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Nonoil Export – Growth Nexus in Nigeria: Macroeconomic Base for Nonoil Export- LED Growth Policy

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Authors' contributions

This work was carried out in collaboration between all authors. Author SOO designed the study and wrote the first draft of the manuscript. Author VCA carried out the review of literature while author ANI analyzed the data. All authors interpreted the results of data analysis, read and approved the final manuscript.

Original Research Article

ABSTRACT

Public hue and cry about Nigeria's overdependence on oil has now faded into an inaudible whisper and a mere rhetoric as diversification of the Nigerian economy still remains an unsettled issue. However, the dwindling international oil price has rendered the country insolvent thereby creating a need to exploit nonoil sources. Therefore, the study was aimed at devising a viable nonoil export-led growth policy. Study covered the period 1980 to 2014. Data were sourced from Central Bank of Nigeria, National Bureau of Statistics and World Development Indicators. This study revealed a preferred choice for a more robust factor analytic model to isolate potent factors influencing nonoil export–growth nexus in Nigeria. Results indicate that there was positive significant relationship between nonoil export and growth in Nigeria which was solely attributable to the influence of foreign direct investment and trade liberalization. Moreover, the study revealed that the active variables in

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the constellation of foreign direct investment and trade liberalization provided the theoretical constructs for a new nonoil export-led growth policy. It was concluded that a viable nonoil export-led growth policy should comprise of such policy instruments as budgetary policy, exchange rate policy, human resource development policy, credit policy, and import substitution/export promotion policy. It was recommended, inter alia, that petroleum exporting countries should channel foreign direct investment to nonoil sectors in order to render the sectors viable and so augment their productive bases.

1. INTRODUCTION

The Nigerian economy is import driven and oil dependent. Efforts of successive governments were focused on reducing Nigeria's overdependence on oil. Support programmes and strategies were developed to boost structural adjustment programme and sustain its achievement. Prominent among these programmes are National Economic Empowerment and Development Strategy (NEEDS) of Obasanjo administration in 2004, Seven-Point Agenda of Yar'Adua administration in 2007 and Transformation Agenda of Jonathan administration in 2011 [1-3]. The structural adjustment programme (SAP) in 1986 had emphasized a shift from oil sector to nonoil sector as a strategy to reduce the country's overdependence on oil and so achieve the diversification of the economy. The natural consequence of SAP was a planned return to agriculture which, hitherto, had remained the mainstay of the Nigerian economy. By 1970, agriculture had contributed over 70 per cent to the country's GDP [4]. Thirty years, after the introduction of SAP, the Nigerian economy has continued to remain oil dependent. Changes in international oil prices have continued to subject the Nigerian economy to external shocks which cause structural dislocation in the economy. The continuing decline in international oil price in the recent time has destabilized the Nigerian economy, thereby forcing the federal government (FG) to adopt austerity measures which impose economic hardship on Nigerians.

Besides, the increasing demand for renewable energy sources now poses a threat to oil exporting countries of imminent oil market failure, thereby leaving them with the Hobson's choice of reducing overdependence on oil. Shift of emphasis from oil export to nonoil export would not only free the oil exporting countries from vicissitudes of international oil price volatility but more importantly lead to the diversification of their revenue bases. Magazzino [5] had stressed the need to consider the far reaching implication of sensitivity of economic growth to carbon dioxide emissions while deciding on the preferred choice of alternative sources of energy. Countries need to adopt clean energy i.e., renewable energy sources to minimize carbon dioxide emissions and so protect the environment [6].

In spite of the various programmes and strategies of successive government to increase the contribution of nonoil sector to the federally collected revenues, nonoil export earnings have not increased substantially over the years. This has resulted to the continuing dominance of oil sector in the Nigerian economy and the inevitable heavy reliance of the country on oil. This situation has been depicted in Table 1.

Table 1 shows that between 2005 and 2014, oil export increased from ₦7140.6bn to ₦12007.0bn representing an increase by ₦4866.4bn and an average increase of ₦486.64bn. In the same period, nonoil export grew from ₦106.6bn to ₦953.5bn, representing an increase by ₦847.5bn and an average increase of ₦84.75bn. Also, computed from the table, the average percentage contributions of oil and nonoil sectors to total export earnings are 96.33 and 3.67 respectively. These results revealed the continuing dominance of oil sector over nonoil sector in Nigeria's revenue base.

This has raised a serious issue bordering on the adequacy of the various programmes and strategies for diversifying the country's revenue base and stimulating growth. Certainly, the various programmes and strategies have failed to achieve their stated objectives, thereby necessitating an urgent review and possibly, a policy shift. Thus, the problem of this study was

Table 1. Percentage contributions of oil and nonoil exports to total export earnings in Nigeria (2005 – 2014) in ₦ Billion

Year	Oil export	Percent contribution	Nonoil export	Percent contribution	Total export
2005	7140.6	98.5	106.0	1.5	7246.6
2006	7191.1	98.2	133.6	1.8	7324.7
2007	8110.5	97.6	199.3	2.4	8309.8
2008	9861.8	97.5	253.0	2.5	10114.8
2009	8105.5	96.5	296.7	3.5	8402.2
2010	11136.2	96.5	405.9	3.5	11542.1
2011	13742.6	96.5	497.6	3.5	14240.2
2012	14526.8	96.8	476.1	3.2	15002.9
2013	14131.8	92.6	1130.2	7.4	15262.0
2014	12007.0	92.6	953.5	7.4	12960.5

Source: CBN Statistical Bulletin 2014

simply to evolve a nonoil export-led growth policy which would harness nonoil export to growth. Low growth rate in Nigeria is attributable to weak and infinitesimal impact of nonoil export [7]. Therefore, the study carried out a detailed analysis of interrelationships among nonoil export, selected macroeconomic indicators and growth in order to isolate active factors to constitute theoretical constructs of the new nonoil export-led growth policy.

2. LITERATURE REVIEW

2.1 Theoretical Literature Review

2.1.1 Endogenous growth theory

Endogenous growth theory emphasizes different growth opportunities in physical capital and knowledge capital. The endogenous growth theory is based on the notion that there are substantial external returns to capital; the major assumption is that better technology is produced as a by product of capital investment. It specifically assumes that technology is proportional to the level of capital per worker in the economy overall, and that technology is labour-augmenting. Endogenous growth theory states that a high saving rate leads to a high growth rate [8]. This theory has relevance for Nigeria with low technology base.

