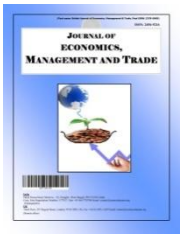

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Assessment of Domestic Investment, Export Expansion and Economic Performance in Nigeria: A Vector Autoregression Approach

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Authors' contributions

This work was carried out in collaboration between both authors. Author AEO designed the study, performed the statistical analysis, wrote the protocol and the first draft of the manuscript. Author ROY managed the analyses and the literature searches of the study. Both authors read and approved the final manuscript.

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ABSTRACT

The purpose of this article is to investigate the nexus between domestic investment, export expansion and economic growth in Nigeria. To achieve this purpose, annual time series data from the period between 1981 and 2018 was tested using the Johansen co-integration analysis, VECM and the Granger-Causality test. The result of the analysis revealed an insignificant relationship between domestic investment and export expansion. Based on the Granger-Causality test, the result indicated a bi-directional relationship between domestic investment and economic growth. These results provide evidence that domestic investment and economic growth are not viewed as sources of export expansion in Nigeria during the period under review. Therefore, changes in policies and regulations to accelerate the export expansion of Nigeria will ultimately yield positive results in terms of achieving high rates of stable economic growth. Policymakers in Nigeria should search for the alternative catalyst to stimulate domestic investment and economic growth geared towards promoting long-term export expansion in Nigeria effectively.

Keywords: Domestic investment; export expansion; economic growth; granger causality; vector autoregression.

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1. INTRODUCTION

In recent years, the Nigerian economy has been bedeviled with a series of turbulence [1]. A nation that recorded average GDP growth of 6.5%, one of the highest in the world just a decade ago, is now projecting a growth rate of 2.5% for 2021. The Nigerian economy is currently facing several challenges and could completely collapse if serious attempts are not made to arrest the drift; the situation may be worsened [2]. The economy, which depends predominantly on revenue from oil exports, has suffered as a result of oil price volatility in the international market. Following the collapse of oil price 2014-2016, combined with adverse production shocks, the gross domestic product (GDP) growth rate dropped to 2.7% in 2015. In 2016 during its first recession in 25 years, the economy contracted by -1.6%.

Since 2015, economic growth remains muted. Growth averaged 1.9% in 2018 and remained stable at 2% in the first half of 2019. Domestic demand remains constrained by stagnating private consumption in the context of high inflation (11% in the first half of 2019). In the aspect of production, economic growth was driven by the services sector, especially telecoms between the second half of 2019 and the third quarters of 2020. Growth in the agricultural sector has remained insignificant and below potentials owing to the continued insurgency in the Northeast and the lingering farmer-herdsmen clashes. The performance of the industrial sector has been mixed. Oil production has remained relatively stable while manufacturing output slowed down in the second quarter of 2019 and became much slower from the second quarter of 2020 due to the effects of COVID-19 Pandemic. Also, food and drink production declined due to the adverse effects of national lockdown. However, the situation is expected to change owing to the gradual easing of the lockdown and subsisting effect of import restrictions. Construction continues to perform positively, supported by ongoing mega projects, higher public investment in the first half of the year, and import restrictions imposed by the national government [2].

The current quagmire facing the Nigerian economy can be mitigated by massive public and private investments in critical sectors that would drive productivity; accelerate export promotion and expansion which will, directly and indirectly, drive the required growth rate that would ensure sustainable development. Several studies have investigated the nexus between domestic investment and economic growth [3,4,5,6] and the nexus between exports and economic growth [7,8,9,10] in different regions of the world. However, there is a paucity of studies that have integrated and examined the relationship between domestic investments, export expansion and its effects on economic growth. In Nigeria, studies such as [11,12,13] investigated the relationship between domestic investment and economic growth, while [14,15,16] investigated the nexus between various dimensions of exports and economic growth. Nevertheless, to the best of the authors' knowledge, none of these studies looked at the effects of domestic investment and export expansion on the growth of the Nigerian economy. As such, this inquiry is motivated by the apparent paucity of studies that have investigated this research space. Therefore, the purpose of this study is to use the [17] endogenous growth theory to empirically investigate the effects of domestic investments and exports on the growth of the Nigerian economy. The Endogenous Growth model developed in the 1990s by [18,19,17,20] as a reaction to this omissions and deficiencies to attain long-run growth. This theory enumerates the policy variables that can have a significant impact on long-run economic growth. Unlike the Solow that considers technical progress as an exogenous factor, the new growth model avers that technical progress has not been equal nor has it been exogenously transmitted to long-run growth in the most developing countries [21].

The contribution of this study to knowledge is threefold. Firstly, it extended earlier studies on effects of domestic investment on economic growth [3,4,5,6] by incorporating the role of export expansion in this relationship.

Secondly, the result of direct investment having a negative impact on economic growth does not support the endogenous theory propounded by the classical theory that emphasised the importance of direct investment on the growth of the economy and the study also contradicts the findings of [22]; [5] and [23] because the findings show that domestic investment in Nigeria has a negative impact on growth in both the short-run and long-run.

Thirdly, the practical implications of this study based on the findings are relevant to policymakers in government, state regulatory authorities through the recommendation of

significant changes in policy and regulatory guidelines that can drive domestic investment and export expansion which will invariably propel economic growth in Nigeria.

The study is structured as follows. In the second section, the study reviewed conceptual, empirical and theoretical literature. Section three contains methodology, section four details out the analysis of the study, section five discusses the findings, section six presents the conclusion based on the results and section seven is policy recommendations and future research direction.

2. LITERATURE REVIEW

2.1 Theoretical Framework

Extant literature, including recent extensions of the neoclassical growth model as well as the theories of endogenous growth, has emphasized the role of domestic investment in economic growth. Among these studies we can cite [18,19,24,25,26,20,27,28,29,30,23].Other studies prove that domestic investment may not necessarily have a favourable impact on economic growth [31,32,33,34] among others.

