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 sustainable 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

![Figure 1: Trend Analysis](image)

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

<table>
<thead>
<tr>
<th>SN</th>
<th>Author(s)</th>
<th>Years</th>
<th>Countries</th>
<th>Topics</th>
<th>Variables</th>
<th>Methods</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Obiomeje (2021)</td>
<td>1990 - 2018</td>
<td>Nigeria</td>
<td>Impact of trade, foreign stock and market index on macroeconomic variables in Nigeria</td>
<td>GDP, price level and interest rate</td>
<td>VAR, Impulse response function and VFD</td>
<td>The result showed that GDP, price level and interest rate is positively related to trade in the long run</td>
</tr>
<tr>
<td>2</td>
<td>Emmanuel and Obong (2021)</td>
<td>1981 - 2019</td>
<td>Nigeria</td>
<td>External sector liberalization and output growth in Nigeria</td>
<td>FDI, External Debt, Trade openness and Exchange rate</td>
<td>VAR and Granger causality test</td>
<td>It was found that FDI, external debt, trade openness and exchange rate were positively GDP in Nigeria.</td>
</tr>
<tr>
<td>3</td>
<td>Francis and Augustine (2019)</td>
<td>1980 - 2017</td>
<td>Nigeria</td>
<td>Analysis of External sector aggregates and economic growth in Nigeria.</td>
<td>Exchange rate, external debt and export</td>
<td>Correlation analysis and Error correction mechanism</td>
<td>The study documented that exchange rate had a negative and significant effect on GDP in Nigeria.</td>
</tr>
<tr>
<td>5</td>
<td>Akidi, Tubotamuno and Obonyor (2018)</td>
<td>1981 - 2016</td>
<td>Nigeria</td>
<td>External sector aggregates and economic growth in Nigeria</td>
<td>RCPI, Imports, Exports, Exchange Rate and FDI</td>
<td>ECM</td>
<td>It was revealed that imports, Exchange Rate and FDI was negative while Exports was positive in relation with economic growth in Nigeria</td>
</tr>
<tr>
<td>6</td>
<td>Lawal &amp; Ezochene (2017)</td>
<td>1985 - 2015</td>
<td>Nigeria</td>
<td>Impact of foreign trade on economic growth in Nigeria.</td>
<td>Export, import, BGP and trade openness</td>
<td>VECM</td>
<td>VECM result revealed that both export and BOT were significant on growth while import and trade openness were insignificant.</td>
</tr>
<tr>
<td>7</td>
<td>Bertasaluce and Romero (2017)</td>
<td>1990 - 2013</td>
<td>Korea</td>
<td>External sector variables and Economic growth in Korea.</td>
<td>Exports, imports and FDI</td>
<td>Vector autoregressive model</td>
<td>It was found that exports and FDI were not driven by growth in Korea.</td>
</tr>
<tr>
<td>8</td>
<td>Hamdan (2016)</td>
<td>1995 - 2013</td>
<td>Arab Countries</td>
<td>Impact of exports and imports on economic growth in Arab countries.</td>
<td>Export and import</td>
<td>Panel Data Analysis</td>
<td>Exports and imports had positive impact on economic growth in Arab countries.</td>
</tr>
<tr>
<td>9</td>
<td>Bakari (2016)</td>
<td>1990 - 2015</td>
<td>Canada</td>
<td>Relationship between export, import and economic growth in Canada.</td>
<td>Export, import, and GDP</td>
<td>VAR and Granger Causality tests</td>
<td>There was no relationship between exports, imports and economic growth in Canada and evidence of bidirectional causality running from imports to economic growth and exports to economic growth.</td>
</tr>
<tr>
<td>10</td>
<td>Uwakaeme (2015)</td>
<td>1990 - 2012</td>
<td>Nigeria</td>
<td>Determinants of the direction between economic growth and growth indicators in Nigeria</td>
<td>Openness, inflation and fiscal deficit</td>
<td>Johansen Co-integration and Granger Causality tests</td>
<td>It was found that trade openness was negative while inflation and excessive government fiscal deficit showed significant with economic growth.</td>
</tr>
<tr>
<td>11</td>
<td>Saaed and Hassain (2015)</td>
<td>1997 - 2012</td>
<td>Tunisia</td>
<td>Impact of export and import on economic growth in Tunisia.</td>
<td>Import, export and GDP</td>
<td>Granger Causality and Johansen Cointegration</td>
<td>It was found that export and import Granger Cause economic growth in Tunisia.</td>
</tr>
<tr>
<td>12</td>
<td>Adeye, and Adewuyo (2015)</td>
<td>1995 - 2012</td>
<td>Nigeria</td>
<td>Impact of foreign trade on economic growth in Nigeria</td>
<td>Total export, total import and GDP</td>
<td>ECM</td>
<td>Total Export (TEX) remains positive and significant while others remain insignificant, in Nigeria.</td>
</tr>
<tr>
<td>13</td>
<td>Aasez, Dada and Aluko (2014)</td>
<td>2000 - 2012</td>
<td>Nigeria</td>
<td>Effect of international trade on the economic growth of Nigeria</td>
<td>Import, export and GDP</td>
<td>OLS</td>
<td>International trade has a significant effect on growth while imports, exports, and trade openness have insignificant effect on growth.</td>
</tr>
<tr>
<td>14</td>
<td>Arodaye and Iyoba (2014)</td>
<td>1981 – 2010 quarterly</td>
<td>Nigeria</td>
<td>Nexus between foreign trade and economic growth in Nigeria</td>
<td>Export, import and exchange rate</td>
<td>VAR</td>
<td>It was found that there was a stable, long, run relationship between foreign trade and economic growth.</td>
</tr>
<tr>
<td>15</td>
<td>Adeleke, Olowu and Fasehin (2014)</td>
<td>1999 – 2013</td>
<td>Nigeria</td>
<td>Impact of foreign direct investment on Nigeria economic growth.</td>
<td>FDI, interest and inflation rate</td>
<td>OLS</td>
<td>Economic growth is directly related to inflow of FDI and statistically significant.</td>
</tr>
</tbody>
</table>

