An Empirical Analysis of the Impact of Intra-African Trade Openness on Economic Growth in Nigeria

OBASANMI, Jude Omokugbo[1] and ISERE, Victoria Oshuare Merab[2]

[1]Department of Economics, Ambrose Alli University, Ekpoma, Nigeria. E-mail: obasanmijude@gmail.com
[2]Department of Humanities & Social Sciences, School of General Studies, Auchi Polytechnic, Auchi, Nigeria

Abstract: This study examined the impact of intra-African trade openness on Nigeria's economic growth for the period of 1990 to 2022. Real GDP is used as a proxy for economic growth and it is regressed against intra-African imports, intra-African exports, unemployment and trade openness using by OLS technique. Intra-African imports and exports had a significant impact on Nigeria's economic growth in the long run and short run respectively. For instance, a 1% change in imports and exports resulted in 20.7units and 76.98units increase in GDP respectively in the long run. In the long run, a 1% change in openness caused a 97units decrease in GDP. The study recommended an increase in Nigeria's intra-African trade if at all and to practice openness especially to help conserve foreign exchange. The Nigeria first mindset (meaning openness which hurts Nigeria must be avoided) must be adopted.

Keywords: African Continental Free Trade Area, Economic Integration, Intra-African Trade, Economic Growth, Nigeria, Trade Openness.

1. Introduction

1.1. Background to the study

Trade is as old as human existence and is one human interactive phenomenon that will last as long as the human race exists. This is because, trade has acted as an important engine of growth for countries at different stages of development (Echekoba, Okonkwo & Adigwe, 2015). International trade therefore constitutes a major vehicle for economic integration. It is a viable instrument for facilitating regional economic integration. International trade has contributed to lifting

hundreds of millions of people out of poverty. The gains of international trade have long been recognized as that is the beginning of modern economics. Trade has brought together the most remote parts of the world and different civilization; reshaping the course of nations. It allows exchange of goods and services while giving a greater variety of goods for consumption and more efficient use of resources. It also helps improve employment rates of nations while also ensuring utilization of local surplus (excess) goods (Anyanwu, 2014).

The main forms of regional integration are the preferential trade agreement (PTA) which involves reduction of customs duties particularly tariffs on trade among member countries, relative to duties on trade with non-member countries; free trade area (FTA), which involves elimination of tariffs and quotas on trade among member countries; customs union (CU), which incorporates the features of the FTA and imposition of common external tariff (CET) against non-members; the common market (CM), which goes beyond the CU to allow for free movement of productive factors across national boundaries of member countries; and the economic and monetary union (EMU) which in essence is a CM, involving common currency, coordination or harmonisation of monetary and fiscal policies, as well as a compensation policy, which allows for transfer of income to poorer or disadvantaged members of the union. Regional integration is expected to engender expansion of trade between or among member countries, which is expected to lead to rapid economic growth (Iyoha, 2005) reported in Aigheyisi &Iyoha, 2022).

Since the time of Adam Smith and David Ricardo, economists have known that free trade is the best policy, but the general public desire has always been to protect jobs by restricting importation of goods and services (Bartlett, 2011). Free trade policy, does not restrict imports or exports, it is a free market idea applied to international trade, whereas, protectionism is the opposite of free trade. Sometimes free trade is established bilaterally, multilaterally or within a region (like the European Union and African Union (Llanes, 2017).

This study focuses on the free trade area. Its emphasis is on the African Continental Free Trade Area (AfCFTA), which aims at eliminating tariffs on over 90.0 per cent of tradable goods within the African continent (Songwe, 2019). The African Union (AU) launched the African Continental Free Trade Agreement (AfCFTA) in 2015 to further help boost intra-African trade which fell seriously behind trade within other regional blocs. Only 15% of African exports go to other African countries and many of the imports to Africa are producible in Africa. The

high tariffs and colonial influence made it easier for Africa to export and import to and from the developed countries in Europe and the Americas. The AfCFTA further seeks to cut tariffs among African nations by 90%; to create a single continental market for goods and services with free movement of business persons and investments; expand intra-African trade through better harmonization and coordination of trade liberalization and facilitation regimes and instrument across regional economic communities and across Africa in general (Campbell, 2019), If successful, it is expected to boost intra-African trade flow. Nigeria signed the AfCFTA agreement on 7th July 2019 (Manni & Afzal, 2022).

