Implications of the African Continental Free Trade Area for Nigeria's Economic Growth

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Abstract

The objective of this paper is to examine the effect of intra-African Trade on Nigeria's economic growth from 1981 to 2019. To achieve this, the ARDL modeling technique is employed 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 the African Continental Free Trade Agreement (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 are observed. Evidence from out-of-sample simulation based on a three-equation system of simultaneous equations model shows that expansion of intra-African trade will (potentially) contribute to the growth of the Nigerian economy. Based on these findings, we 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, as well as development of a knowledge-base of the population to improve the performance of the Nigerian economy in the years ahead.

I.   Introduction

International trade constitutes a major vehicle for economic integration. It is a viable instrument for facilitating regional economic integration. 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*

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(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).

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). It was conceived to expand intra-African trade, which is trade among countries in the continent. Over the last four decades, intra-African trade has been quite low, compared with extra-African trade that is trade between African countries and the other regions of the world. According to UNCTAD (2019), between 2015 and 2017, 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), Asia (61.0 per cent), Europe (67.0 per cent), and Oceania or Australia (7.0 per cent). In 2017, 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). 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 2017 (UNCTAD, 2019). The trends in intra-African trade and extra-African trade from 1981 to 2019 are shown in Figure 1.

Figure 1. Trends in Intra-African and Extra-African Trade.
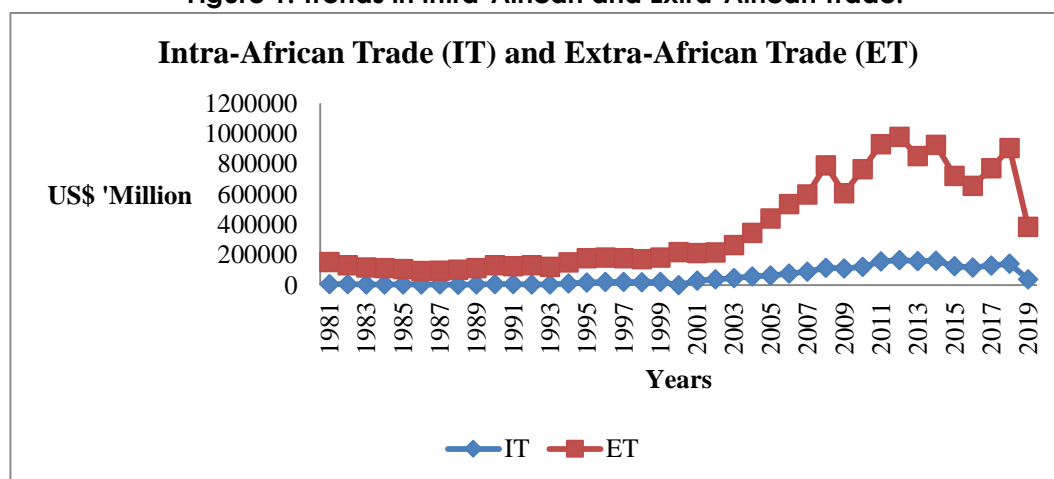
Source: United Nations University-Comparative Regional Integration Studies, Regional Integration Knowledge System (UNU-CRIS RIKS), 2020.

Longo and Sekkat (2004) identified mismanagement of economic policies, poor infrastructure and internal political tensions as some of the factors affecting intra-African trade. Other factors that may be responsible for the low volume of intra-African trade are low level of investment, low volume and quality of industrial and non-industrial output, weak commitment of member countries to regional economic agreements within the continent, differences in level of development of countries in the continent, preferences or taste for foreign goods (responsible for high demand for imports from highly industrialised economies), desire to earn more foreign exchange from the advanced economies and to learn their technologies (partly responsible for higher volume of extra-African exports).