2.1.2 Export-led growth theory

This theory states that the growth of exports has a favourable impact on economic growth, i.e., that exports are a main determinant of overall economic growth. It holds that the overall growth of countries can be generated, not only by increasing the amounts of labour and capital within the economy, but also by expanding exports; hence exports can perform as an engine of growth [9]. The export-led growth theory has implication for developing countries like Nigeria which rely more on export of raw materials and less on export of finished products.

2.1.3 Theory of comparative advantage

This theory was put forth by David Ricardo in 1817. He posited that countries should produce commodities for which they have maximum cost advantage and import those commodities for which they have minimum cost advantage [10,11]. This theory is relevant for this study as trade between Nigeria and some of her trading partners still proceed on this paradigm.

2.1.4 Heckscher-Ohlin theory

The theory is also known as factor production theory. It was put forth by Eli Heckscher and Bertil Ohlin. The theory states that the pattern of international trade is determined by the relative factor of production existing in countries. Under certain assumptions, this theory posits that less developed countries with abundant labour should specialize in the production of primary product for exports while importing capital intensive products, mostly, manufactured goods from developed countries [12]. This theory provides a theoretical base for the present study which sought to identify factors influencing nonoil export-growth nexus in Nigeria.

2.1.5 New trade theory

This theory was developed by Paul Krugman in the late 1970s. The theory explains that critical factors in determining international pattern of trade are the very substantial economies of scale and network effect that can occur in key

industries. These economies of scale and network effect can be so significant that they outweigh the more traditional theory of comparative advantage. In some industries, two countries may have no discernible differences in opportunity cost at a particular point in time. But if one country specializes in particular industries then it may gain economies of scale and other network benefits from its specialization [13]. In essence, the theory posits that in globalized economy, only countries which produce cheap, high-quality goods on a large scale can compete in international market. This theory has wide applicability in the Nigerian situation where trade sector is characterized by low balance of trade-foreign direct investment ratios, small shares of manufacturers in the country's exports, and low credit-worthiness rating [14].

2.2 Empirical Literature

Several studies have been carried out in Nigeria and overseas to determine the impact of nonoil export on economic growth. In order to establish a priori justification for the present study a brief review of only recent studies in this area has been presented in this section.

Okoh [15] studied the implication of global integration for increasing Nigeria's nonoil export. The study employed vector error correction model in order to establish long-run relationship among growth in nonoil exports, growth in import of capital inputs and global integration. She reported a finding which indicates that global integration was not significant in explaining the behaviour of nonoil export in the long-run as well as in the short-run. She also found that growth in import of capital inputs positively impacted on growth of nonoil exports. This finding is in concurrence with that reported by Waithe, Lorde and Francis [18] which indicate that import of capital inputs enhanced growth. The policy implication of this finding is that FG should harness the complementarity between import of primary inputs/raw materials and nonoil export to enhance growth. A drawback of this study is its lack of clear-cut period of study. Notwithstanding, it has provided a strong basis for comparison with result of the present study.

Chukwuigwe and Abili [16] carried out a study to determine the impact of monetary and fiscal policies on nonoil export in Nigeria. The study covered the period 1974 to 2003. They employed OLS technique. They concluded that exchange rate affected negatively nonoil export. This finding supports the shift of emphasis to nonoil sector and has a policy implication for the diversification of the economy. The study is relevant to the present study as it yielded some key variables which have been included in its analysis. However, it failed to provide a base for comparing its findings with the findings of the present study.

Efobi and Osabuohien [17] studied the level of interaction between Agricultural Credit Guarantee Scheme Fund (ACGSF) and nonoil export in Nigeria. They employed vector auto-regressive technique for the analysis of their data. The study covered the period 1978 to 2007. They reported that there was a long-run relationship, though minimal, between ACGSF and nonoil export in Nigeria. The finding is consistent with Adebile and Amusan's [19] result that agriculture remains a more viable option to oil. The study recommended provision of storage facilities for agricultural products in order to promote nonoil export. However, this study has no direct link with the present study as it did not establish nonoil export-growth nexus in Nigeria.

Waithe, Lorde and Francis [18] carried out a study on export-led growth using Mexico as a case study. They employed an export-augmented neoclassical production function for testing the validity of export-led-growth hypothesis in Mexico for the period 1960 to 2003. They reported a finding which suggests that in the short-run the export-led hypothesis was valid while there was an inverse relationship between exports and GDP in the long-run. The result validates the export-led hypothesis and its applicability in Mexico. The finding has a wider implication for harnessing export to growth through a concessional duty free import of inputs and raw materials. Even though the finding of this study has no direct bearing on the present study, it provided an insight into export-growth nexus.

Usman [11] had embarked on a study to establish the determinants of nonoil export in Nigeria. The study covered the period 1988 to 2008. Data were analyzed using multi-linear regression technique. He reported that nonoil export contributed significantly to the variance in GDP in Nigeria. This finding is consistent with the results of earlier studies. The implication of the finding is that FG should strive toward nonoil export promotion through the involvement of commodity marketing board to ensure competitive prices of agricultural product. A

limitation of this study is the ambiguity of its design which appeared to be in conflict with its stated objective. A study designed to establish the determinants of nonoil export could not be expected to yield results on the magnitude and direction of contribution of nonoil export to GDP. Notwithstanding, the model for this study has been adapted for the present study.

Adebile and Amusan [19] studied the contribution of nonoil export to economic growth in Nigeria with particular reference to cocoa industry. The study covered the period 1961 to 2009. They analyzed the data using descriptive statistics of skewness and Kurtosis as well as the time series component of trend. They reported that there was a downward trend in export of cocoa between 1961 and 1985 and an upward trend between 1986 and 2009. This result is consistent with Onodugo, Ikpe and Anowor's [7] findings. The finding has the implication for achieving economic growth through the shift of emphasis from oil to agriculture. They concluded that Nigeria's involvement in the nonoil export is the most viable alternative to oil. A major limitation of this study is that the technique of data analysis was not suitable to warrant the kind of generalization drawn by the researchers. Nevertheless, this study has been effective in arousing the interest of researchers in this area.

Ningi [20] carried out a study on financing of nonoil export in Nigeria. He used primary data from 120 nonoil firms. Data were analyzed using m, SD, and multiple regression technique. He found that nonoil export financing by banks significantly accounted for 16 per cent of variance in nonoil export performance. This finding is in accordance with Efobi and Osabuohien's [17] result and has policy implication for direct application of agricultural credit for promoting export of agricultural products. The strength of this study lies in its application of multiple regression technique to analyze data from extremely large sample that yielded reliable result. Although the study has not yielded any finding to serve as a priori expectation, yet it has reported findings which indicate that nonoil export financing was not receiving due attention in Nigeria.

