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External Sector Aggregates and Sustainable Economic Development: Are there Expected Behaviour of Export, Import and Exchange Rate Variability in Nigeria?

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Abstract

The paper investigated on the behaviour of export, import and exchange rate variability as external sector aggregates and sustainable economic development in Nigeria using time series data spanning from 1970 to 2021. The paper adopted an ARDL (Autoregressive Distributed Lags model) and Bounds Test to check for the cointegration and long-run form of the variables in the model. This is so because the order of integrations were not the same, that is; a combination of order zero and order one (a condition that required the application of the ARDL model). Overall, the paper documented evidence of positive and insignificant effect of external sector aggregates (export and import) but negative and significant effect of exchange rate behaviour on sustainable economic development in Nigeria. The implication of the above findings suggested that export of goods and its twin import response have favoured balance of payment equilibrium while exchange rate has not fared well in sustaining growth in Nigeria. The paper is therefore, of the view that a quick policy response geared towards stimulating economic activities that will appreciate exchange rate of Naira to foreign currencies should be adopted to ensure sustaininable economic development in Nigeria.

Keywords*: Export, import, exchange rate variability, sustainable economic development and Nigeria*

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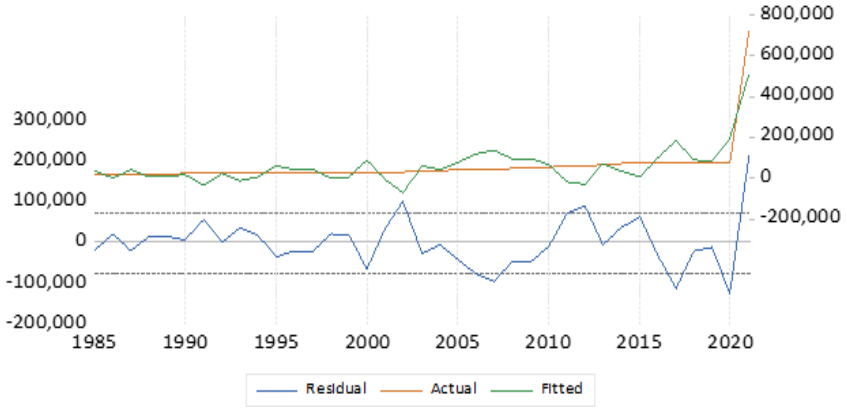
Background to the Study

External sector analysis is one of the critical sectors that brings about economic growth and development processes in mostly developing economies such as Nigeria. Admittedly, external sector is the only means through which countries of the world transact economic activities. In a real sense, external sector contributes to stable equilibrium, which leads to sustainable growth and development. Many empirical evidences have documented either positive and significant relations between external aggregates and growth (e.g. Emmanuel and Obong, 2021; Badejo, Maku, Adelowokan and Alimi, 2018; Lawal and Ezeuchenne, 2017), while others found that external sector aggregate has a negative and insignificant relationship with growth (e.g. Francis and Augustine, 2019; Akidi, Tubotamuno and Obayori, 2018; Berasaluce and Romero (2017). However, the major indicators of external sector aggregates can be identified to include the balance of payments, exchange rate variation, foreign exchange earnings, imports, exports, external debt and among others. Trade provides both foreign exchange earnings and market stimulus for accelerated economic growth and development especially in developing economies (Berasaluce and Romero (2017).

However, exchange rate of Naira to US Dollar for the past decades has continued to depreciate from N180.00 per US$ in 2015 to about N415.00 per US$ in 2022 (CBN, 2022). Consequently, external sector aggregates such as total imports, total exports, Foreign Direct Investments (FDI), exchange rate variability and so on have grossly affected the Nigerian economy.

Figure 1: Trend Analysis



Source: E-view 12.0

Figure 1 as represented above showed a trend analysis of external sector variables (total export, total import and exchange rate variability) in Nigeria. Total export has moderated at the early 1980's and had continued in the trend up to 2020 when total export had shown upward movement.In total import, the trend was gradual and had continued even in the early 2020's while exchange rate variation appreciated in the early 1980's but was shown to be depreciated from early 2000's up to the present years.

Literature Review

The paper adopted a BPC (Balance of Payment Constrained) model proposed and extended by Thirlwall (1979) and Ferreira and Canuto (2003) respectively.