Upon implementation, the AfCFTA is expected to be the largest free trade area in the world, comprising about 55 countries. The implementation is expected to enhance the continent's long-run growth, increase aggregate income level, reduce extreme poverty raise the continent's manufactured exports, improve employment level and the wages of both skilled and unskilled workers therein (World Bank, 2020). The World Bank also 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, 2019). Fofack et al. (2021) 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 NOTN (2018), UNCTAD (2019) and Songwe (2019) 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. Kimenyi et al. (2016) noted that expansion of intra-African trade has the potential to engender improvement in industrial competitiveness through economies of scale and weeding out less productive producers, enhance the attractiveness of African countries to FDI, facilitate technology and knowledge transfers, and create incentives for infrastructural development, all of which are essential ingredients for rapid economic growth.

Nigeria signed the Agreement to be part of the African Continental Free Trade Area (AfCFTA) on July 7, 2019. Prior to this, Nigeria's economy had been plagued with slow growth, particularly during the years: 2015 to 2019. The slow growth was due largely to the collapse of crude oil prices during the 2014-2016 period, as well as drop in the country's oil production and other structural economic constraints. The annual real GDP growth rate which averaged 7.0 per cent during the 2000-2014 period crashed to 2.7 per cent in 2015. The country went into a depression the

following year when it recorded a growth rate of -1.6 per cent. It rebounded to 0.8 per cent in 2017 and rose to 1.9 per cent in 2018, and thereafter to 2.2 per cent in 2019 (Tralac, 2018; World Bank, 2022).

The country's intra-African trade had also been low, compared to trade with countries outside the continent. In 2017 and 2018, Nigeria's imports from African countries were respectively 4.0 per cent and 3.3 per cent of her total imports, while her exports to African countries were respectively 12.0 per cent and 13.2 per cent of her total exports in same period. In 2017, Nigeria's export to the African region was mainly petroleum oil, which accounted for nearly 83.0 per cent of her exports to countries in the continent. Her major imports were chemical fertilisers, petroleum (excluding crude), polymers of propylene, and frozen fish. The country's major trading partner in terms of exports and imports in the continent is South Africa (Tralac, 2018). The AfCFTA is envisaged to increase intra-African trade which is expected to bring about improvement in macroeconomic conditions, including, economic growth, job creation, investment, and poverty reduction in Nigeria and other countries in the continent.

The research question of this study is: will expansion of intra-African trade which is expected to result from the formation and implementation of the AfCFTA be beneficial to Nigeria's economic growth? The objective of the study therefore is to investigate the growth effects of the intra-African trade in Nigeria. This study contributes to existing knowledge by empirically examining the short-run and the long-run effects of intra-African trade on economic growth in Nigeria. To our knowledge, this has not been done by any previous research. Most of the previous related studies (Adom, 2012; Kitavi, 2015; Zahonogo, 2016; Gnimassoun, 2018) employed panel data to investigate the growth effect of intra-regional trade on regional growth, paying little or no attention to the effect(s) in specific economies in Africa.

The remainder of the study is organised as follows: Section 2 contains a review of theoretical and empirical literature. In Section 3, the methodology of the study, comprising data issues, theoretical framework, model specification and estimation technique are discussed. The estimation results are presented and evaluated in Section 4. Section 5 concludes the paper with evidence-based policy recommendations.

II.　　Literature Review

The section begins with a review of the theoretical literature on the trade-economic growth relationship. This is followed by the empirical literature review. The gap in the literature is highlighted in the concluding part of the review.

II.1   Theoretical Literature

The classical theories of trade, including the absolute cost advantage theory of Adam Smith (which attributes trade to difference in absolute advantage), the comparative cost advantage theory of David Ricardo (which attributes trade to differences in comparative cost), the neoclassical theories such as the Hecksher-Ohlin theory (which attributes trade to factor endowment), and the neo-technology trade theories of Kravis (1956) and Posner (1961), both cited in Berkum and Merji (2000), (which attribute trade to endogenous technological innovation and technology gap across countries), all posit positive effect of trade on economic growth. The positions of these theories are based on different assumptions. Smith argued that specialisation (which engenders efficiency gains and improvement in technological progress, resulting in development of new tools and mechanisms for undertaking specialised tasks), division of labour and international exchange would engender welfare and growth enhancing effects in nations. Ricardo's theory proposes specialisation in the production and export of commodities in which they have the most comparative advantage as pathway to economic growth. The Hecksher-Ohlin theory proposes production based on factor-endowment: countries are to specialise in the production of commodities that intensively utilise factors for which they are relatively more endowed.