Intra-African trade has been quite low over the last seven decades, compared with extra African trade that is trade between African countries and the other regions of the world (UNCTAD, 2022). As reported by Aigheyisi and Iyoha, (2022), between 2015 and 2020, intra-African trade was just 2.0 per cent of the continent's total trade, compared with other regions/continents such as the Americas (47.0 per cent), Europe (67.0 per cent) and Australia (7.0 per cent). In 2021 for instance, intra-African exports share of the continent's total export was 16.6 per cent, compared with Europe (68.1 per cent), Asia (59.4 per cent), America (55.0 per cent) and Oceania (7.0 per cent) (UNCTAD, 2022). These figures reveal that the continent's trade has been dominated by extra-African trade. The continent's exports to other regions ranged between 80.0 per cent and 90.0 per cent of total exports in 2019 (UNCTAD, 2022).

Upon implementation, the AfCFTA is expected to be the largest free trade area in the world, comprising about 55 countries. The World Bank envisages that the implementation of the AfCFTA will help address the adverse economic effect of the COVID-19 pandemic. The African Union (AU) estimates a 60.0 per cent boost in intra-African trade by 2022 (BBC, 2020). Fofack, Dzene, and Hussein, (2023) in their study presented some empirical evidence that the AfCFTA could raise intra-African trade by 24.0 per cent in the short-run and 25.3 per cent in the long-run. Other anticipated benefits of the implementation of the AfCFTA according to the Fotack, et al (2022), include self-reliant cooperation among member countries, higher levels of intra-African trade, economic diversification, export diversification, export sophistication, industrialisation, sustainable development, greater investment and innovation, and enhanced competitiveness of the manufacturing sector, improved food security and structural transformation of the continent.

It is against this background that this research seeks to appraise trade openness within the African continent and its impact on economic growth of Nigeria over the period 1990 to 2022.

2.   Instant Literature

2.1. Concept of Economic Growth

Studies have shown that for any country that is interested in reducing poverty, improving quality of life and provision of basic infrastruture must ensure economic growth. It is seen as a very vital tool to making faster progress (Khalid, 2020; Abinabo and Abubakar 2023,and Obasanmi 2023). Growth generate virtuous circles of prosperity and opportunity. Strong growth and employment opportunities improve incentives for parents to invest in children's education. According to Khalid, (2020) and reported by Abinabo and Abubakar (2023), Economic growth is obtained by efficient use of available resources and by increasing capacity of production. It facilitates redistribution of income in a society (Haller, 2022). The cumulative effects, the small differences of the increase rates, become big for periods of one decade or more. It is easier to redistribute income in a dynamic, growing society, than in a static one (Khalid, 2020). Despite the benefits of high economic growth, researchers still believe that economic growth is a complex, long-run phenomenon that is subject to constraints.

According to Rodrik (2007) provides evidence that rapid and sustained economic growth is critical to making faster progress. Economic growth stimulate entrepreneurship and generate pressure for improved governance in a nation. Strong economic growth by implication advances human development, which, in turn, promotes further economic growth. Therefore, Son and Kakwani (2014) states that economic growth is "continuous improvement in the capacity to satisfy the demand for goods and services, resulting from increased production scale, and improved innovations in products and processes.

The Concept of Trade Openness

Trade openness is a key driver of progress, skill transfer and productivity in many countries. For this reason, Khalid (2020) provide information on various aspects of the importance of trade openness to economic growth, income distribution, government spending and the environment. This term is most times used in place of Liberalization. Trade libralization means the removal or loosening of restriction

on something and is typically used in economic and political sense. It means laws or rules being relaxed by government. It occurs when a ban is lifted or government regulations concerning trade and commerce are relaxed. Trade is the buying and selling of goods and services. Trade means to exchange something for something commercially. It is synonymous with commerce, marketing, deal to mention a few. All countries have limited resources to respond to the needs of her people, so they engage in trade to complete their needs (Liechtenstein, 2018). Despite this fact, countries do not open their borders for everyone to freely go in and out.

Trade openness is the flexibility of a host country and how accessible international trade is to foreign Investors As Gupta, Kaur, and Sarva, (2020) asserted imports and exports, trade volume are concepts for measuring trade openness. Export is part of international trade where goods produced in one country are transported to another country for sale or trade and as a crucial element of a country's economy. It stimulates economic growth of exporting countries (Gruzina, Firsova and Strielkowski, 2021).

Lebenbaum (2017) viewed trade liberalization as a process of reducing or eliminating restrictions on foreign trade which is intended to make trade freer between nations The principal and primary intention of trade liberalization is to promote free trade which was intended to improve the economic growth of a nation and also trade liberalization involves three things namely; reducing tariffs, reducing/eliminating quotas and reducing Non-Tariff Barriers (Trade and Law Centre, Tralac, 2019). In conclusion, the intention in liberalizing trade is usually for the improved general welfare of the people even as the countries involved get better economic growth figures. Economic growth is an increase in the amount of goods and services produced, compared from one period to another.