The BPC model maintained that the balance of payment equilibrium is restrained by a slow growth rate of individual country. According to the model, it is assumed that the balance of trade equilibrium is basically a function of income of individual country only. By implication, export and import performances determine growth in the long run. Inspite of its application to economic theory, the model has been accused by some scholars for not incorporating savings-investment gap, fiscal gap and balance of payment monetary implications. However, the paper proposed few selected empirical literatures as contained in table 1 below:

Table 1: Empirical Literature

S/N	Author(s)	Years	Countries	Topics	Variables	Methods	Findings
1.	Ohiomoje (2021)	1990 - 2018	Nigeria	Impact of trade, foreign stock and market index on macroeconomic variables in Nigeria	GDP, price level and interest rate	VAR, Impulse response function and EVD	The result showed that GDP, price level and interest rate is positivel related to trade in the long run
2.	Emmanuel and Obong (2021)	1981 - 2019	Nigeria	External sector liberalization and output growth in Nigeria	FDI, External Debt, Trade opennes and Exchange rate	VAR and Granger causality test.	It was found that FDI, external debt, trade openness and exchange rate were positively GDP in Nigeria.
3.	Francis and Augustine (2019)	1980 - 2017	Nigeria	Analysis of External sector aggregates and economic growth in Nigeria.	Exchange rate, external debt and export	Correlation analysis and Error correction mechanism	The study documented that exchange rate had a negative and significant effect on GDP in Nigeria
4.	Badejo, Maku, Adelowokan and Alimi (2018)	1980 - 2016	Nigeria	Effect of external sector aggregates on economic growth in Nigeria.	Total export, government expenditure and exchange rate	Vector error correction mechanism	There is a positive effect of non oil sector and growth in Nigeria
5.	Akidi, Tubotamuno and Obayori (2018)	1981 - 2016	Nigeria	External sector aggregates and economic growth in Nigeria	RGDP, Imports, Exports, Exchange Rate and FDI	ECM	It was revealed that imports, Exchange Rate and FDI was negative while Exports was positive in relation with economic growth in Nigeria
6.	Lawal & Ezeuchenne (2017)	1985 - 2015	Nigeria	Impact of foreign trade on economic growth in Nigeria	Export, import. BOP and trade openness	VECM	VECM result revealed that both export and BOT were significant on growth while import and trade openness were insignificant.
7.	Berasaluce and Romero (2017)	1990 - 2015	Korea	External sector variables and Economic growth in Korea.	Exports, imports and FDI	Vector autoregressive model	It was found that exports and FDI were not driven by growth in Korea.
8.	Hamdan (2016)	1995 - 2013	Arab Countries	Impact of exports and imports on economic growth in Arab countries	Export and import	Panel Data Analysis	Exports and imports had positive impact on economic growth in Arab countries.
9.	Bakari (2016)	1990 - 2015	Canada	Relationship between export, import and economic growth in Canada	Export, import, and GDP	VAR and Granger-Causality tests	There was no relationship between exports, imports and economic growth in Canada and evidence of bidirectional causality runing from imports to economic growth and exports to economic growth.
10.	Uwakaeme (2015)	1980 - 2012	Nigeria	Determinants of the direction of causality between economic growth and growth indicators in Nigeria	Openness, inflation and fiscal deficit	Johansen Co-integration and Granger Causality tests	It was found that trade openness wa, negative while inflation and excessive government fiscal deficit showed significant with economic growth
11.	Saaed and Hussain (2015)	1977 - 2012	Tunishia	Impact of export and import on economic growth in Tunisia	Import, export and GDP	Granger Causality and Johansen Cointegration	It was found that export and import Granger Cause economic growth in Tunisia.
12.	Adeleye , and Adewuyi (2015)	1985 - 2012	Nigeria	Impact of foreign trade on economic growth in Nigeria	Total export, total import and GDP	ECM	Total Export (TEX) remains positive and significant while others remain insignificant, in Nigeria
13.	Azeez, Dada and Aluko (2014)	2000 - 2012	Nigeria	Effect of international trade on the economic growth of Nigeria	Import, export, trade openness and GDP	OLS	International trade has a significant effect on growth while imports, exports, and trade openness have insignificant effect on growth.
14.	Arodoye and Iyoha (2014)	1981 – 2010 quarterly	Nigeria	Nexus between foreign trade and economic growth in Nigeria	Export, import and exchange rate	VAR	It was found that there was a stable, long- run relationship between foreign trade and economic growth.
15.	Adeleke, Olowe and Fasesin (2014)	1999 – 2013	Nigeria	Impact of foreign direct investment on Nigeria economic growth	OLS	FDI, interest and inflation rate	Economic growth is directly related to inflow of FDI and statistically significant.