As such, the study is anchored on the endogenous growth theory that emphasizes the role of domestic investment and other variables such as exports on the growth of an economy.

The endogenous growth model developed by [35,18,19] and other economists do not merely criticise the neoclassical growth theory; instead, it extends the latter by introducing endogenous technical progress in growth models [36]. By assuming that private and public investments in critical sectors raise external economies and productivity improvements that mitigate the natural tendency for diminishing returns; endogenous growth theory seeks to explain the existence of increasing returns to scale and the divergence long-term growth patterns among countries. Technical progress is a function of the production of ideas in endogenous growth theory [36,37]. New ideas facilitate new and better goods and services as well as better production techniques and higher quality of older products. Technical progress can be increased by providing monopoly power through patents and copyrights to speed-up the pace of innovation. Technological change can also be increased through proper investment in human capital, which is the sum of all of a country's human knowledge [30,38]. Through investment in education, health, training, research and development, and other human capital determinants, a country can increase and enhance the productivity of labour and promote economic growth. Endogenous growth theory also predicts that spillover from investment in value-added products and knowledge will itself be a form of technical progress and lead to increased growth. Therefore, domestic investment and export expansion is an essential approach to achieving desired growth [29,30,23].

2.2 Empirical Review

This section entails the review of extant empirical studies that focused on the relationship among domestic investment, exports and economic growth in different regions of the world. This review revealed that most studies in this research space are based on times series analysis.

2.2.1 Domestic investment and economic growth nexus

[22] examined the effects of capital flows on economic growth in Senegal using autoregressive distributed lag (ARDL) over the period 1970 – 2014. The results show that domestic investment has a positive effect on economic growth in the long run. [5] investigated the long run and short-run impacts of exports on economic growth in Gabon for the period 1980 – 2015 by deploying a cointegration analysis and error correction model. The empirical results show that in the long-run domestic investment affect negatively on economic growth. However, in the short-run domestic investment produce economic growth.

[39] investigated the relationship between domestic investment and economic growth in Malaysia; to ascertain if domestic investment bears significant impact on economic growth. The study analyzed annual time-series data for the periods between 1960 and 2015 using Correlation analysis, Johansen cointegration analysis of Vector Error Correction Model and the Granger-Causality tests. The study found that there is a positive effect of domestic investment and exports on economic growth in the long-run; however, there is no relationship between domestic investment and economic growth in the short run. It is evident from this study that in addition to domestic investment, exports, and labour constitute significant sources of economic growth in Malaysia.

In the Nigerian context, [23] used the auto-regressive distributed lag (ARDL) to investigate the impact of domestic investment on the growth of the Nigerian economy from 1981 to 2017. The study found that in the short-run and long-run domestic investment has a positive but insignificant impact on Nigeria's economic growth. [40] examined how private investment and private sector credit from financial institutions affect economic growth. The study conducted Johansen cointegration test and used error correction mechanism to analyze the time series data covering from 1980 to 2016. The result shows that a 10% rise in the current value of a private domestic investment on the average, it stimulates economic growth by 2.08%. Similarly, the value of financial sector credit to the private sector is positively related to economic growth in Nigeria.

[41] used multiple regression and cointegration approach to examine the impact of domestic investment on economic growth in Nigeria, employing annual time-series data from 1970 to 2013. The study found that private investment had a positive but insignificant impact on economic growth; while the protective investment of government hurt economic growth.

$H0_1$: Domestic investment has significant impact on Nigeria's economic growth.

2.2.2 Exports and economic growth

[42] Investigated agriculture export and economic growth with the objective of ascertaining the role of agricultural export on the Pakistani economy. The study obtained data from 1972 to 2008. For the estimation of the study, the cointegration test and Granger Causality test was applied. The finding points out the insignificant impact of due to agricultural exports based on raw material rather than the manufactured products. [43] evaluated the effect exports and foreign direct investment on the Pakistani economy from 1990 to 2010. The study used the ordinary least square (OLS) econometric technique and finding revealed that both FDI and exports has a positive effect on the Pakistani economy. [44] used the ARDL approach to find long-run positive effects of exports, human capital and capital formation on GDP in Pakistan for the period 1973-2013. The Granger causality analysis revealed bidirectional causality between exports and GDP both in the short and long run. [45] used the Toda and Yamamoto augmented causality test to provide evidence confirming the growth-led exports hypothesis for Malaysia (1970-2012).

Studies concerning African countries are relatively limited and again provide mixed evidence. [46] studied the impact of exports on economic growth in 28 African countries using an augmented production function, including labour, capital formation, and exports. Using a pooled cross-sectional time-series estimation of 1960-1970 and 1970-1980 average annual growth rates, he found that exports exert a positive impact on economic growth. [47] employed threshold regression techniques to examine the relationship between exports and per capita income growth in a sample of 43 African countries over the period 1960-1999. He found a positive relationship between the two variables.

In Nigeria, [48] investigated the relationship between exports, imports, gross domestic investment, labour force and GDP in Nigeria over the period 1970-2006. Using the Johansen methodology and Granger causality test, he found no evidence supporting the export-led growth hypothesis. The results also revealed a causality running from imports to exports and from economic growth to imports. [49] used the Johansen approach in a two-variable framework and found supportive evidence of the growth-led export in Nigeria for the period 1970-2009.

$H0_2$: Exports have significant impact on Nigeria's economic growth.

3. METHODOLOGY

The research plan that is adopted for the study is descriptive research method and Ex Post Facto Research Design. The variables used for the analysis are all gross domestic product (RGDP) known as the dependent variable in the model and the independent variables: domestic investment (DINV), and total export (TEXP). The variables used in the analysis were subjected to unit root test to determine their stationary state. The research utilized secondary data annual time series for the variables identified above. The data were obtained from the Central Bank of Nigeria (CBN) statistical Bulletins, Nigeria Stock Exchange (NSE), and World Bank Data Base.