Alimi and Muse [21] studied the role of export in the growth process of Nigeria. The study covered the period 1970 to 2009. The variables included in the analysis were total export, oil export, nonoil export and GDP. They employed econometric technique involving unit root test, co-integration analysis, VAR Granger Causality Exogenecity Wald test. They reported that there was uni-directional causality between export and economic growth in Nigeria in three measures of exports and the direction of causality runs strictly from economic growth to export. This study is a replication of Waithe, Lorde and Francis's [18] study for Nigeria. The results of this study have validated the export-led growth hypothesis in Nigeria. It has the implication for diversifying the country's exports for higher export earnings. A major limitation of this study is the restricted scope of the model adapted in which there were only three independent variables. Nevertheless, the study had yielded major determinants of nonoil export which were included in the analysis of the present study.

Onodugo, Ikpe and Anowor [7] investigated the impact of nonoil export on economic growth in Nigeria. The study covered the period 1981 to 2012. The study employed conventional tests for mean reversion and co-integration. The study revealed that nonoil export did not contribute significantly to economic growth in Nigeria. This finding stands in contradiction of the earlier studies and has policy implication for FG to expand the country's industrial base through provision of basic infrastructures. The study has relevance for the present study as it provided a strong bases for comparison with the findings of the present study. The model for this study was also adapted for the present study.

Alley, Asekomeh, Mobolaji and Adenira [22] studied the impact of oil price shocks on economic growth in Nigeria. The study covered the period 1981 to 2012. They employed "general methods of moment" for the analysis of data. They concluded that oil price shock impacted negatively on economic growth. This finding provides an indirect concurrence of results of earlier studies on impact of oil export on growth and has policy implication for the government to diversify the economy in order to shield it from the vagaries of oil price volatility.

Abogan, Akinola and Baruwa [23] embarked on study to determine the impact of nonoil export on economic growth in Nigeria. The study spanned across the period 1980 to 2010. The study employed OLS involving Augmented Dickey Fuller and Philips Perron and Johansen co-integrated tests. Results suggest that nonoil export had moderate significant impact on economic growth in Nigeria. This finding is a confirmation of Onodugo, Ikpe and Anowor's [7] result and has policy implication for FG to pursue

vigorously the policy of diversification to avert a possible collapse of the nonoil sector. This study has provided the theoretical base for the present study.

Mehrara [24] carried out a study using panel data from selected 11 oil exporting countries, to determine the causal relationship between nonoil trade and GDP. His study covered the period 1970 to 2011. He employed unit root test and co-integration technique to analyze a three-variable model. His results indicate that nonoil trade did not have any significant effect on GDP in the short-and long-run. This finding is in agreement with those reported by Onodugo, Ikpe and Anowor [7], and Abogan, Akinola and Baruwa [23]. It has policy implication for diversification of the economy to promote nonoil export. Obviously, what has limited the applicability of this study to the present study is the ambiguity in model specification which treated trade as share of nonoil exports and imports to GDP.

Alam, Abbasi and Baseri [25] carried out a study on the relationship between exports and economic growth in the industrial sector in Iran. The study covered the period 2002 to 2010. They employed econometric tool involving multiple regression to determine the nature of relationship between export and economic growth in industrial sector. They concluded that there was a positive significant relationship between export and economic growth in industrial sector. The finding is quite identical to Adebile and Amusan's [19] results with slight difference in emphasis on industry rather than agriculture. The implication of this, is that export is a sine qua non for industrial growth. Even though this study is fraught with computational aberration, still it has created some insight into the nature of relationship between nonoil export and growth.

Imoughele and Ismaila [26] studied the impact of exchange rate on nonoil export. The study covered the period 1986 to 2013. They employed ADF test and Johansen co-integration test. Their study revealed that effective exchange rate, money supply, credit to the private sector and economic performance were determinants of nonoil export. The finding is in agreement with the findings of earlier studies. It has policy implication for FG to shift emphasis from oil to nonoil sector for sustainable growth. This study has yielded variables which have been included in the present analysis. Nevertheless, extreme caution should be taken while considering the results of analysis of data from small sample using OLS technique.

Gokmenoglu, Sehnaz and Taspinar [27] tested the validity of export-led growth hypothesis for Costa Rica. The study covered the period 1980 to 2013. They employed Johansen co-integration and Granger causality test. They reported findings which indicate that there was a long-run relationship between export and economic growth and that there was a unidirectional causality from economic growth to export growth of cost Rica. These findings are in agreement with results of earlier studies and have policy implication for pursuit of export promotion strategy. The study has created deep insight into the current interest exhibited by researchers in this area of study.

Nwankwo [28] studied the diversification of nonoil export products as a measure for achieving accelerated economic growth in Nigeria. The study covered the period 1981 to 2014. He employed OLS technique for the analysis of data. His finding indicates that there was a long-run equilibrium relationship between nonoil export and economic growth in Nigeria. This finding is in conflict with findings reported by Onodugo, Ikpe and Anowor [7], and Abogan, Akinola and Baruwa [23] and has practical implication for achieving growth through enhanced nonoil export. This study has a strong link with the present study for which it has provided some a priori expectations.

Adel [29] studied the effects of oil and nonoil exports on economic growth in Syria for the period 1975 to 2010. He analyzed the data using ADF unit root test, Johansen co-integration test, Granger causality test, impulse response function (IRF) and variance decomposition (VD) analysis. He found that GDP was positively and significantly related with oil and nonoil exports. This finding supports the findings reported by Waithe, Lorde and Francis [18], and Alimi and Muse [21] which validated export-led hypothesis for Mexico and Nigeria respectively. It has policy implication for pursuit of import substitution /export promotion strategy. This study has a link with the present study in providing evidences to facilitate comparison with its own outcome.

Oluwatoyese, Applanaidu and Razak [30] carried out a study titled 'Agricultural export, oil export and economic growth in Nigeria: Mulitvariate co-intergration approach'. The study spanned across 1981 and 2014. Data were analyzed using unit root test, multiple regression technique and Granger causality test. Study revealed that there was a significant relationship among

economic growth, agricultural export and oil export. The finding is a confirmation of export-led hypothesis validated by Waithe, Lorde and Francis [18] for Mexico and Alimi and Muse [21] for Nigeria. The finding has policy implication for achieving growth through diversification of the economy.