3. Empirical Literature

Aigheyisi and Iyoha, (2022) study had the objective to examine the effect of intra-African Trade on Nigeria's economic growth from 1981 to 2019. They employed, the ARDL modeling technique to investigate the short-run and long-run effects of intra-African trade on Nigeria's economic growth. The study finds that though the short-run effect is positive but not significant; the long-run effect is significantly positive, and robust to alternative estimation techniques. This suggests that expansion of trade among African countries, which is expected to result from the full implementation of AfCFTA, would have positive growth effect on Nigeria in

the long-run. Furthermore, positive and significant long-run real output effects of capital formation, exchange rate and population, as well as negative and significant long-run real output effect of inflation were observed. Based on these findings, the study recommend strong commitment to the implementation of the Free Trade Agreement, improvement of the investment climate, moderation of inflation and establishment of a stable exchange rate system.

An empirical analysis of the relationship between trade openness and economic growth in Nigeria from 1990 to 2021 was the focus of Abinabo and Abubakar (2023) study. The study adopted descriptive statistics; Augmented Dickey Fuller (ADF) unit root test for stationarity, Johansen Cointegration test for long run relationship and Error Correction Mechanism (ECM) model as the methods of estimation. The results amongst others indicated that a long-run relationship exists between trade openness (volume of export, import and international trade) on economic growth in Nigeria. The study concludes that Nigerian economy has benefited from other countries, therefore the country should open the boarders for foreign goods to come into the country and recommends that government should encourage external trade and open the boarders, but with caution to avoid dumping of some irrelevant goods to the country.

To enhance how trade openness is measured by including facets of nations' global trade integration to generate four distinct measures: exports plus imports to GDP ratio, the ratio of exports to GDP, the ratio of imports to GDP, and their combined effect index was the main goal of Madinatou, Simon, and Yin (2022) research. Using Pooled Ordinary Least Square (POLS), fixed effects and the system generalized methods of moment's estimation approaches to analyze balanced panel data from 52 African nations from 2000 to 2018. The results showed an intriguing mixed pattern between trade openness and GDP per capita: 1) POLS show trade openness has a mixed influence on economic growth. Similarly, when subdividing Africa into sub-regions, trade openness demonstrated a non-linear relationship with GDP, but the result in Northern Africa is sturdy in terms of economic growth. 2) Trade openness has a negative and statistical effect on GDP per capita, as per the fixed-effects model. 3) Finally, the sys-GMM verifies that trade openness is not resilient across various openness measures and robustness regression estimates. In particular, the findings suggest that imports stifle growth while exports boost growth in Africa. They advocated that governments pursue the new structural economic policies to encourage export expansion and promote economic growth.

Abendin and Duan (2021) explored the role of the digital economy and international trade on Africa's economic growth using POLS, random and fixed effects, and sys-GMM models. Using merchandise trade as a proxy for trade openness, the findings revealed that trade has a large positive impact on economic development in Africa. Malefane and Odhiambo (2018) looked into the dynamic effect of trade openness on South African economic growth. Their long-term empirical findings reveal that when the ratio of total trade to GDP had a positive and significant impact on economic growth, but not when alternative proxies were used. Their short-run empirical data showed that trade openness had a beneficial influence on economic growth when the first three proxies of openness were utilized, but not when the trade openness index was used. They concluded that encouraging policies that boost trade was important for the South African economy based on these findings.

Interestingly, some empirical studies have revealed that trade openess as harmful to economic groth, particularly in countries with high level in infrastuctural decay, infant industries, market defects, unstable foreign demand for home products and wide spread inconsistency in policies. All these and many more put together can slow economic growwth. Ulaşan (2022) explores the long-run trade openness-economic growth connection in OECD and non-OECD countries from 1970 to 2010 using cross-country regressions. Many variables related to openness have a significant positive impact on the economy. When other factors are added to the model, the result vanishes, revealing the rigidity of the links between trade openness and economic growth for the chosen group of countries.

Employing data from 1975 to 2017, Ijirshar (2022) analysed the influence of trade on growth in ECOWAS countries. The findings demonstrate that trade openness has good long-term effects on growth in ECOWAS countries, but ambiguous short-term ones. Adhikary (2021) points out that more trade openness leads to greater exchange rate depreciation, which reduces aggregate input supply by raising the prices of imported commodities utilized in production. As a result, domestic output tends to decline, making the domestic market less competitive. Furthermore, according to Rodrik (2007), openness can exacerbate macroeconomic instability by increasing inflation, weakening currency rates, and causing a balance-of-payments crisis.