Through trade, countries are able to efficiently allocate their resources, intensify their specialisation, invest more in innovation, and expand the market for their goods and services with the resultant effect of expansion of output of goods, which are exchanged with their trading partners. This will engender improvement in consumption or welfare (Zahonogo, 2016). According to Chen and Looi (2005), knowledge is the main engine of economic development. This is in consideration of its enhancing effects on productivity of labour and capital. The endogenous growth theories recognise trade as the principal channel through which knowledge is transmitted internationally (Mejia, 2011). Based on the theoretical prediction on the linkage between knowledge and economic growth, and the role of trade in international transmission or diffusion of knowledge, it can be inferred that trade is a key determinant of economic growth.

Trade affects economic growth through its components – imports and exports. Rising imports adversely affect economic growth and engenders depletion of external reserves. However, through importation, residents of a country are able to access and consume goods and services produced by other countries. Imported items also include foreign technology and equipment which could be deployed for efficient and more effective production in the importing country. Rodrik (1999) argues that the benefits of trade lie mainly on the import side rather than on the export side. However, the ELG hypothesis popularised by Findley (1984) and Krueger (1985) posits that growth is export-led, that is export is an important ingredient of economic

growth. The validity of this hypothesis is still being debated as the results from empirical studies of the relationship have been divergent. The debate on the relative effects of exports and imports on economic growth remains inconclusive, owing to countries' position and the competitiveness in the international market. However, there is considerable consensus that trade is beneficial to economic growth (Arodoye & Iyoha, 2014; Iyoha & Akim, 2017), though this is largely dependent on country-specific conditions (Aigheyisi, 2015, 2016).

II.2   Empirical Literature

In this section, the literature on growth effect of intra-regional trade is reviewed. Wooster et al. (2008) employ Granger-causality test to examine the contributions of intra-regional trade and extra-regional trade to economic growth in 13 countries of the European Union over the 1980-2003 period. The study found that extra-regional trade had greater impact on economic growth than intra-regional trade by as much as 30.0 per cent.

Miron et al. (2010) examine the effect of Romania's trade (exports and imports) with the European Union (EU) on the country's economic development over the 2008-2010 period, using VAR and logistic regression methodologies. The study finds that trade with the EU had positive effect on the development of the country's economy. This suggests that the country benefits from its membership of the EU.

Adom (2012) employs the two-stage-least-squares (2SLS) technique to estimate a system of simultaneous equations in a study to examine the impact of intra-ECOWAS trade and aid on economic growth in the ECOWAS region, using a panel dataset spanning 1980 to 2009 on 14 member countries of ECOWAS. The study finds that the regional growth-effect of intra-ECOWAS trade was positive and significant, while that of aid was negative and significant. These suggest that greater trade among countries in the ECOWAS sub-region and less reliance on foreign aid will enhance the sub-region's economic growth.

Anyanwu (2014) examines the effect of intra-African trade on aggregate and gender-specific youth unemployment in Africa over the 1980-2010 period. The study finds that aggregate and gender-specific youth unemployment in the country were reduced by intra-African trade. It further finds that economic growth, domestic investment, inflation, higher urbanisation, secondary education and institutionalised democracy serve to reduce unemployment in the country.

Kitavi (2015) employs the OLS technique to estimate a multiple linear regression model in a study to examine the effect of intra-African trade on economic growth in the East African Community (EAC) during the 1980-2012 period. The study finds a positive and significant long-run growth effect of intra-African trade (exports and

imports) on economic growth in the EAC. However, the conclusion of the study should be treated with caution as the Durbin-Watson statistic indicates evidence of positive correlation, which renders the results and the conclusion of the study unreliable.