2.3 Summary of Review

Critical survey of related literature has revealed almost immediately a common feature of inadequate sample to warrant the application of econometric tools for reliable results. With only a few exceptions, including Waithe, Lorde and Francis [18], Adebile and Amusan [19], Ningi [20], Alimi and Muse [21], and Mehrara [24], several studies had employed only moderate samples (a little above 30). Certain studies including Usman [11], Alam, Abbasi and Baseri [25], and Imoughele and Ismaila [26] had even applied OLS involving multiple regression in the analysis of data from extremely small sample. It is a well-known fact that the larger the sample, the more reliable are the results of data analysis with most econometric techniques.

It is not surprising then that the findings of these studies are conflicting. It is not difficult to observe two sets of discordant research evidences in this area of study. Studies which reported positive significant relationship between nonoil export and growth include the following: Usman [11], Alimi and Muse [21], Abogan, Akinola and Baruwa [23], Alam, Abbasi and Baseri [25], Gokmenoglu, Sehnaz and Taspinar [27], Nwankwo [28], Adel [29] and Oluwatoyese, Applanaidu and Razak [30]. On the contrary, studies which found inverse relationship between nonoil export and growth include Chukwuigwe and Abili [16], Onodugo, Ikpe and Anowor [7] and Mehrara [24].

Not infrequently, researchers had sought a prior justification for replication of these studies on account of these conflicting results. The natural consequence of their continuing search for key variables to mediate between the two set of conflicting findings is expanded models containing new additional variables. This has led to a complicated situation where every new research solution constitute itself into a new research problem. This becomes a self perpetuating, irreversible process.

Perhaps what is more puzzling is the rapidity with which Nigerian researchers replicate studies on impact of nonoil export on economic growth between 2011 and 2016. This portends the level of restiveness and despair among these researchers. More importantly, it is a glaring evidence that diversification of the economies of petroleum exporting countries and indeed less-developed countries have continued to remain an unsettled issue. To continue to expect a different result while still using exactly the same technique over the years is, to say the least, expecting too much.

Certainly, there is a dire need for a change in the technique for data analysis. This new technique is simply factor analysis which combines the predictive powers of multiple regression with its own inherent capacity for excavation to isolate potent factors which would mediate among the conflicting findings of earlier studies. Beyond this, factor analysis has the robust feature of yielding coefficient of determination (r^2) to determine the extent to which nonoil export contributes to the variance on economic growth. In this way, factor analysis performs both exploratory and confirmatory function. As a more robust technique, factor analysis works well with moderate sample to yield highly reliable results when the factors contain adequate number of variables which are sufficiently correlated among themselves.

3. RESEARCH METHODOLOGY

3.1 The Data

The data for the study were sourced from Central Bank of Nigeria (CBN), National Bureau of statistics and World Development indicators. The study spanned across the period 1980 to 2014. The variables included in the analysis are those used by Usman [11], Onodugo, Ikpe and Anowor [7], Abogan, Akinola and Baruwa [23], and Imoughele and Ismaila [26] in their econometric studies to determine the impact of nonoil export on economic growth. The choice of these variables and their ordering in the scheme of this work has ensured that they conformed to linearity and stationarity assumptions for a facile application of a more robust technique.

3.2 Empirical Model

As stated, the broad objective of this study is the identification of the factors which influenced the relationship between nonoil export and economic growth in Nigeria. The present study has employed the model used by Usman [11] to identify the determinants of nonoil export and economic growth in Nigeria. Usman [11], had

adopted the model expressed as a functional relationship in the form:

GDP = f (NOE, Xnoe, CPI, ER)

Where GDP is gross domestic product; NOE is nonoil export earnings; Xnoe is nonoil export for previous year; CPI is consumer price index; ER is exchange rate.

Researchers including Onodugo, Ikpe and Anowor (7), Abogan, Akinola and Baruwa [23], and Imoughele and Ismaila [26] had adopted Usman's [11] model.

The model used in this study was adopted with modification from Onodugo, Ikpe and Anowor [7], Abogan, Akinola and Baruwa [23], and Imoughele and Ismaila [26]. This has been presented below.

GDP=f(EXC, INF, FCE, PIV, OPN, CAP, LBR, CPI, PCI, OEX, NOE, BOT)

where GDP is gross domestic product; EXC is exchange rate; INF is inflation rate; FCE is federal consumption expenditure; PIV is private investment; OPN is openness; CAP is capital; LBR is labour; CPI is consumer price index; PCI is per capita income; OEX is oil export; NOE is nonoil export; BOT is balance of trade.

3.3 Factor Model Specification

Common factor model was used for this study. The a prior justification for the choice of common factor model was the application of Usman's [11] model which expresses a linear functional relationship among GDP, NOE, Xnoe, CPI, ER. Onodugo, Ikpe and Anowor [7] had also expressed a functional relationship among Y, L, K, OX, NOX, GDP. In line with the above stated models, the present study has also adopted a model which expresses a functional relationship among GDP, EXC, INF, FCE, PIV, OPN, CAP, LBR, CPI, PCI, OEX, NOE, BOT. Common factor model is appropriate when the variables are assumed to be a linear function of a set of latent variables [31,32]. This model assumes that the variance can be divided into common and unique components with the unique variance being further divided into specific and random error variance [33].

There are 13 variables – GDP (CRN), EXC, INF, FCE, PIV, OPN, CAP, LBR, CPI, PCI, OEX, NOE and BOT. Factor analysis model requires that the variables included in the analysis should be linearly related to each other [34]. Scatterplots of pairs of variables conformed to linearity. The factor model used for this study was developed by Cornish [34]. The model had been expressed algebraically in the form:

$$X_i = \alpha_{i1}F_1 + \alpha_{i2}F_2 + \ldots + \alpha_{im}F_m + e_i$$

Suppose there are p variables X_1, X_2,…Xp measured on a sample of n subjects, variable i is a linear combination of m factors F_1, F_2…, Fm and m < p, where αis are the factor loadings for variable i and ei is that part of variable Xi that cannot be explained by the factors.

Since there are 13 variables, the rule of thumb requires that only one-third of the total number of variables could be extracted as factors. Therefore, the factor analysis model has been written in the form:

$$GDP = \alpha_{i1}F_1 + \alpha_{i2}F_2 + \alpha_{i3}F_{3+} \alpha_{i4}F_4 + ei$$

where

α_{i1} is the factor loading of factor 1
α_{i2} is the factor loading of factor 2
α_{i3} is the factor loading of factor 3
α_{i4} is the factor loading of factor 4
ei is the part of criterion variable GDP that cannot be explained by that factor.