3.1 Model Specification

To establish a simple and explicit model for this study, the neoclassical growth theory will be adopted in order to determine the connection

between economic growth, domestic investment and total export. This model constitutes total exports and domestic investment which formed the augmented production function and it is depicted as follows:

$$\mathbf{Y} = \mathbf{F}\ (\mathbf{K}, \mathbf{X}, \mathrm{M}) \quad (1)$$

The augmented production function comprising all these variables can be further expressed as:

$$\mathbf{Y}=\mathbf{A}\ \mathbf{K}^{\alpha 1}\ \mathbf{X}^{\alpha 2}\ \mathbf{M}^{\alpha 3} \quad (2)$$

In equation (2) Y is RGDP, K is Domestic Investment (DI) proxy of government fixed capital formation, X is Export, M is Import and A shows the level of technology engaged in the country which is assumed to be constant. The returns to scale connected with domestic investment, total exports and imports are represented by $\alpha 1$, $\alpha 2$ and $\alpha 3$, respectively. Equation (2) can be further transformed from the non linear form to linear; the Cobb-Douglas production function of the linear form can be expressed as:

$$\mathrm{Log}\ (\mathbf{Yt}) = (\mathbf{A}) + \boldsymbol{\alpha 1}\mathbf{Log}(\mathbf{Kt}) + \boldsymbol{\alpha 2}\mathbf{Log}(\mathbf{Xt}) + \boldsymbol{\alpha 3}\mathbf{Log}(\mathrm{M}\mathbf{t}) + \boldsymbol{\varepsilon t} \quad (3)$$

By keeping the level of technology constant, the impact of the domestic investment, total export and the total import on economic growth can be determined. The linear model generating the impact of domestic investment, total export and the total import on economic growth after holding technology constant can be written as follows:

$$\mathrm{Log}\ (\mathbf{Yt}) = \boldsymbol{\alpha 0} + \boldsymbol{\alpha 1}(\mathbf{Kt}) + \boldsymbol{\alpha 2}\mathbf{Log}(\mathbf{Xt}) + \boldsymbol{\alpha 3}\mathbf{Log}(\mathrm{M}\mathbf{t}) + \boldsymbol{\varepsilon t} \quad (4)$$

4. EMPIRICAL ANALYSIS, RESULT AND DISCUSSION

Table 1. Result of descriptive analysis

	RGDP	DI	X	M
Mean	27568.69	5.02E+12	4820.078	16226.66
Median	6102.422	2.25E+12	1526.861	7115.503
Maximum	127736.8	2.46E+13	19280.04	146740.7
Minimum	144.8312	8.71E+10	7.5025	144.7233
Std. Dev.	37733.05	5.98E+12	5816.793	31753.64
Skewness	1.279753	1.343021	0.926652	3.146605
Kurtosis	3.322305	4.340234	2.499966	12.08884
Jarque-Bera	10.53701	14.26749	5.83422	193.5016
Probability	0.005151	7.98E-04	0.05409	0
Sum	1047610	1.91E+14	183163	616613.1
Sum Sq. Dev.	5.27E+10	1.32E+27	1.25E+09	3.73E+10
Observations	38	38	38	38

Source: Author's computation using E-views, 2020

List of Variables

RGDP= Real Gross Domestic Product; DI =Direct Investment; X= Export and M=Import

4.1 Unit Root Test

Table 2. Summary of unit root test using ADF

Varable		ADF Statistics	Critical values		Order of Integration
			1%	5%	
LRGDP *	Level	-1.047445	-3.6155	-2.9411	Order 1
	1st Diff	-3.208559	-3.6210	-2.9434	
LDI*	Level	0.004837	-3.6210	-2.9434	Order 1
	1st Diff	-3.737417	-3.6267	-2.9458	
LX*	Level	-1.989667	-3.6329	-2.9484	Order 1
	1st Diff	-6.2841	-3.6267	-2.9458	
M*	Level	-2.720330	-3.6210	-2.9434	Order 1
	1st Diff	-5.799336	-3.6267	-2.9458	

** and 1st Diff denote intercept and First Differences respectively*

From Table 2, all the variables used in the model were found to be stationary at first difference, and then we can conclude that there may be a cointegration relation [44]. To establish the cointegration between the variables under studied, two stages will be involved. Firstly, it is expedient to specify the number of optimal lag which must be suitable for the model and secondly, the Johanson Test will be used to specify the number of cointegration relationships that exist between the variables.

4.2 Determination of Optimal Lag

The results of VAR lag order selection criteria in Table 3 show that the number of lags is equal to 1 and the lag is selected by SC: Schwarz information criterion.

4.3 Results and Discussion

4.3.1 Cointegration analysis

In this analysis the Johanson cointegration test was used to determine the level of cointegration among the variables.

From Table 4 the Johanson cointegrattion test shows that the trace test and Max-eigenvalue test indicates 1 cointegrating equation(s) at the 0.05 level respectively therefore, the Vector Error Correction Model (VECM) can be held. The normalized test result shows that in the long run, *LDI, LX* and *M* has a positive impact on *LRGDP* respectively, on average, ceteris paribus. (base on the assumption of OLS).