3.1. Theoretical Framework

The theoretical framework of this study is based on the Export-led growth hypothesis. The export-led growth hypothesis holds that overall growth of countries

can be generated not only by increasing the amounts of labour and capital but also by expanding exports (Essays, 2018). It postulates that export expansion is one of the main determinants of growth. The causal relationship between exports and economic growth is known as the Export-Led Growth (ELG) hypothesis. Empirical works such as Essays (2018), Leibovici and Crew (2018) and Tralac (2019) to mention a few abound pointing to the fact that economic growth can be achieved via trade. The rationale for the hypothesis is hinged on the facts that exports may generate positive externalities on non-exports through more efficient management styles and improved production techniques; export expansion will increase productivity via economies of scale and lastly that exports are likely bring greater access to foreign exchange.

This hypothesis holds that overall growth of different economies could be generated not by increasing the amounts of labour and capital, but also by expanding exports. The theoretical rationale for this hypothesis hinges on a number of arguments which included that; the export sector may generate positive externalities on non-export sectors through more efficient management styles and improved production techniques, export expansion will increase productivity by offering potential for scale economies and exports are likely to alleviate foreign exchange constraints and can thereby provide greater access to international markets. These arguments have recently been extended by the literature on endogenous growth theory which emphasizes the role of exports on the long-run. This hypothesis holds that overall growth of different economies could be generated not by increasing the amounts of labour and capital, but also by expanding exports (Essays, 2018).

3.2. Methodology

For this empirical study, Real Gross Domestic Product in naira is used as a proxy for economic growth, Intra-African exports in naira, Intra-African imports in naira, Openness to intra-African trade as a ratio of total trade to GDP (a proxy for trade openess) and Unemployment rate in percentages Real GDP was regressed against intra-African imports, intra-African exports, unemployment and openness using the Ordinary Least Square (OLS) technique. The sample size was from 1990-2022 based on availability of data from Central Bank of Nigeria Statistical Bulletin, World Integrated Trade Solution, Trade Law Centre (TRALAC) website and the National Bureau of Statistics. The annual time series data for those years was used to examine the impact of intra-african trade openness on economic growth in Nigeria.

The choice of OLS was influenced by its wide range of economic relationship which gives satisfactory result, as well as the sound statistical econometric technique appropriate for empirical problems. This becomes so standard that its estimates are presented as a point of reference even when results from other estimation technique are used. More so, the reliability of this method lies on its desirability properties which are efficiency, consistency and unbiased. The model is preceded by unit root, co-integration using the Johansen co-integration procedure to determine the long run relationship among the variables of interest. The Vector Error Corection Model (VECM) was used to estimate a long run and short run model. The rationale behind this is to avoid the problem of spurious regression which is commonly associated with a time series data.

3.3. Model Specification

The Gravity Model of Trade was first introduced by Walter Isard in 1954. It is a model which in its traditional form predicts bilateral trade flows between countries as proportional to the size of their economies and inversely proportional to the distance between them (Tralac, 2019). The model has been used to analyze the determinants of bilateral trade flows and to test the effectiveness of trade agreements and organizations such as the World Trade Organization (WTO). It has also been used to evaluate the impact of treaties and alliances on Trade (Obasanmi, 2020).

The model takes the econometric form:

$$F_{ij} = G \frac{M_i^{B_1} M_j^{B_2}}{D_{ij}^{B_3}} \delta_{ij}$$

2.1

Where F_{ij} = Trade flow between country i and j,

      G is a constant,

      D_{ij} is distance between i and j

      M is GDP's of country,

      δ_{ij} is an error term with unit expectation.

However for econometric estimation, a multiplication rather than a log-linearized form and a Poisson Pseudo-Maximum Likelihood (PPML) estimator may be used.

      Where,

$$F_{ij} = exp[\beta_0 + B_1 \, ln(M_i) + B_2 \, ln(M_j) - B_3 ln(Dij)] \delta_{ij}$$

$$F_{ij} = exp[\beta_0 + B_1\, ln(M_i) + B_2\, ln(M_j) - B_3\, ln(Dij)]\delta_{ij} \qquad 2.2$$

In applied usage, the model is often extended by including variables such as exchange rate and tariffs. The Model for this study is an adaptation of the model used by Alimi (2012) and Obasanmi (2020). Their theoretical framework was based on the Export-Led Growth hypothesis and their model was given as:

$$GDP = f\, (IMP,\, EXP,\, FDI,\, EXR, INF) \qquad 3.1$$

Where: GDP = Gross Domestic Product; IMP = Imports; EXP = Exports; FDI = Foreign Direct Investment; EXR = Exchange Rate and INF = Inflation Level

In this study, equation 3.1 is modified to become

$$GDPQ = f(AEX,\, AIM,\, OPN,\, UNE) \qquad 3.2$$

The operational form is

$$GDP = \beta_0 + \beta_1 AEX + \beta_2 AIM + \beta_3 OPN + \beta_4 UNE + \mu_t \qquad 3.3$$

Where, β_i's are the coefficient to be estimated.