3.4 Validation Technique

To determine the suitability of factor analysis for the study, Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's test of sphericity have been computed. KMO statistic was used to ascertain whether or not the factors were comprised of sufficient number of variables while Bartlett's test (Chi-square) was used to ascertain whether or not the variables were sufficiently correlated. KMO statistic should exceed 0.7 to justify the application of factor analysis while chi-square value should be significant at 0.05 confidence interval to infer that the variables were sufficiently correlated [34].

KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.769
Bartlett's Test of Sphericity	Approx. Chi-Square	678.022
df		78
Sig.		.000

As can be seen above, KMO statistic is 0.769. Since this is greater than the criterion KMO statistic of 0.700, KMO statistic of 0.769 was considered to be significant. Again, Chi-Square is 678.022($p \leq 0.000$) at df 78. Since $p \leq 0.05$ is greater than $p \leq 0.000$, Chi-Square value of 678.022 was considered to be significant. These results suggest that the factors were comprised of sufficient numbers of variables and that the variables were sufficiently correlated. This has warranted the application of factor analysis for data analysis in the present study.

3.5 Eigenvalues for Determination of Number of Factors

Cornish [34] had recommended that to determine the number of factors to be extracted, say m, the number of eigenvalues should be divided by 1 to obtain m. The eigenvalues have been presented in a tabular form:

As can be seen below, the number of eigenvalues equals 2 when divided by 1 yields 2. Thus, accordingly only two factors could be extracted in this analysis.

3.6 Evaluation Criteria

Data were analyzed using factor analysis. The main focus of factor analysis was to determine the nature of the factor structure of nonoil export – economic growth nexus in Nigeria. The principal axes method was applied for the factorization of the inter-correlation matrix. This method is also known as the method of principal factor solution.

To keep the number of independent dimensions to the essential minimum, extraction of factors was restricted to only those values of correlation coefficients equal to or greater than unity. Furthermore, conservative rule of thumb for considering a factor as real is as follows: No attempt is made to take decision on the significance of unrotated loadings, e.g. as obtained from centroid method or the method of principal axes [35]. Thus, following this principle, the Varimax rotation of the matrix was carried out.

By rotating the factors slightly in a clockwise direction, the strength of the relationship between the factors and the variables clustered near each other was increased [36,37]. Rotation improves the meaningfulness, reliability and reproducibility of factors [32,38]. Interpretation of results was based on the new values of factor loadings obtained through the use of 'Orthogonal Rotation' formula expressed in the form of $X_1 = X \cos \theta + Y \sin \theta$. Factor loadings which were equal to or greater than ±0.4 were considered to be significant. Ford, MacCallum and Tait [32] had suggested the inclusion of factor loading ≥ 0.4. Factor loadings of the criterion variable were given for all factors disregarding the level of significance so as to ascertain whether or not the factors represented correlates of GDP. The process of factor extraction was discontinued when the number of factors (m= number of eigenvalues 2/1, i.e., 2) [34]. Extracting too many factors may present undesirable error variance but extracting too few factors might leave out valuable common variance [39].

Table 2. Eigenvalues for determination of number of factors

Component	Initial eigenvalues			Extraction sum of squared loadings		
	Total	%of variance	Cumulative%	Total	%of variance	Cumulative%
1	8.192	63.019	63.019	8.192	63.019	63.019
2	1.560	12.003	75.022	1.560	12.003	75.022
3	.937	7.211	82.233			
4	.740	5.692	87.925			
5	.719	5.530	93.455			
6	.407	3.133	96.588			
7	.181	1.394	97.982			
8	.115	.887	98.869			
9	.065	.501	99.371			
10	.054	.417	99.788			
11	.017	.128	99.916			
12	.009	.067	99.983			
13	002	.017	100.000			

4. RESULTS

The results of data analysis have been presented in Tables and discussed under the following subheadings:

- Inter-correlation matrix
- Nonoil export – growth relationship in Nigeria
- Factor structure of NOE-GDP nexus
- Varimax (rotated) factor structure of nonoil export-GDP nexus
- Factors influencing the relationship between nonoil export and GDP
- Categorization of factor correlates into policy instrument

4.1 Inter-correlation Matrix

Inter-correlations among GDP and twelve independent variables have been presented in Table 3.

As can be seen in Table 3, all the correlation coefficients are of zero order. At $p \leq 0.010$, correlation coefficients of 0.394, 0.463, 0.485, 0.489, 0.495, 0.522 and 0.534 were significant, implying thereby that they were significant at both 0.01 and 0.05 confidence intervals. Only three correlation coefficients including 0.285, 0.295 and 0.342 were significant at $p \leq 0.050$, indicating thereby that they were significant at

0.05 confidence interval but not at 0.01 confidence interval. Thus, with the exception of INF, $r=-0.123 (p \leq 0.240)$ and PCI, $r=-0.118 (p \leq 0.250)$, all correlation coefficients were statistically significant. Inter-correlations are therefore in conformity with Tabachnick and Fidell [40] requirement that the correlation, r must be 0.30 or greater since anything lower would suggest a really weak relationship between the variables.

4.2 Nonoil Export-growth Relationship in Nigeria

Correlation coefficient between NOE and GDP, after partially out the effects of 11 other independent variables-EXC, INF, FCE, PIV, OPN, CAP, LAB, CPI, PCI, OEX, and BOT have been presented in Table 4 to facilitate discussion on nonoil export-growth relationship. Coefficient of determination (r^2) has also been computed to determine the percentage contribution of NOE to GDP in Nigeria.

Table 4 shows clearly that: $r_{noe/gdp} = 0.342$ ($p \leq 0.022$) which yielded $r^2_{noe/gdp} = 0.1170$ representing 11.70 per cent. These results suggest that: (1) There was a positive significant relationship between NOE and GDP in Nigeria (2) NOE has made a significant contribution of 11.70 per cent to GDP in Nigeria.