Table 3. VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-434.9859	N	9676328.	27.43662	27.61984	27.49735
1	-298.3811	230.520*	5206.342	19.89882	20.8149*	20.20247
2	-282.4989	22.83064	5524.695	19.90618	21.55513	20.45276
3	-273.9489	10.15311	10088.91	20.37181	22.75363	21.16131
4	-258.5080	14.47584	13909.43	20.40675	23.52144	21.43918
5	-222.1732	24.98015	6794.749	19.13583	22.98338	20.41118
6	-181.7500	17.68518	4431.21*	17.6093*	22.18980	19.1276*

** indicates lag order selected by the criterion*
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information

Table 4. Johanson cointegration test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		**Trace**	**0.05**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None *	0.564978	57.20957	47.85613	0.0052
At most 1	0.309620	27.24465	29.79707	0.0958
At most 2	0.254982	13.90620	15.49471	0.0856
At most 3	0.087837	3.309711	3.841466	0.0689

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) P-values*

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		**Max-Eigen**	**0.05**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None *	0.564978	29.96492	27.58434	0.0243
At most 1	0.309620	13.33845	21.13162	0.4216
At most 2	0.254982	10.59649	14.26460	0.1756
At most 3	0.087837	3.309711	3.841466	0.0689

Max-eigen value test indicates 1 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*

Normalized cointegrating coefficients (standard error in parentheses)	
LRGDP	**LDI LX M**
1.000000	-0.184173 -0.789957 -1.42E-05
	(0.32465) (0.21932) (2.9E-06)

4.3.2 Estimation of Vector Error Correction Model (VECM)

The idea is to estimate based on the error correction model by extracting the effect of the explanatory variables on the dependent variable which is explained from the short term and the long term perspective. Since the variables are cointegrated, the ECM (error correction model) representation would have the following form:

$$\mathbf{\Delta Y_t} = \sum_{i-1}^{k} \alpha_0 \mathbf{\Delta} Y_{t-1} + \sum_{i-1}^{k} \alpha_1 \mathbf{\Delta} K_{t-2} + \sum_{i-1}^{k} \alpha_2 \mathbf{\Delta} X_{t-3} + \sum_{i-1}^{k} \alpha_3 \mathbf{\Delta} M_{t-4} + Z_1 EC1_{\mathbf{t-1}} + \boldsymbol{\varepsilon_{1t}} \quad (5)$$

Where Δ is defined as difference operator, k is the number of lags, α_0, α_1, α_2, $_3 and\ \alpha_4$ are the short run coefficients to be estimated, $EC1_{t-1}$ is the error correction term derived from the long-run co integration relationship, Z_1 is the error correction coefficients of $EC1_{t-1}$ and $\boldsymbol{\varepsilon_{1t}}$ is the serially uncorrelated error terms in equation.

4.3.3 Long term equilibrium determination

Table 5 presents the vector error correction estimates. After the estimation, the equation of long-run equilibrium is presented as follows:

Log(Y) = 1.000 – 0.184173Log (DI) – 0.789957Log(X) – 1.42 E-05Log (M) (6)

Equation (6) is the long run equilibrium equation, it state that there is a negative relationship between direct investment and economic growth (a 1% increase in direct investment leads to a decrease of 0.184173% of RGDP); a negative relationship between total export and economic growth (a 1% increase in total export leads to an increase of 0.789957% of RGDP) and a negative relationship between import and economic growth (a 1% increase in import leads to a decrease of 1.42 E-05% of GDP).

Table 5. Vector error correction estimates

Cointegrating Eq:	CointEq1
LRGDP(-1)	1.000000
LDI(-1)	-0.184173
	(0.32465)
	[-0.56730]
LX(-1)	-0.789957
	(0.21932)
	[-3.60190]
M(-1)	-1.42E-05
	(2.9E-06)
	[-4.86234]
C	2.174858

Source: Author's computation using E-views, 2020

To establish the robustness of the last result and to prove and affirm that this long-term relationship is fair or not, there is need to test the significance of these variables. Thus, Error Correction Model (ECM) will be adopted. After estimating the long-run equilibrium relationship, the equation will be estimated in the form of error correction model.

D(LRGDP) = C(1)*(LRGDP(-1) - 0.18417283696*LDI(-1) - 0.789957106909*LX(-1) - 1.41510725546e-05*M(-1) + 2.17485828137) + C(2)*D(LRGDP(-1)) + C(3)*D(LDI(-1)) + C(4)*D(LX(-1)) + C(5)*D(M(-1)) + C(6)

D(LDI) = C(7)*(LRGDP(-1) - 0.18417283696*LDI(-1) - 0.789957106909*LX(-1) - 1.41510725546e-05*M(-1) + 2.17485828137) + C(8)*D(LRGDP(-1)) + C(9)*D(LDI(-1)) + C(10)*D(LX(-1)) + C(11)*D(M(-1)) + C(12)

D(LX) = C(13)*(LRGDP(-1) - 0.18417283696*LDI(-1) - 0.789957106909*LX(-1) - 1.41510725546e-05*M(-1) + 2.17485828137) + C(14)*D(LRGDP(-1)) + C(15)*D(LDI(-1)) + C(16)*D(LX(-1)) + C(17)*D(M(-1)) + C(18)

D(M) = C(19)*(LRGDP(-1) - 0.18417283696*LDI(-1) - 0.789957106909*LX(-1) - 1.41510725546e-05*M(-1) + 2.17485828137) + C(20)*D(LRGDP(-1)) + C(21)*D(LDI(-1)) + C(22)*D(LX(-1)) + C(23)*D(M(-1)) + C(24)