Source: Author's Compilation, 2023
Model Build Up

The framework of this paper relied on the Grossman and Helpman (1991) extension 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,
- \( 1-\alpha \) suggests Share of Private Capital,
- \( \alpha \) implies Share of trade

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

\[ Y_t = f(T) \]  

(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

\[ Y_t = a + \beta_1 EXP + \beta_2 IMP + \Psi \cdot EXR + u \]  

(4)

Econometrically, equation (4) is specified as:

\[ RGDP_t = a + \beta_1 EXP + \beta_2 IMP + \Psi \cdot EXR + u \]  

(5)

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

\[ Lg(RGDP) = a + Lg(EXP) + \beta \cdot Lg(IMP) + \Psi \cdot Lg(EXR) + u \]  

(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 transformation, \( \beta \), \( \Psi \) and the parameter, estimate, \( a \) is the intercept and \( u \) 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

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

Source: Authors’ Compilation

Results and Discussion

Table 3: Summary of ADF Unit Root Test

<table>
<thead>
<tr>
<th>Variables</th>
<th>1% Critical Value</th>
<th>5% Critical Value</th>
<th>10% Critical Value</th>
<th>T -Statistic</th>
<th>Order</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(RGDP)</td>
<td>-4.211868</td>
<td>-3.529758</td>
<td>-3.196411</td>
<td>-8.306190</td>
<td>I(0)</td>
<td>0.0000</td>
</tr>
<tr>
<td>(EXP)</td>
<td>-4.211868</td>
<td>-3.529758</td>
<td>-3.196411</td>
<td>-8.583501</td>
<td>I(1)</td>
<td>0.0000</td>
</tr>
<tr>
<td>(IMP)</td>
<td>-4.211868</td>
<td>-3.529758</td>
<td>-3.196411</td>
<td>-8.105352</td>
<td>I(1)</td>
<td>0.0000</td>
</tr>
<tr>
<td>(EXR)</td>
<td>-4.211868</td>
<td>-3.529758</td>
<td>-3.196411</td>
<td>-4.657349</td>
<td>I(1)</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

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.
The estimates of the long run results as contained in table 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 combination of I(0) and I(1), which is the most reason for the use of ARDL. We can therefore hypothesize as follows:

- $H_0$: Long run does not exist
- $H_1$: 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

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(RGDP(-1))</td>
<td>-27.57931</td>
<td>6.86524</td>
<td>-4.12531</td>
<td>0.0003</td>
</tr>
<tr>
<td>D(IMP)</td>
<td>3716.279</td>
<td>3254.451</td>
<td>-1.141906</td>
<td>0.2639</td>
</tr>
<tr>
<td>D(EXR)</td>
<td>3223.054</td>
<td>6129.466</td>
<td>-0.500974</td>
<td>0.6207</td>
</tr>
<tr>
<td>D(EXR(-1))</td>
<td>-1511.705</td>
<td>9525.999</td>
<td>-1.773832</td>
<td>0.0827</td>
</tr>
<tr>
<td>D(EXR(-2))</td>
<td>-2790.183</td>
<td>831.3063</td>
<td>-3.356383</td>
<td>0.0024</td>
</tr>
<tr>
<td>D(EXR(-3))</td>
<td>-2509.905</td>
<td>934.9035</td>
<td>-2.693738</td>
<td>0.0125</td>
</tr>
<tr>
<td>Co(ARDL&lt;1)&gt;</td>
<td>-0.317644</td>
<td>0.395905</td>
<td>-0.826431</td>
<td>0.4099</td>
</tr>
</tbody>
</table>


* p-value incompatible with t-Bounds distribution.

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 sustainable economic development in Nigeria.

References