Table 3. Correlation matrix (13x13) among GDP(CRN) and independent variables

S/no	Var. codes	1	2	3	4	5	6	7	8	9	10	11	12	13
1	GDP	X												
2	EXC	.394	X											
3	INF	-.123	-.374	X										
4	FCE	.463	.782	-.310	X									
5	PVI	.295	.872	-.355	.623	X								
6	OPN	.285	.688	-.163	.514	.484	X							
7	CAP	.495	.882	-.343	.946	.745	.596	X						
8	LAB	.485	.483	-.246	.685	.334	.311	.739	X					
9	CPI	.489	.901	-.348	.912	.733	.649	.976	.736	X				
10	PCI	-.118	.058	.018	-.335	.082	.333	-.204	-.289	-.133	X			
11	OEX	.534	.857	-.335	.960	.691	.577	.966	.734	.973	-.269	X		
12	NOE	.342	.685	-.277	.784	.521	.484	.868	.860	.895	-.229	.858	X	
13	BOT	.522	.828	-.334	.896	.703	.504	.880	.530	.878	-.293	.940	.712	X

NB: All figures were rounded to three places of decimal

Table 4. Partial correlation and coefficient of determination between NOE and GDP

S/No	Criterion variable	GDP		Per cent contribution	Probability	Decision
	Predictor	r	r^2			
1	NOE	0.342	0.1170	11.70	0.022	Significant

4.3 Factor Structure of NOE – GDP Nexus

The factor structure of NOE-GDP nexus has been presented in Tables 5 and 6 to facilitate the extraction of factors lying concealed in the interrelationships among the criterion variable and the independent variables.

Table 5 presents original principal components factor matrix. The last column reveals the communalities (h^2). On the whole, factor analysis led to the extraction of two factors.

4.4 Varimax (Rotated) Factor Structure of Nonoil Export-GDP Nexus

Orthogonal rotation of the principal axes (original) factor matrix has yielded new values for the factor loadings. The results have been presented in Table 6.

Table 6 shows the Varimax factor loadings along with communalities and uniqueness of variables. The total variance of any variable comprises of common variance (h^2) as well as specific and error variance. Now, since it is usually difficult to separate specific variance and error variance, both are always combined and denoted by unique variance (U^2). This has been revealed in the last column of this table. At the end of each column of the factor, the eigenvalues, i.e., percentages of total variance and common variance contributed by the factor were entered.

4.5 Factors Influencing the Relationship between Nonoil Export and GDP

To identify Factors 1 and 2 which have crystallized from data analysis, Table 6 was further split into two sub-tables-Tables 6.1 and 6.2 to facilitate discussion on the significant factor loadings of each of the rotated factors.

Table 5. Principal axes (Original) factor structure for NOE-GDP nexus (N=35)

S/No	Variable codes	Factor 1	Factor 2	h^2
1	GDP	0.541	-0.155	0.317
2	EXC	0.902	0.327	0.920
3	INF	-0.390	-0.121	0.167
4	FCE	0.934	-0.163	0.900
5	PIV	0..756	0.363	0.703
6	OPN	0.630	0.551	0.700
7	CAP	0.985	-0.027	0.970
8	LBR	0.743	-0.367	0.687
9	CPI	0.987	0.036	0.976
10	PCI	-0.185	0.879	0.808
11	OEX	0.985	-0.091	0.979
12	NOE	0.870	-0.176	0.788
13	BOT	0.914	-0.065	0.839

NB: Factor loadings are rounded to three decimal places

Table 6. Varimax (rotated) factor matrix for nonoil export-GDP nexus (N=35)

S/No	Variables codes	Factor 1	Factor 2	h^2	$U^2=(1-h^2)$
1	GDP	0.529	0.191	0.317	0.683
2	EXC	0.539	0.793	0.920	0.080
3	INF	-0.246	-0.327	0.167	0.833
4	FCE	0.853	0.415	0.900	0.100
5	PIV	0.400	0.737	0.703	0.297
6	OPN	0.188	0.815	0.700	0.300
7	CAP	0.814	0.555	0.970	0.030
8	LBR	0.817	0.138	0.687	0.313
9	CPI	0.779	0.608	0.976	0.024
10	PCI	-0.665	0.604	0.808	0.192
11	OEX	0.852	0.503	0.979	0.021
12	NOE	0.808	0.367	0.788	0.212
13	BOT	0.779	0.582	0.839	0.161
	Sum of squares	5.92	3.84		
	Percentage of total variance	45.52	29.50		
	Percentage of common variance	45.52	29.50		

4.5.1 Factor 1

As has been explained earlier, the Varimax rotation of original factor matrix involving the determinants of nonoil export and GDP was carried out and the Varimax rotated version presented in descending order in Table 6.1.

As can be seen in Table 6.1, Factor 1 had its highest loading on FCE (0.853). Positive significant loading on FCE implies that Factor 1 was a factor of federal government consumption expenditure. The next highest loading on OEX (0.852) clearly indicates that federal government financed the consumption expenditure from sale of crude oil since Nigeria is not an exporter of finished petroleum products. The next highest positive significant loadings on Factor 1 from LAB (0.817) and CAP (0.814) brought Factor 1 close to factor of production. As Factor 1 increased, FCE, OEX, LAB and CAP also increased. It is only reasonable to assume that the increase in FCE, OEX, LAB and CAP did not occur within the economy and cannot therefore be localized. There is no a priori reason why this should not be a valid assumption considering that a country such as Nigeria which allocates over 70 per cent of its annual budgets to recurrent expenditure can neither create jobs nor augment its capital base. It is then only logical to consider Factor 1 as 'foreign direct investment (FDI)'. Now, it is not difficult to link the positive significant loading of FCE (0.853) on Factor 1 to the huge cost associated with various federal government incentives to attract foreign investors. Certainly, increase in FDI would lead to increase in NOE (0.808), CPI (0.779), BOT (0.779), EXC (0.539), and PVI (0.400). Rising FDI accompanied by declining PCI (-0.665) was a natural consequence of foreign investors' adoption of sophisticated technology and their preferred choice of foreign labour to local workers who were generally considered to be unskilled. Okafor and Jegbefumwen [41] had also observed that foreign investors preferred foreign workers to Nigerian workers whom they considered unskilled. Low absorptive capacity of domestic economy, coupled with skill-based technology change, had eroded the country's productive base thereby leading to steady reduction in national income and PCI.

The constellation of variables with highly significant loadings on Factor 1 (FDI) are: FCE, OEX, LBR, CAP and NOE. These variables contributed significantly to the variance in FDI since, according to Kline [37], factor loadings are same as regression weights. Thus, FCE, OEX, LAB, CAP and NOE could be constituted into active constructs of nonoil export-led growth theory.

The extent of common factor variance contributed by Varimax Factor 1 (FDI) was found to be 45.52 per cent which is 45.52 per cent of the total variance in GDP contributed by the two factors. Positive significant loadings on NOE (0.808) and GDP (0.529) imply that Factor 1 i.e., FDI had positive valence for NOE and GDP. In other words, FDI boosted the relationship between NOE and GDP in Nigeria.

4.5.2 Factor 2

Table 6.2 presents the significant loadings of Factor 2 in descending order.