GDP = Real Gross Domestic Product in naira

AEX = Intra-African exports in naira

AIM = Intra-African imports in naira

OPN = Openness to intra-African trade as a ratio of total trade to GDP and

UNE = Unemployment rate in percentages

And taking log transformations becomes

$$lnGDP = \beta_0 + \beta_1 lnAEX + \beta_2 lnAFIM + \beta_3 lnOPN + \beta_4 UNE + \mu_t \qquad 3.4$$

The apriori expectations are given as $\beta_1 > 0,\ \beta_2 > 0,\ \beta_3 > 0,\ \beta_4 < 0$.

The Vector Autoregressive Error Correction model (VECM) is specified as:

$$\Delta lnGDP_t = d_0 + \sum_{i=1}^{k-1}\beta_i\,\Delta lnGDP_{t-i} + \sum_{j=1}^{k-1}a_j\,\Delta lnAEX_{t-j} + \sum_{m=1}^{k-1}\sigma_{2m}\,\Delta lnAIM_{t-m} + \sum_{r=1}^{k-1}\delta_r\,\Delta lnOPN_{t-r}$$

$$+ \sum_{v=1}^{k-1}\rho_v\,\Delta UNE_{t-v} + \delta_1 ECT_{t-1} + \mu_{1t}$$

$$\Delta lnAEX_t = d_1 + \sum_{i=1}^{k-1}\beta_i\,\Delta lnGDP_{t-i} + \sum_{j=1}^{k-1}a_j\,\Delta lnAEX_{t-j} + \sum_{m=1}^{k-1}\sigma_{2m}\,\Delta lnAIM_{t-m} + \sum_{r=1}^{k-1}\delta_r\,\Delta lnOPN_{t-r}$$

$$+ \sum_{v=1}^{k-1}\rho_v\,\Delta UNE_{t-v} + \delta_2 ECT_{t-1} + \mu_{2t}$$

$$\Delta lnAIM_t = d_2 + \sum_{i=1}^{k-1} \beta_i \Delta lnGDP_{t-i} + \sum_{j=1}^{k-1} a_j \Delta lnAEX_{t-j} + \sum_{m=1}^{k-1} \sigma_{2m} \Delta lnAIM_{t-m} + \sum_{r=1}^{k-1} \delta_r \Delta lnOPN_{t-r}$$
$$+ \sum_{v=1}^{k-1} \rho_v \Delta UNE_{t-v} + \delta_3 ECT_{t-1} + \mu_{3t}$$

$$\Delta lnOPN_t = d_3 + \sum_{i=1}^{k-1} \beta_i \Delta lnGDP_{t-i} + \sum_{j=1}^{k-1} a_j \Delta lnAEX_{t-j} + \sum_{m=1}^{k-1} \sigma_{2m} \Delta lnAIM_{t-m}$$
$$+ k \sum_{r=1}^{k-1} \delta_r \Delta lnOPN_{t-r} + \sum_{v=1}^{k-1} \rho_v \Delta UNE_{t-v} + \delta_4 ECT_{t-1} + \mu_{4t}$$

$$\Delta UNE_t = d_1 + \sum_{i=1}^{k-1} \beta_i \Delta lnGDP_{t-i} + \sum_{j=1}^{k-1} a_j \Delta lnAEX_{t-j} + \sum_{m=1}^{k-1} \sigma_{2m} \Delta lnAIM_{t-m} + \sum_{r=1}^{k-1} \delta_r \Delta lnOPN_{t-r}$$
$$+ \sum_{v=1}^{k-1} \rho_v \Delta UNE_{t-v} + \delta_5 ECT_{t-1} + \mu_{5t}$$

3.5

Where ECT is the error correction term and k is optimal lag length for each series.

3.3. Sources of Data and Data Analysis

This study relies on secondary data sources from various issues of the Central Bank of Nigeria's Statistical Bulletin, World Integrated Trade Solution, Trade Law Centre (TRALAC) website and the National Bureau of Statistics website. The data used are annual time series data spanning from 1990 to 2022.