Source: Author's Compilation, 2023

Model Build Up

The framework of this paper relied on the Grossman and Helpman (1991) extention of constant return to capital or the technology and capital to include trade as a major determinant of growth as postulated by the growth model of Romer (1986 and 1989) and Robert Lucas (1988). According to Grossman and Helpman (1991), both technology and foreign trade can be engaged endogenously. Therefore, the paper specified as follow;

$Y_t = f(A, K, 1-\alpha, T, \alpha)$ (1)

Where;

Y_t is the output growth rate,
A implies Index of Technology,
K connodes Private Capital,
T represents Trade,
1-α suggests Share of Private Capital,
α implies Share of trade

In line with the objective of this paper, equation (1) is written in an intensive form as:

$Y_t = f(T\alpha)$ (2)

In equation (2), Trade (T) is composed of trade of both import (IMP) and export (EXP). The paper also included exchange rate (EXR) as major variables for external sector aggregates. This is done to avoid the issue of heterosdasticity that may occur in the process. Therefore, the model is as follows:

$Y_t = f(EXP, IMP, EXR)$ (3)

Substituting equation (2) into equation (3) and stating the model econometrically, we obtain

$Y_t = a_o + Л EXP_t + \beta IMP_t + \Psi EXR_t + u_t$ (4)

Econometrically, equation (4) is specified as:

$RGDP_t = a_o + Л EXP_t + \beta IMP_t + \Psi EXR_t + u_t$ (5)

To improve the validity of the regression estimate, equation (5) is transformed into a log-linear form as follows:

$Lg(RGDP_t) = a_o + LgЛEXP_t + Lg\beta IMP_t + Lg\Psi EXR_t + u_t$ (6)

Where;

RGDP represents the real Gross Domestic Product, EXP is the total export, IMP is the total import, EXR represents exchange rate, Lg is the logarithm transfromation, Л, β and Ψ and the parameter, estimate, a_o is the intercept and u_t is the white noise or simply error term, while in apriori, it is expected that export and import are positive and exchange rate is negative.

Table 2: Definition of Variables and Data Sources

Variables	Symbols	Definitions and measurements
Real GDP	RGDP	This is the aggregate value of goods and services produced in a country over a given period. (measures as the % of real GDP)
Total Export	EXP	Aggrgate exports by emigrants (% of GDP)
Total Import	IMP	Aggregate imports by immigrants; (% of GDP)
Exchange rate	EXR	Amount of domestic currency required to purchase one unit of foreign currency (constant 2015 US$)

Source: Authors' Compilation

Results and Discussion

Table 3: Summary of ADF Unit Root Test

Variables	1% Critical Value	5% Critical Value	10% Critical Value	T -Statistic	Order	Prob.
(RGDP)	-4.211868	-3.529758	-3.196411	-8.306190	I(0)	0.0000
(EXP)	-4.211868	-3.529758	-3.196411	-8.583501	I(1)	0.0000
(IMP)	-4.211868	-3.529758	-3.196411	-8.105352	I(1)	0.0000
(EXR)	-4.211868	-3.529758	-3.196411	-4.657349	I(1)	0.0001

Source: Author's Computation, 2023

Table 3 above reveals that RGDP was stationary at level {I(0)} and has no unit root. On the other hand, total export (EXP), total import (IMP) and exchange rate (EXR) were stationary at order one {I(1) and have no unit root. Therefore, at the various level of integration, the variables have been confirmed useable, which showed different order of integration and consequently the need for the application of ARDL model.

Table 4: ARDL Long-run Form

ARDL Long Run Form and Bounds Test
Dependent Variable: D(RGDP)
Selected Model: ARDL(2, 0, 1, 4)
Case 2: Restricted Constant and No Trend
Date: 04/12/23 Time: 20:12
Sample: 1981 2021
Included observations: 37