As can be seen in Table 6.2, Factor 2 was most highly loaded on OPN (0.815). OPN is the only variable with 'very high' loading on Factor 2. With its next highest loading of 0.793 on EXC (trade transaction variable), Factor 2 comes close to 'Trade Liberalization' (TRL).

Table 6.1. Varimax factor 1

S/No.	Description of variables	Codes	Factor loading
4	Federal consumption expenditure	FCE	0.853
11	Oil export	OEX	0.852
8	Labour	LBR	0.817
7	Capital	CAP	0.814
12	Nonoil export	NOE	0.808
9	Consumer Price Index	CPI	0.779
13	Balance of Trade	BOT	0.779
10	Per Capita Income	PCI	-0.665
2	Exchange Rate	EXC	0.539
5	Private Investment	PIV	0.400
1	Gross Domestic Product	GDP(CRN)	0.529

NB: GDP is Criterion variable

Table 6.2. Varimax factor 2

S/No.	Description of variables	Codes	Factor loading
6	Openness	OPN	0.815
2	Exchange rate	EXC	0.793
5	Private investment	PIV	0.737
9	Consumer price index	CPI	0.608
10	Per capita income	PCI	0.604
7	Capital	CAP	0.555
11	Oil export	OEX	0.503
13	Balance of trade	BOT	0.482
4	Federal consumption expenditure	FCE	0.415
12	Nonoil export	NOE	0.367
3	Inflation rate	INF	-0.327
1	Gross domestic product	GDP(CRN)	0.191

This finds justification in the axiom that a country which relaxes import restrictions and pursues export promotion, attracts foreign investors whose active participation in the country's stock market leads to the appreciation of its currency. Positive significant loadings on PIV (0.737), CPI (0.608), PCI (0.604), CAP (0.555), OEX (0.503), BOT (0.482) and FCE (0.415) are all compatible with the nomenclature in confirmatory factor analysis. Positive, though nonsignificant loading on NOE (0.367) implies that a country that pursues the policy of trade liberalization has positive valence for NOE. Negative, though nonsignificant loading on INF (-0.327) is an indication that a country which pursues the policy of trade liberalization tends toward reduction in inflation rates.

OPN is the only variable with very significant factor loading to constitute trade liberalization constellation. However, by the close approximation of 'high' significant factor loading on EXC(0.793) to very high significant loading of 0.800, EXC has been considered as one of the variables in Trade Liberalization constellation. Essentially therefore, the constellation of variables in Trade Liberalization includes OPN and EXC.

The common factor variance accounted for by Factor 2 i.e., Trade liberalization was 29.50 per cent which is 29.50 per cent of the total variance contributed by the two factors. Positive nonsignificant loading on NOE (0.367) and positive nonsignificant loading on GDP (0.191) imply that trade liberalization did not boost the relationship between NOE and GDP in Nigeria.

On the whole Factors 1 and 2 had explained the variance in GDP upto 75.02 per cent leaving out only 24.98 per cent of unexplained variance. Thus, the two-factor solution stands justified.

4.6 Categorization of Factor Correlates into Policy Instruments

Categorization of factor correlates into policy instruments has been carried out in this section in order to constitute a viable nonoil export-led growth policy. This has been presented in Table 7.

As can be seen in Table 7, factor correlates of GDP including FCE, OEX, LBR, CAP, OPN and EXC have been transformed into their equivalent policy instruments of budgets, foreign exchange earnings, human capital investment, stock market, import/export and foreign currencies respectively. In turn, these policy instruments have been aptly constituted into their corresponding policies. These results indicate clearly that a viable nonoil

Table 7. Classification of factor correlates into nonoil export-led growth policy instruments

S/no.	Factor correlates	Policy instrument	Corresponding policy
1	FCE	Budget	Budgetary policy
2	OEX	Foreign exchange earnings	Exchange rate policy
3	LBR	Human capital investment	Human resource development policy
4	CAP	Stock market	Credit policy
5	OPN	Import/export	Import substitution/export promotion policy
6	EXC	Foreign currency	Exchange rate policy

export – led growth policy which has evolved from the analysis is comprised of the following components:

- Budgetary policy
- Exchange rate policy
- Human resource development policy
- Credit policy
- Import substitution/export promotion policy

4.7 Diagrammatic Representation of Factors and Modal Summary

For at a glance appreciation, the factors have been presented diagrammatically in Figs. 1 and 2.

The results of factor analysis have been aptly summarized in the following equation:

GDP = 0.529FDI + 0.191 TRL

5. EMPIRICAL RESULTS AND DISCUSSION

5.1 Empirical Results

The major findings which have crystallized from this study include the following:

1. There was a positive significant relationship between nonoil export and growth which is implicit in a positive contribution of nonoil export to growth in Nigeria.
2. Two potent factors influencing nonoil export and growth relationships in Nigeria were foreign direct investment and trade liberalization. While foreign direct investment was an active factor boosting the relationship between nonoil export and growth, trade liberalization remained a passive factor in the relationship between the two.
3. A viable nonoil export-led growth policy, is comprised of budgetary policy, exchange rate policy, human resource development policy, credit policy, and import substitution/export promotion policy.

5.2 Discussion

To integrate this study into the existing economic literature, the findings of the study have been discussed hereunder.

An important finding of this study is that there was a positive significant relationship between nonoil export and growth which is implicit in a positive contribution of nonoil export to growth in Nigeria. This finding has come much in expectation. This is because for over two decades, successive governments in Nigeria have devised programmes and strategies to diversify the economy and so reduce overdependence on oil. As the largest economy in Africa, Nigeria has become a final destination to foreign investors and the single largest recipient of foreign direct investment in Sub-Saharan Africa. Therefore, it is possible that foreign participation in mining and agriculture has yielded exportable surplus in the nonoil sector. This particular finding has a practical value as it stands to mediate between two sets of discordant evidences on the impact of nonoil export on growth in petroleum exporting countries. This finding has confirmed the results of earlier studies reported by Usman [11], Alimi and Muse [21], Abogan, Akinola and Baruwa [23], Alam, Abbasi and Baseri [25], Gokmenoglu, Sehnaz and Taspinar [27], Nwankwo [28] and Adel [29]. Certainly, the conflict in the findings of earlier studies was due to the influence of foreign direct investment and trade liberalization as extraneous variables in the models employed by the researchers. A strict control of these extraneous variables in the models would reduce to the barest minimum any such inconsistencies in the results of these studies.