Zahonogo (2016) examines the effect of trade openness on economic growth in 42 sub-Saharan African (SSA) countries during the 1980-2012 period using the PMG estimation technique. Trade openness and its squared value were incorporated among the explanatory variables in the model to determine whether a threshold level exists for trade openness and whether the relationship between trade openness and economic growth is non-linear. The study finds that for SSA, the relationship between trade openness and economic growth was non-linear (that is, it is inverted U-shaped), suggesting that a threshold level exists below which economic growth improves with trade openness and above which it declines. This suggests that SSA countries should cautiously embrace and implement trade liberalisation policies.

The growth effect of trade on economic growth in ECOWAS during the 1990-2013 period was investigated in Iyoha and Okim (2017), using both dynamic and static panel modeling techniques. The study specifically investigates the effect of exports, exchange rate and other policy variables on per capita income in the Economic Community. The study finds, *inter alia*, positive and significant effect of export on economic growth. Ijirshar (2019) also examines the growth effect of trade openness in ECOWAS during the 1975-2017 period using pooled mean group (PMG) estimation technique. The study finds that trade openness positively affected economic growth in the long-run, though the short-run growth effects of trade openness varied across countries in the Community. Labour force, government expenditure and exchange rate were also found to exert significant positive impact on the long-run growth of the sub-region's economy. Contrary to these findings, Guei and Roux (2019) find negative and significant short-run growth effect of trade openness in ECOWAS during the period from 1990 to 2016 in their study which involved application of the PMG technique. The short-run effect was not significant for the entire sub-region taken together, but negative and significant for eight out of the 15 countries.

Tinta (2018) employs panel least squares estimator to estimate two fixed effect models in a study to examine the effects of intra-ECOWAS trade on per capita income and food security (measured as per capita dietary energy supply) in the Community during the period from 1995 to 2012. The study finds that the effect of intra-ECOWAS trade on per capita income was positive and significant, suggesting that intra-Community trade had been beneficial to the sub-region's economic growth. The effect on food security was positive, but not statistically significant.

Gnimassoun (2018) examines the effect of intra-African trade and migration on income in Africa using 2SLS technique based on a gravity model. The study finds that the long-run effect of intra-African trade on income per capita in the continent had not been significant, but the short-run and medium-run effects had been positive and significant through the channel of inter-country migration.

Ikpesu et al. (2019) also examine the effect of trade and investment in 35 SSA countries during the 2000-2016 period, using the technique of panel corrected standard error. Three measures of trade openness were adopted in the study. They are total trade i.e., export plus import (as a percentage of GDP); export as a percentage of GDP; and import as a percentage of GDP. The study finds that total trade openness and import openness were favourable to economic growth, while export adversely affected growth. The researcher attributed the adverse growth effect of export to the dominance of SSA exports basket by primary commodities whose prices are quite low, unstable and volatile in the global market.

Previous related studies were concerned with the effect of intra-African trade on regional economic growth. To our knowledge based on wide literature search, no prior study exists which empirically examined the effect of intra-African trade on economic growth in Nigeria and indeed in any specific African country using time series data. This study therefore fills this gap.

III. Data, Model Specification and Estimation Technique

This section discusses the data used for the study. It also presents the theoretical framework and the specification of the models of the study. The techniques for estimating the model are also presented.

III.1 Data Sources and Measurement

Data used for the study are annual time series data spanning 1981 to 2019. They were obtained from various sources. Table 1 shows the variables and their description, as well as data sources.