Table 6. Short term coefficient determination

Error correction	D(LRGDP)	D(LDI)	D(LX)	D(M)
CointEq1	-0.10099	-0.05632	0.178297	15118.73
	-0.03135	-0.0533	-0.13829	-10819.7
	[-3.22140]	[-1.05672]	[1.28925]	[1.39734]
D(LRGDP(-1))	0.131672	0.499801	0.759821	-10178.1
	-0.24255	-0.41238	-1.06998	-83711.3
	[0.54286]	[1.21200]	[0.71013]	[-0.12159]
D(LDI(-1))	-0.02766	-0.00816	0.788616	-2501.18
	-0.13069	-0.2222	-0.57652	-45104.9
	[-0.21163]	[-0.03674]	[1.36789]	[-0.05545]
D(LX(-1))	0.013452	0.002665	-0.09754	16027.52
	-0.04167	-0.07085	-0.18384	-14383.2
	[0.32278]	[0.03761]	[-0.53058]	[1.11432]
D(M(-1))	-1.97E-06	-1.27E-06	-5.15E-06	0.106108
	-6.20E-07	-1.10E-06	-2.70E-06	-0.21496
	[-3.17061]	[-1.20075]	[-1.87359]	[0.49361]
C	0.163138	0.05397	-0.01355	-882.784
	-0.03754	-0.06382	-0.16559	-12954.8
	[4.34619]	[0.84568]	[-0.08184]	[-0.06814]

Source: Author's computation using E-views, 2020

Table 6 shows the short term coefficient of the variables, the table revealed that direct investment and import exact negative relationship with economic growth in the short run while total export exacts positive relationship with economic growth in the short run. The coefficient of the error correction terms is negative and significant.

Table 7. Least squares (Gauss-Newton / Marquardt steps)

	Coefficient	Std. error	t-Statistic	Prob.
C(1)	-0.101202	0.030840	-3.281551	0.0026
C(2)	0.146883	0.225819	0.650443	0.5202
C(3)	-0.038973	0.114996	-0.338905	0.7370
C(4)	0.012118	0.040456	0.299543	0.7665
C(5)	-1.97E-06	6.13E-07	-3.219739	0.0030
C(6)	0.161761	0.036275	4.459230	0.0001
R-squared	0.610071	Mean dependent va	0.184750	
Adjusted R-squared	0.554276	S.D. dependent var	0.105579	
S.E. of regression	0.077994	Akaike info criterion	-2.116963	
Sum squared resid	0.188577	Schwarz criterion	-1.855734	
Log likelihood	45.16382	Hannan-Quinn crite	-2.024868	
F-statistic	6.993487	Durbin-Watson stat	1.879043	
Prob(F-statistic)	0.000178			

Source: Author's computation using E-views, 2020

Table shows that the correction error term is significant and has a negative coefficient. Thus, there is a long run causality running from direct investment, total export and import to RGDP. The R-squared of 61% and Prob(F-statistics) of) 0.000178 shows that the model is fitted.

Table 8. Summary of Wald test

Test statistic	Value	Df	Probability
Direct Investment (DI)			
t-statistic	-0.338905	31	0.7370
F-statistic	0.114857	(1, 31)	0.7370
Chi-square	0.114857	1	0.7347
Total Export (X)			
t-statistic	0.299543	31	0.7665
F-statistic	0.089726	(1, 31)	0.7665
Chi-square	0.089726	1	0.7645
Import (M)			
t-statistic	-3.219739	31	0.0030
F-statistic	10.36672	(1, 31)	0.0030
Chi-square	10.36672	1	0.0013

Source: Author's computation using E-views, 2020

Table 8 presents the summary of Wald test between the variables; the table shows that there is no short run causality running from direct investment and total export to RGDP but there is short run causality running from import to RGDP.

4.3.4 Diagnostic check

Table 9. Breusch-Godfrey serial correlation LM test

F-statistic	**0.337282**	**Prob. F(2,29)**	**0.7165**
Obs*R-squared	0.841086	Prob. Chi-Square(2)	0.6567

Source: Author's computation using E-views, 2020

Table 10. Heteroskedasticity test: Breusch-Pagan-Godfrey

F-statistic	1.975366	Prob. F(8,28)	0.0875
Obs*R-squared	13.34861	Prob. Chi-Square(8)	0.1004
Scaled explained SS	11.29677	Prob. Chi-Square(8)	0.1854

Source: Author's computation using E-views, 2020

Tables 9 and 10 shows that there is absence of serial correlation and heteroskedasticity in the model.

4.3.5 Normality test

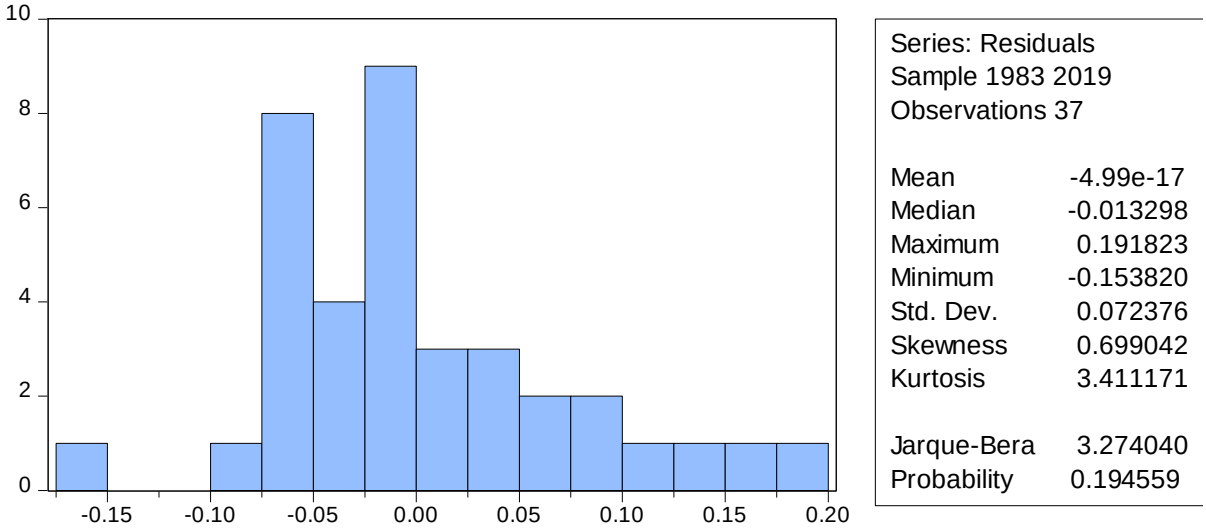

Fig. 1. Graphical presentation of normality test

The probability value of 0.1945 indicates that we accept the null hypothesis that the residual is normally distributed.