Using the augmented Dickey-Fuller unit root test, the stationarity of each series was determined. Secondly, the variables are tested for co-integration using the Johansen co-integration procedure to determine the long run relationship among the variables of interest. The Vector Error Corection Model (VECM) was used to estimate a long run and short run model..

4. Data Presentation and Analysis

4.1. Descriptive Statistics

The description of the data set used in this study is presented in table 4.1, using the untransformed form of the data.

Table 4.1: Descriptive Statistics of Data Used

	GDP	AEX	AIM	OPN	UNE
Mean	532880.3	4723048	1063072	9.013364	12.68889
Median	511291.6	1827461	721553.9	5.135334	13.10000
Maximum	888893.0	14134825	3627600.	23.33454	35.00000
Minimum	328606.1	435763.3	116529.4	1.637448	1.800000
Std. Dev.	171540.3	4583390.	1001003.	6.977801	9.167221
Skewness	0.375406	0.747224	0.914832	0.666604	0.517173
Kurtosis	1.891040	2.040106	2.882060	1.988393	2.469515
Jarque-Bera	2.092428	3.680567	3.921841	3.267589	1.520199
Probability	0.351265	0.158772	0.140729	0.195188	0.467620
Sum	14920649	1.32E+08	29766004	252.3742	342.6000
Sum Sq. Dev.	7.95E+11	5.67E+14	2.71E+13	1314.622	2184.987
Observations	32	32	32	32	31

Source: Author's computation on Eviews 2023

All the variables are platykurtic (meaning more of the values are lower than their mean) and positively skewed. The probability of the Jarque-Bera statistics necessitated the transformation of the data. A log transformation was done and absence of autocorrelation and heteroskedasticity were proven. The test for normality of the log transformation of the data is also not in doubt.

4.2. Unit Root Tests Results

Table 4.2: Augmented Dickey-Fuller Unit Root Tests

Variables	ADF computed value at level	5% Critical value	ADF computed value at 1st difference	5% Critical value	Conclusion
lnGDP	-1.006197	-2.976263	5.189664	-2.981038	I(1)
lnAEX	-1.638718	-2.991878	-5.148588	-2.986225	I(1)
lnAIM	-2.503749	-3.012363	-10.19932	-2.981038	I(1)
lnOPN	-1.371379	-2.976263	-6.634675	-2.981038	I(1)
UNE	0.669635	-2.981036	-4.402208	-2.986225	I(1)

Source: Author's computation on Eviews 2023

Table 4.2 above shows that all the series are stationary at first level [$I(1)$]. The null hypothesis of the presence of unit roots is rejected (decision rule being to reject the null hypothesis if the absolute value of the ADF statistic is higher than the corresponding 5% critical value) and the series are all integrated at first difference. Hence we can do a test for co-integration to determine if a long run relationship exists among the variables.

4.3. Johansen Co-integration Test Results

Table 4.3: Summary of Johansen Co-integration Result

Hypothesized no. of CE(s)	Eigen value	Trace statistic	5% Critical value	Prob	Max-Eigen statistics	5% critical value	Prob
None *	0.857690	97.82612	69.81889	0.0001	48.74373	33.87687	0.0004
At most 1 *	0.682572	49.06239	47.85613	0.0382	29.48786	27.58434	0.0281
At most 2	0.373737	19.59453	29.79707	0.4508	11.69964	21.13162	0.5775
At most 3	0.22714	7.894897	15.49471	0.4767	6.441517	14.26460	0.5572
At most 4	0.056478	1.45338	3.841466	0.2280	1.453381	3.841466	0,2280

Note: * indicates presence of co-integrating equations at 5% level
Source: Author's computation on Eviews 2023

The result of the Johansen co-integration showed that there exist at least two co-integrating equations at the 5% level of significance in both the Trace and Max-Eigen statistics. The trace statistic of the two co-integrating equations gave 97.82512 and 49.08239 which are higher than the 5% critical values of 69.81889 and 47.85613 respectively. Before the short run model was estimated, the optimal lag length was determined to be 3 by all the lag length selection criteria. The result is presented on Table

4.4. Table 4.4 Optimum lag length for VAR model

VAR Lag Order Selection Criteria
Endogenous variables: LNGDP LNAEX LNAIM LNOPN UNE
Exogenous variables: GDP
Date: 10/14/23 Time: 04:30
Sample: 1990 2022
Included observations: 28

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-30.06620	NA	1.28e-05	2.922184	3.167612	2.987296
1	38.85362	103.3797	3.47e-07	-0.737802	0.734766	-0.347129
2	74.34049	38.44410	1.99e-07	-1.611707	1.088000	-0.895474
3	169.9238	63.72222*	1.52e-09*	-7.493651*	-3.566805*	-6.451857*

* 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 criterion

Source: Authors computation on Eviews 2023.