Another finding of the study is that foreign direct investment and trade liberalization were two potent factors which influenced the relationship between nonoil export and growth in Nigeria. While foreign direct investment was an active factor which boosted the relationship between nonoil export and growth, trade liberalization remained a passive factor in the relationship between the two. These results are not altogether unexpected considering that foreign direct investment has always constituted an important source of foreign capital to augment the capital base of the recipient country. S. Okafor, Jegbefumwen and P. Okafor [42] had reported that foreign direct investment contributed significantly to economic growth in Nigeria. Perhaps, what has come as a surprise is the emergence of trade liberalization as a passive factor in the relationship between nonoil export and growth. It is an established fact that trade is an engine of growth. However, a plausible explanation in the Nigerian situation is that unrestricted flow of goods and services across the country's borders exposes the infantile home industries to unhealthy
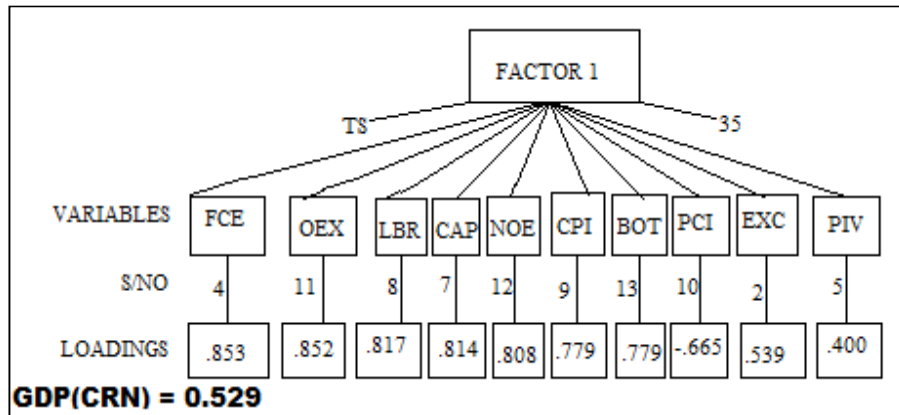
Fig. 1. Factor 1: Foreign direct investment (FDI)
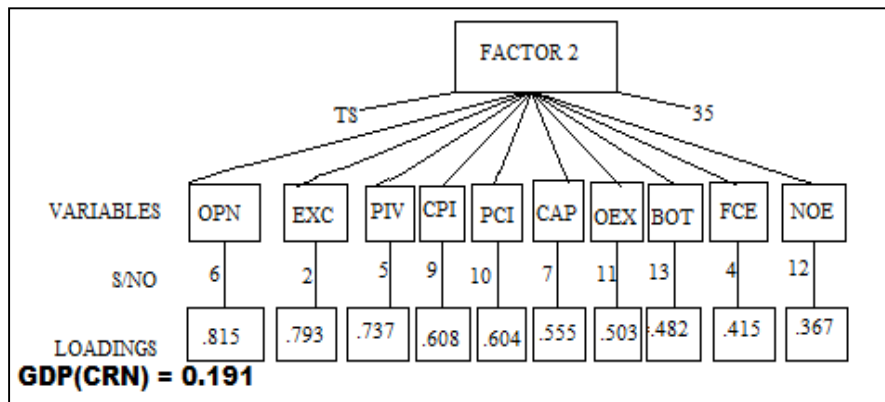*Source: Authors' Presentation*

Fig. 2. Factor 2: Trade liberalization (TRL)
Source: Authors' Presentation

competition with highly specialized foreign firms. The posture of trade liberalization as a passive factor in nonoil export-growth nexus is a natural consequence of undiversified, monolithic, import-dependent country with low export base. Okafor [43], in his study had reported a finding which indicates that nonoil sources were not fully exploited in Nigeria.

Moreover, there is the finding that a viable nonoil export-led growth policy is comprised of budgetary policy, exchange rate policy, human resource development policy, credit policy and import substitution/export promotion policy. Perhaps, this is a most startling feature of this article – the modeling of a nonoil export – led growth policy for Nigeria and indeed, the petroleum exporting countries. Essentially, the nonoil export-led growth policy derives its base from the constellation of variables of factors condensed out of the inter-correlations among

common determinants of nonoil export and growth in Nigeria. The policy instruments of nonoil export-led growth policy are deeply moored in major macroeconomic theoretical constructs and are therefore in conformity with modern macroeconomic theories and practices. Okafor, Oleribe and Mba [44] had also applied factor analysis for identifying potent factors which were constituted into a dynamic microfinance policy.

6. CONCLUSION AND POLICY IMPLICA-TIONS

6.1 Conclusion

The major inference warranted by this study is that there was a positive significant relationship between nonoil export and growth in Nigeria which was influenced by foreign direct investment and trade liberalization. This

inference has formed a strong base for developing the nonoil export-led growth policy for Nigeria, and by extension, the petroleum exporting countries. The nonoil export-led growth policy has as its goal, the achievement of growth through foreign direct investment while adopting import substitution/export promotion strategies in order to protect the home industries. The nonoil export-led growth policy has been derived by constituting the correlates of the two isolated factors – foreign direct investment and trade liberalization into policy instruments. The theoretical and practical value of the nonoil export-led growth policy can be educed from the policy implications of the findings which have been presented in the next section.

6.2 Policy Implications

The findings of this study have several policy implications for Nigeria, and by extension, the oil exporting countries and even the developing economies. Firstly, there is a need to exploit the positive significant relationship between nonoil export and growth for developing a strategy to achieve sustainable growth in petroleum exporting countries. This would involve a shift of emphasis to the nonoil sector in order to diversify their revenue bases and so mitigate the external shock caused by the crash in international oil price.

Secondly, given foreign direct investment as a booster of the relationship between nonoil export and growth, a viable option for the petroleum exporting countries is the induction of foreign capital and technology in their nonoil sectors in order to augment their domestic productive capacities and harness foreign direct investment toward achieving sustainable economic growth.

Thirdly, the emergence of trade liberalization as a passive factor in nonoil export-growth nexus requires that in developing any programme to reduce overdependence on oil, it is important to consider a likely impact of trade openness on the nonoil sector. Certainly, the next priority is arguably the adoption of import substitution/export promotion in order to derive the full benefit of international trade while pursuing the policy of trade liberalization with extreme caution in order to protect their home industries.

Fourthly, the cluster of active variables of foreign direct investment and trade liberalization around GDP has paved the way to consider them as correlates of GDP. It is therefore important that in formulating a dynamic nonoil export-led growth policy, all correlates of foreign direct investment and trade liberalization which impinge on nonoil export-growth nexus such as budgetary policy, exchange rate policy, human resource development policy, credit policy and import substitution/export promotion policy should be modelled as components of a new dynamic policy.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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