4.3.6 VAR stability

Lastly, the CUSUM test is check, this test makes it possible to study the stability of the model estimated over time.

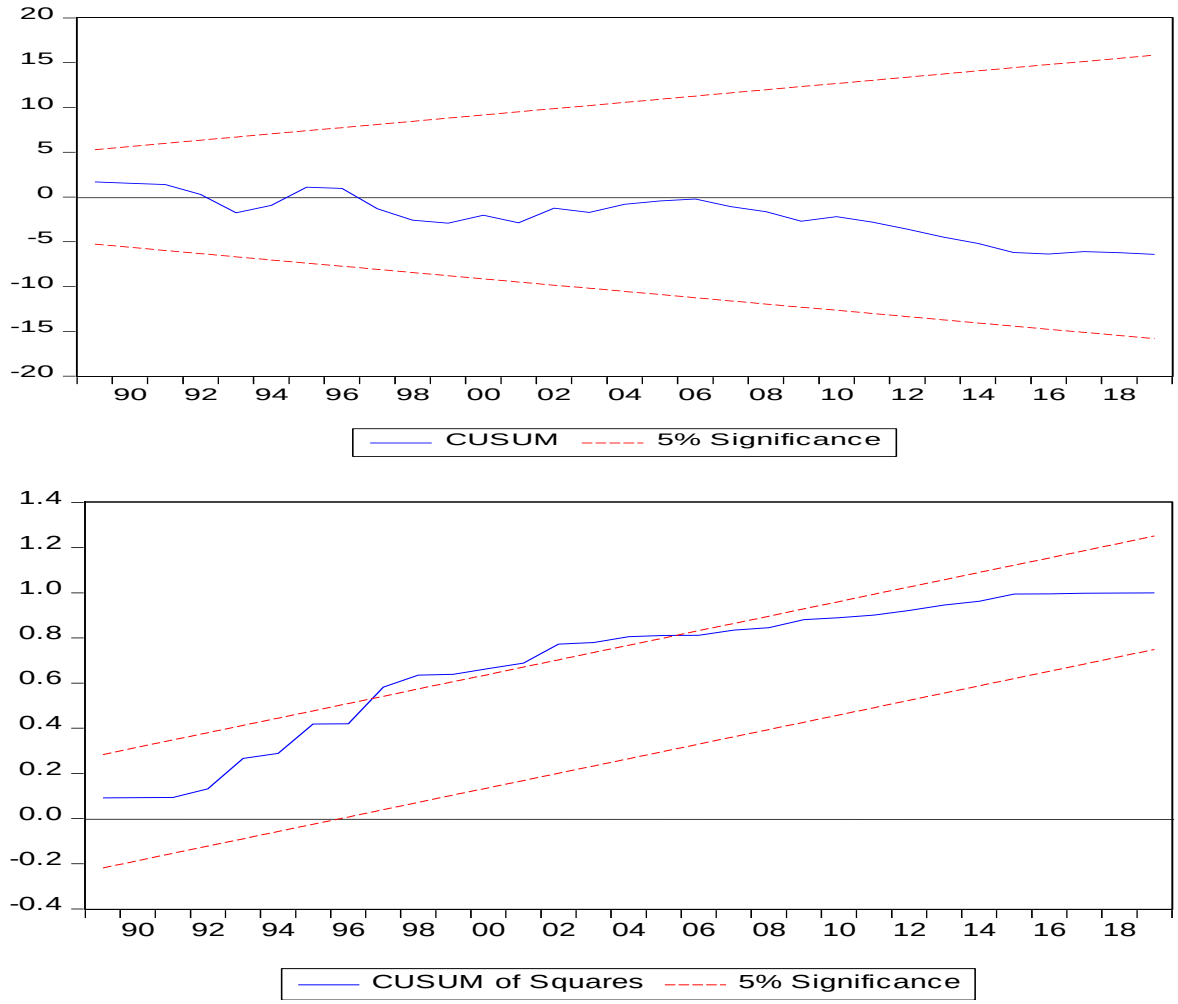

Fig. 2. (a,b). VAR stability

The test result of the stability VAR (CUSUM Test) show that the Modulus of all roots is less than unity and lie within the unit circle. Accordingly we can conclude that our model the estimated VAR is stable or stationary.

5. CONCLUSION

From the empirical findings it was concluded that in the short-run that direct investment and import has negative impacts on economic growth while total export has a positive relationship with economic growth in Nigeria. However, in the long-run all the independent variables adversely affected economic growth. Furthermore, the findings revealed that there is cointegration among the variables.

The result of direct investment having a negative impact on economic growth does not support the endogenous theory propounded by the classical theory that emphasised the importance of direct investment on the growth of the economy and the study also contradicts the findings of [22,5,23] because the findings show that domestic investment in Nigeria has a negative

impact on growth in both the short-run and long-run. However, the result supports other studies carried out by [31,32,33] that domestic investment may not necessarily have a favourable impact on economic growth. Furthermore in the short run total exports exact positive impact on economic growth this is export-led growth and this support the empirical findings of [46,47,43,45].

6. POLICY RECOMMENDATIONS

It is expected that export expansion would positively drive economic performance through foreign exchange earnings. It is recommended that the agricultural, manufacturing, and industrial sector of the economy be revitalized to raise productivity level and encourage exports. On that note, state policies backed by the will to accelerate and stimulate increased productivity of traditional and non-oil products for export purposes should be canvassed. It is essential to recognize that such produced goods meet global standards to compete favourably both in terms of quality and prices.