4.4. The VEC results

The VECM result is presented in table 4.5 below.

<p align="center">**Table 4.5**</p>

Vector Error Correction Estimates
Sample (adjusted): 1993 2022
Included observations: 28 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1				
LNGDP(-1)	1.000000				
LNAEX(-1)	-0.510227				
	(0.00519)				
	[-98.3853]				
LNAIM(-1)	-0.314214				
	(0.00282)				
	[-111.471]				
LNOPN(-1)	0.726001				
	(0.00650)				
	[111.614]				
UNE(-1)	0.003655				
	(0.00014)				
	[25.7373]				
C	-2.805087				

Error Correction:	D(LNGDP)	D(LNAEX)	D(LNAIM)	D(LNOPN)	D(UNE)
CointEq1	-2.717056	-16.42953	-2.220325	-10.12856	-106.2388
	(0.94343)	(8.64908)	(9.29265)	(8.15060)	(65.7696)
	[-2.87996]	[-1.89957]	[-0.23893]	[-1.24268]	[-1.61532]
D(LNGDP(-1))	0.966532	17.40608	5.835116	12.79632	132.6282
	(1.15491)	(10.5878)	(11.3757)	(9.97760)	(80.5122)
	[0.83689]	[1.64397]	[0.51295]	[1.28250]	[1.64731]
D(LNGDP(-2))	0.448051	10.71148	6.887332	8.991110	88.97533
	(0.75485)	(6.92019)	(7.43512)	(6.52135)	(52.6227)
	[0.59356]	[1.54786]	[0.92632]	[1.37872]	[1.69082]
D(LNAEX(-1))	-0.610478	-13.25300	-3.302223	-9.590327	-93.39723
	(0.89232)	(8.18048)	(8.78918)	(7.70900)	(62.2062)
	[-0.68415]	[-1.62008]	[-0.37571]	[-1.24404]	[-1.50141]
D(LNAEX(-2))	-0.408856	-7.319060	-5.057893	-6.078037	-86.16071
	(0.60729)	(5.56739)	(5.98166)	(5.24652)	(42.3357)

	[-0.67325]	[-1.31463]	[-0.84557]	[-1.15849]	[-2.03518]
D(LNAIM(-1))	-0.383161	-5.601643	-1.956118	-4.105838	-43.18351
	(0.37059)	(3.39745)	(3.65025)	(3.20164)	(25.8350)
	[-1.03392]	[-1.64878]	[-0.53589]	[-1.28242]	[-1.67151]
D(LNAIM(-2))	-0.130755	-2.383665	-1.625631	-1.968032	-30.40916
	(0.20561)	(1.88492)	(2.02517)	(1.77628)	(14.3333)
	[-0.63595]	[-1.26460]	[-0.80271]	[-1.10795]	[-2.12157]
D(LNOPN(-1))	0.868812	17.11994	4.341841	12.32577	127.7452
	(1.17568)	(10.7782)	(11.5802)	(10.1570)	(81.9599)
	[0.73899]	[1.58838]	[0.37494]	[1.21352]	[1.55863]
D(LNOPN(-2))	0.553338	9.110043	6.734680	7.613487	106.0421
	(0.77351)	(7.09129)	(7.61895)	(6.68259)	(53.9238)
	[0.71536]	[1.28468]	[0.88394]	[1.13930]	[1.96652]
D(UNE(-1))	0.016755	-0.005240	0.002468	-0.021519	0.712934
	(0.00553)	(0.05070)	(0.05448)	(0.04778)	(0.38556)
	[3.02951]	[-0.10334]	[0.04531]	[-0.45037]	[1.84909]
D(UNE(-2))	0.004548	0.047895	0.006630	0.030334	0.408682
	(0.00637)	(0.05840)	(0.06275)	(0.05503)	(0.44409)
	[0.71395]	[0.82011]	[0.10567]	[0.55118]	[0.92027]
C	0.020730	0.270490	0.142674	0.215702	2.718669
	(0.01396)	(0.12794)	(0.13746)	(0.12056)	(0.97286)
	[1.48546]	[2.11425]	[1.03796]	[1.78912]	[2.79452]
R-squared	0.873460	0.679545	0.633588	0.596828	0.610270
Adj. R-squared	0.757465	0.385795	0.297710	0.227254	0.253018
Sum sq. resids	0.019949	1.676658	1.935462	1.488963	96.95159
S.E. equation	0.040773	0.373793	0.401607	0.352250	2.842411
F-statistic	7.530163	2.313343	1.886365	1.614907	1.708234
Log likelihood	51.05683	-2.119513	-3.842030	-0.694837	-50.80842
Akaike AIC	-3.254736	1.176626	1.320169	1.057903	5.234035
Schwarz SC	-2.665709	1.765653	1.909196	1.646930	5.823062
Mean dependent	0.029173	0.099841	0.105112	0.071839	1.312500
S.D. dependent	0.082792	0.476952	0.479229	0.400712	3.288757
Determinant resid covariance (dof adj.)	9.08E-10				
Determinant resid covariance	2.84E-11				
Log likelihood	121.1594				
Akaike information criterion	-4.679951				
Schwarz criterion	-1.489389				

