is because we relied on cumulative private capital flows as a measure of oil and non-oil FDI data given its unavailability at the disaggregated level.

7. For example, the Dickey and Fuller (1979) type test for unit root is not consistent if the alternative is that of a stationary noise component with a break in the slope of the deterministic trend while the Perron (1989) test has been generally criticized for treating the time of break as exogenous or the time of break is known apriori (Altinay and Karagol, 2004).

8. The breakpoint τ_b can be found by using the Quandt-Andrews breakpoint test. The optimal lag length *p* is also determined by using the general to specific approach so as to minimize the AIC or SIC. The Zivot and Andrews (1992) unit root test suggests that we reject the null hypothesis of a unit root if computed *t* is less than the left-tail critical *t* value.

9. As pointed out by Clarke and Mirza (2006) unit root and cointegration might suffer from size distortions, which often imply the use of an inaccurate model for the non-causality test. To obviate some of these problems, based on augmented VAR modelling, T-Y introduced a Wald test statistic that asymptotically has a chi square (χ^2) distribution irrespective of the order of integration or cointegration properties of the variables.

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