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	92480.81	61035.92	1.515187	0.1418
RGDP(-1)*	-5.317044	1.966821	-2.703370	0.0119
EXP01**	964.2793	2622.438	0.367703	0.7161
IMP(-1)	-1189.891	3992.290	-0.298047	0.7680
EXR(-1)	2061.375	434.7569	4.741443	0.0001
D(RGDP(-1))	-27.57931	12.24483	-2.252323	0.0330
D(IMP)	3716.279	4268.682	0.870592	0.3919
D(EXR)	322.0354	807.2546	0.398927	0.6932
D(EXR(-1))	-1517.705	1006.568	-1.507803	0.1437
D(EXR(-2))	-2790.183	917.4981	-3.041077	0.0053
D(EXR(-3))	-2509.036	1025.684	-2.446207	0.0215

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXP01	181.3563	510.0841	0.355542	0.7251
IMP	-223.7880	756.5666	-0.295794	0.7697
EXR	387.6919	85.64323	4.526824	0.0001
C	17393.27	8582.773	2.026533	0.0531

EC = RGDP - (181.3563*EXP01 -223.7880*IMP + 387.6919*EXR + 17393.2740)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	6.105185	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Actual Sample Size	37	Finite Sample: n=40		
		10%	2.592	3.454
		5%	3.1	4.088
		1%	4.31	5.544
		Finite Sample: n=35		
		10%	2.618	3.532
		5%	3.164	4.194
		1%	4.428	5.816

Source: E-view 12.0

The estimates of the long run results as contained in tabe 3 showed that all the variables under investigation exhibited a long run relationship, which implied that they were cointegrated. The implication of the above empirical findings suggested that external sector aggregates (total export, total import and exchange rate variability) exhibit a stable long-run relationship with growth in Nigeria.

Autoregressive Distributed Lags (ARDL) and Bounds Test

The paper has already ascertained that the order of integrations after the unit root test were combiation of I(0) and I(1), which is the most reason for the use of ARDL. We can therefor hypothesize as follows;

$H_{o:}$ = 0: Long run does not exist

$H_{1:}$ ≠ 0: Long run exists

However, the result of the bound test indicated that the value of the computed f-statistic was 6.1 point, which is higher than the upper bound value at 10%, 5%, 2.5% and 1% level of significant. This implies that there exist a long run mix among the variables under investigation.

Table 5: ARDL ECM and Bound Test

ARDL Error Correction Regression
Dependent Variable: D(RGDP)
Selected Model: ARDL(2, 0, 1, 4)
Case 2: Restricted Constant and No Trend
Date: 04/12/23 Time: 20:14
Sample: 1981 2021
Included observations: 37

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1))	-27.57931	6.685824	-4.125042	0.0003
D(IMP)	3716.279	3254.451	1.141906	0.2639
D(EXR)	322.0354	642.9468	0.500874	0.6207
D(EXR(-1))	-1517.705	855.5599	-1.773932	0.0878
D(EXR(-2))	-2790.183	831.3063	-3.356383	0.0024
D(EXR(-3))	-2509.036	934.9033	-2.683738	0.0125
CointEq(-1)*	-5.317044	0.895905	-5.934831	0.0000

R-squared	0.660051	Mean dependent var	19132.90
Adjusted R-squared	0.592061	S.D. dependent var	107167.6
S.E. of regression	68448.02	Akaike info criterion	25.27419
Sum squared resid	1.41E+11	Schwarz criterion	25.57896
Log likelihood	-460.5726	Hannan-Quinn criter.	25.38164
Durbin-Watson stat	1.641874		

* p-value incompatible with t-Bounds distribution.

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	6.105185	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: E-view 12.0

This paper has shown that both endogenous and exogenous variables are correlated, such that the null hypothesis was rejected. This suggests that external sector aggregates (total export, total import and exchange rate variability) have a significant effect on growth in Nigeria, within the period under review. The paper further documented that export and import exert positive but not significant with growth while exchange rate revealed negative but significant effect with growth in Nigeria. This empirical finding contradicted with those of Akidi, Tubotamuno and Obayori (2018) who revealed that imports, Exchange Rate and FDI were not significant; yet export was statistically significant and positive, in line with the findings of the current paper.

Conclusion and Recommendation

The main trust of this paper is to investigate external sector aggregates and sustainable economic development considering whether there are expected behaviour of export, import and exchange rate variability in Nigeria, employing data ranging from 1970 to

2021. Adopting an ARDL (Autoregressive Distribution Lags) method of estimation, the result showed that export and import exert positive but not significant with growth while exchange rate revealed negative but significant effect with growth. The paper recommended that a quick policy response geared towards stimulating economic activities that will appreciate exchange rate of Naira to foreign currencies should be adopted to ensure sustaininable economic development in Nigeria.

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