Source: Authors computation on Eviews 2023/

The upper part of the result shows the long run model results and indicates that log of intra-African exports and imports respectively have a negative impact on the

log of GDP as corroborated by[14] but contrary to the views of the ELG hypothesis; while the log of openness and unemployment had positive impact on the log of GDP in the long run contrary to the findings of Tralac, (2019). By rule of thumb (t > 2) for the t-values all the variables are statistically significant at the 5% level.

The lower part of the result is the short run result and reveals a speed of adjustment of 271.7% that is the previous period deviation is corrected at an adjustment speed of 271.7%. A 1% change in the first year lag of imports reduced current GDP by about 61%. One period lag of Intra-African exports also reduced GDP by over 38%. However openness improved GDP in the first and second period lags with about 87% and 55% respectively. The overall model explains 87.4% of the causes of variations in GDP by the explanatory variables used.

4.6. Test of hypotheses

H_{O1}: Intra-African trade openness has no significant impact on Nigeria economic growth.

For this hypothesis, the result shows that Intra-African trade openness has a positive and statistically significant impact on Nigeria s economic growth in the long run as well as in the short run. This supports the findings of Kalu, et al (2016), Iyoha and Okim, A. (2017).

H_{O2}: Intra-African imports has no significant impact on Nigeria's economic growth

As revealed, in the long run Intra-African imports has negative and statistically significant impact on economic growth. This is contrary to the findings of Kalu, Nwude and Nwonye (2016 and Yakubu and Akanegbu (2018). We therefore reject the null hypothesis.

H_{O3}: Intra-African exports has no significant impact on Nigeria's economic growth.

Here also, in the long run intra-African exports has a negative and statistically significant impact on economic growth. This is in consonance with Kalu, et al (2016) and Nteegah, Nelson and Owede (2017). We therefore reject the null hypothesis.

4.7. Diagnostic Tests

Table 4.7: Diagnostic test result summary

Test	Value	Prob
Normality (Jarque-Bera)	30.2180	0.0008
Heteroskedasticity	340.99094	0.3267
Auto correlation	17.49443	0.8631
R square	0.873460	

Source: Authors computation on Eviews

The results in the Table 4.7 shows the Jarque-Bera statistic with a highly significant value of 0.0008 indicating normality in the distributions used for the model estimation. The Jarque-Bera is a goodness of fit test of whether the sample data have the skewness and kurtosis matching a normal distribution. The nearer it is to zero the more closer it is to a normal distribution. On the test for heteroskedasticity, with its probability value higher than 5%, we accept the null and conclude there is no heteroskedasticity in the model. The same goes for the test for autocorrelation. With autocorrelation probability values greater than 5%, we accept the null hypothesis and conclude that the model does not suffer from autocorrelation in both the first and second lags. Finally, the explanatory variables explained 87.4% of variations in real GDP.

5. Conclusion

The study examined the impact of intra-African trade openness on the growth of the Nigerian economy. Intra-African trade openness is an idea of the African Union under the aegis of the AfCFTA agreement. From the study, it was revealed that intra-African exports and imports have negative impact on the economic growth of Nigeria, hence an increase in intra-African imports and exports will also increase economic growth. The study also showed that openness has negative impact on economic growth, signifying that increase in openness will reduce economic growth ceteris paribus. Following this, the study concluded that intra-African trade openness had a negative impact on Nigeria's economic growth during the study period.

It is therefore recommended that,

(i) If Nigeria decides to concentrate on African exports the volume of her exports needs to be high enough to increase her tangible gain; otherwise, it is not advisable.

(ii) In terms of trade openness, Nigeria needs to open up her economy to more African countries. This may help conserve foreign reserves.

(iii) The gains and pains of openness and increasing unemployment has to be checked by very gradual openness as it may cause jobs to be created abroad; leaving our people unemployed.

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