The exchange rate policy should be reviewed to close the savings/investment gaps, raise government revenue and reduce the fiscal gap through the curtailment of deficits and guarantee of external balance in the long run.

The high cost of capital has been identified as a critical determinant of a firm's access to loans and credit facilities in the Nigerian economy. Therefore, the monetary authorities need to intensify effort at pursuing financial reforms targeted at reducing high-interest rates to encourage domestic investments.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

Date: 10/17/20 Time: 05:50
Sample (adjusted): 1983 2018
Included observations: 36 after adjustments
Trend assumption: Linear deterministic trend
Series: LRGDP LDI LX IMPORTS__M_
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None *	0.564978	57.20957	47.85613	0.0052
At most 1	0.309620	27.24465	29.79707	0.0958
At most 2	0.254982	13.90620	15.49471	0.0856
At most 3	0.087837	3.309711	3.841466	0.0689

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None *	0.564978	29.96492	27.58434	0.0243
At most 1	0.309620	13.33845	21.13162	0.4216
At most 2	0.254982	10.59649	14.26460	0.1756
At most 3	0.087837	3.309711	3.841466	0.0689

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LRGDP	LDI	LX	IMPORTS__M_
-2.373929	0.437213	1.875302	3.36E-05
0.751103	-4.422477	2.436114	-2.55E-05
4.926915	-6.396758	0.175286	9.54E-06
0.719016	-3.034811	1.054298	-1.01E-05

Unrestricted Adjustment Coefficients (alpha):

D(LRGDP)	0.042541	-0.009851	0.007552	0.017028
D(LDI)	0.023726	0.009992	0.058295	0.009555
D(LX)	-0.075106	-0.081079	0.024760	0.080531
D(IMPORTS__M_)	-6368.652	9937.839	-1823.364	4778.288
1 Cointegrating Equation(s):		Log likelihood	-339.4342	

Normalized cointegrating coefficients (standard error in parentheses)

LRGDP	LDI	LX	IMPORTS__M_
1.000000	-0.184173	-0.789957	-1.42E-05
	(0.32465)	(0.21932)	(2.9E-06)

Adjustment coefficients (standard error in parentheses)

D(LRGDP)	-0.100989
	(0.03135)
D(LDI)	-0.056323
	(0.05330)
D(LX)	0.178297
	(0.13829)
D(IMPORTS__M_)	15118.73
	(10819.7)

2 Cointegrating Equation(s):		Log likelihood	-332.7650

Normalized cointegrating coefficients (standard error in parentheses)			
LRGDP	**LDI**	**LX**	**IMPORTS__M_**
1.000000	0.000000	-0.920192	-1.35E-05
		(0.02960)	(3.0E-06)
0.000000	1.000000	-0.707132	3.47E-06
		(0.02712)	(2.8E-06)

Adjustment coefficients (standard error in parentheses)			
D(LRGDP)	-0.108388	0.062166	
	(0.03257)	(0.05814)	
D(LDI)	-0.048818	-0.033815	
	(0.05572)	(0.09945)	
D(LX)	0.117398	0.325731	
	(0.14029)	(0.25039)	
D(IMPORTS__M_)	22583.07	-46734.32	
	(10410.3)	(18580.5)	
3 Cointegrating Equation(s):		Log likelihood	-327.4667

Normalized cointegrating coefficients (standard error in parentheses)			
LRGDP	**LDI**	**LX**	**IMPORTS__M_**
1.000000	0.000000	0.000000	0.000474
			(0.00011)
0.000000	1.000000	0.000000	0.000378
			(8.4E-05)
0.000000	0.000000	1.000000	0.000530
			(0.00012)

Adjustment coefficients (standard error in parentheses)			
D(LRGDP)	-0.071181	0.013858	0.057103
	(0.07182)	(0.10133)	(0.04006)
D(LDI)	0.238397	-0.406715	0.079052
	(0.10867)	(0.15332)	(0.06062)
D(LX)	0.239389	0.167347	-0.334023
	(0.31003)	(0.43744)	(0.17294)
D(IMPORTS__M	13599.51	-35070.70	11946.96
	(23007.2)	(32462.2)	(12833.7)

Vector Error Correction Estimates
Date: 10/17/20 Time: 06:37
Sample (adjusted): 1983 2018
Included observations: 36 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	**CointEq1**
LRGDP(-1)	1.000000
LDI(-1)	-0.184173
	(0.32465)
	[-0.56730]
LX(-1)	-0.789957
	(0.21932)
	[-3.60190]
M(-1)	-1.42E-05
	(2.9E-06)
	[-4.86234]
C	2.174858

Error Correction:	**D(LRGDP)**	**D(LDI)**	**D(LX)**	**M**
CointEq1	-0.100989	-0.056323	0.178297	15118.73
	(0.03135)	(0.05330)	(0.13829)	(10819.7)
	[-3.22140]	[-1.05672]	[1.28925]	[1.39734]
D(LRGDP(-1))	0.131672	0.499801	0.759821	-10178.07
	(0.24255)	(0.41238)	(1.06998)	(83711.3)
	[0.54286]	[1.21200]	[0.71013]	[-0.12159]
D(LDI(-1))	-0.027657	-0.008164	0.788616	-2501.184
	(0.13069)	(0.22220)	(0.57652)	(45104.9)
	[-0.21163]	[-0.03674]	[1.36789]	[-0.05545]
D(LX(-1))	0.013452	0.002665	-0.097543	16027.52
	(0.04167)	(0.07085)	(0.18384)	(14383.2)
	[0.32278]	[0.03761]	[-0.53058]	[1.11432]
D(IMPORTS__M_(-1))	-1.97E-06	-1.27E-06	-5.15E-06	0.106108
	(6.2E-07)	(1.1E-06)	(2.7E-06)	(0.21496)
	[-3.17061]	[-1.20075]	[-1.87359]	[0.49361]
C	0.163138	0.053970	-0.013552	-882.7837
	(0.03754)	(0.06382)	(0.16559)	(12954.8)
	[4.34619]	[0.84568]	[-0.08184]	[-0.06814]
R-squared	0.525765	0.315598	0.356942	0.137777
Adj. R-squared	0.446726	0.201531	0.249766	-0.005926
Sum sq. resids	0.188343	0.544426	3.665222	2.24E+10
S.E. equation	0.079234	0.134713	0.349534	27346.22
F-statistic	6.651963	2.766776	3.330420	0.958760
Log likelihood	43.47237	24.36596	-9.958446	-415.5880
Akaike AIC	-2.081798	-1.020331	0.886580	23.42156
Schwarz SC	-1.817878	-0.756411	1.150500	23.68548
Mean dependent	0.186512	0.145991	0.215609	67.68654
S.D. dependent	0.106523	0.150758	0.403544	27265.55
Determinant resid covariance (dof adj.)		3771.518		
Determinant resid covariance		1818.826		
Log likelihood		-339.4342		
Akaike information criterion		20.41301		
Schwarz criterion		21.64464		
Number of coefficients		28		

Dependent Variable: D(LRGDP)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 10/18/20 Time: 02:47
Sample (adjusted): 1983 2019
Included observations: 37 after adjustments
D(LRGDP) = C(1)*(LRGDP(-1) - 0.18417283696*LDI(-1) -
0.789957106909*LX(-1) - 1.41510725546E-05*IMPORTS__M_(-1) +
2.17485828137) + C(2)*D(LRGDP(-1)) + C(3)*D(LDI(-1)) + C(4)*D(LX(
-1)) + C(5)*D(IMPORTS__M_(-1)) + C(6)

	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C(1)	-0.101202	0.030840	-3.281551	0.0026
C(2)	0.146883	0.225819	0.650443	0.5202
C(3)	-0.038973	0.114996	-0.338905	0.7370
C(4)	0.012118	0.040456	0.299543	0.7665
C(5)	-1.97E-06	6.13E-07	-3.219739	0.0030
C(6)	0.161761	0.036275	4.459230	0.0001
R-squared	0.610071	Mean dependent var		0.184750
Adjusted R-squared	0.554276	S.D. dependent var		0.105579
S.E. of regression	0.077994	Akaike info criterion		-2.116963
Sum squared resid	0.188577	Schwarz criterion		-1.855734
Log likelihood	45.16382	Hannan-Quinn criter.		-2.024868

F-statistic	6.993487	Durbin-Watson stat	1.879043
Prob(F-statistic)	0.000178		

VEC Residual Serial Correlation LM Tests
Date: 10/17/20 Time: 06:58
Sample: 1981 2019
Included observations: 36

Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	Df	Prob.
1	9.176243	16	0.9060	0.553968	(16, 70.9)	0.9070

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	Df	Prob.
1	9.176243	16	0.9060	0.553968	(16, 70.9)	0.9070

*Edgeworth expansion corrected likelihood ratio statistic.
Estimation

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.975366	Prob. F(8,28)	0.0875
Obs*R-squared	13.34861	Prob. Chi-Square(8)	0.1004
Scaled explained SS	11.29677	Prob. Chi-Square(8)	0.1854

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 10/18/20 Time: 03:56
Sample: 1983 2019
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.457710	0.215841	2.120587	0.0429
LRGDP(-1)	-0.032214	0.023417	-1.375672	0.1798
LDI(-1)	-0.003299	0.011927	-0.276633	0.7841
LX(-1)	0.003464	0.004923	0.703699	0.4874
IMPORTS__M_(-1)	-1.43E-08	5.42E-08	-0.263764	0.7939
LRGDP(-2)	0.032481	0.021765	1.492385	0.1468
LDI(-2)	-0.015427	0.011969	-1.288891	0.2080
LX(-2)	0.008130	0.004185	1.942665	0.0622
IMPORTS__M_(-2)	-2.61E-08	5.85E-08	-0.446287	0.6588
R-squared	0.360773	Mean dependent var		0.005097
Adjusted R-squared	0.178137	S.D. dependent var		0.008023
S.E. of regression	0.007274	Akaike info criterion		-6.801350
Sum squared resid	0.001481	Schwarz criterion		-6.409505
Log likelihood	134.8250	Hannan-Quinn criter.		-6.663206
F-statistic	1.975366	Durbin-Watson stat		2.209145
Prob(F-statistic)	0.087509			

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.337282	Prob. F(2,29)	0.7165
Obs*R-squared	0.841086	Prob. Chi-Square(2)	0.6567

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 10/18/20 Time: 03:47
Sample: 1983 2019
Included observations: 37
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.002949	0.037029	-0.079631	0.9371
C(2)	-0.081252	0.311677	-0.260693	0.7962
C(3)	-0.012449	0.120754	-0.103091	0.9186
C(4)	-0.005509	0.042110	-0.130827	0.8968
C(5)	-1.18E-07	7.21E-07	-0.163373	0.8714
C(6)	0.017676	0.053218	0.332138	0.7422
RESID(-1)	0.154970	0.309986	0.499925	0.6209
RESID(-2)	0.132215	0.201493	0.656174	0.5169
R-squared	0.022732	Mean dependent var		-4.99E-17
Adjusted R-squared	-0.213160	S.D. dependent var		0.072376
S.E. of regression	0.079717	Akaike info criterion		-2.031850
Sum squared resid	0.184291	Schwarz criterion		-1.683543
Log likelihood	45.58922	Hannan-Quinn criter.		-1.909055
F-statistic	0.096366	Durbin-Watson stat		2.038669
Prob(F-statistic)	0.998154			

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/67239