Table 1: Variable Description, Measurement and Data Sources

S/N	Variable Symbol	Description	Unit of Measurement	Data Sources
1	RGDP	Gross domestic product adjusted for inflation	US$	World Bank's World Development Indicators, 2020
2	AfTRADE	Total intra-African trade (intra-African exports plus intra-African imports)	US$	UNU-CRIS RIKS database, 2020
3	RGCF	Gross capital formation, adjusted for inflation	US$	World Bank's World Development Indicators, 2020
4	CPI	Consumer price index	-	World Bank's World Development Indicators, 2020
5	EXRT	Official nominal exchange rate	₦/US$	World Bank's World Development Indicators, 2020
6	POP	Nigeria's total annual population	-	World Bank's World Development Indicators, 2020

Source: Authors' compilation.

III.2   Model Specification

The Solow's (1956) output equation, which expresses real output as a function of capital and labour provides the theoretical foundation for this study.

$$Y = f (T, K, L) \qquad (1)$$

Where, Y represents real GDP, T represents technology, K represents physical capital and L denotes labour force. The level of real output is determined by technology, physical capital and labour employed. In empirical applications, the Solow model is modified to incorporate other policy variables affecting output (Mankiw et al., 1992). The neoclassical and endogenous growth theories identify trade as a key factor affecting economic growth. In line with the objective of this study, the Solow's model is modified to incorporate intra-African trade, and other variables including consumer price index and exchange rate as determinants of real output. Thus equation (1) is expanded and re-specified as:

$$RGDP = f (T, AFTRADE, RGCF, CPI, EXRT, POP) \qquad (2)$$

T represents the level of technology; RGDP represents real GDP, an indicator of economic activity (World Bank, 2019); AFTRADE represents intra-African trade measured as the sum of total intra-African exports and total intra-African imports in US$; RGCF represents gross capital formation, adjusted for inflation; CPI represents consumer price index; EXRT represents nominal exchange rate (₦/US$); and POP represents population, a proxy for labour supply.

III.3   Estimation Technique

The ARDL bounds testing approach to co-integration and error correction model developed by Pesaran et al. (2001) was employed for the analysis. The choice of this methodology was informed by the need to examine the short- and long- run growth implications of the expansion in intra-African trade expected to result from the formation and implementation of the African Continental Free Trade Area for Nigeria. A major advantage of bounds testing approach is its flexibility, as it can be applied in cases where the model variables are integrated of different orders. That is, it is applicable in cases of variables that are integrated of order 1 [I (1)], order zero [I (0)] or a mix of both (except order 2, where it breaks down). Furthermore, the method can be applied to small, finite data series, and it yields long-run estimates that are efficient and consistent with valid t-ratios even where there is repressor endogeneity peculiar with co-integrated regressors (Harris & Sollis, 2003).

The method involves OLS-estimation of an unrestricted error correction ARDL model (UEC-ARDL) specified (using natural logarithm of the variables) as:

$$\Delta LnRGDP_t = \beta_0 + \sum_{j=1}^{p} \left(\gamma_{1j}\Delta LnRGDP_{t-j}\right) + \sum_{j=0}^{p} \left(\gamma_{2j}\Delta LnAFTRADE_{t-j}\right) +$$

$$\sum_{j=0}^{p} \left(\gamma_{3j}\Delta LnRGCF_{t-j}\right) + \sum_{j=0}^{P} \left(\gamma_{4j}\Delta LnCPI_{t-j}\right) + \sum_{j=0}^{P} \left(\gamma_{5j}\Delta LnEXRT_{t-j}\right) +$$

$$\sum_{j=0}^{P} \left(\gamma_{6j}\Delta LnPOP_{t-j}\right) + \pi_1 LnAFTRADE_{t-1} + \pi_2 LnRGCF_{t-1} + \pi_3 LnCPI_{t-1} + \pi_4 LnEXRT_{t-1} +$$

$$\pi_5 LnPOP_{t-1} + \xi_t \tag{3}$$

The definition of the variables remains as in equation (2) and Ln stands for natural logarithm. Parameters π_1 to π_5 correspond to the long-run relationships, while the parameters $\gamma_{1j} \dots \gamma_{6j}$ capture the short-run relationships. Δ is the first difference operator, ξ is the error term, j is the empirically determined optimal lag order of the ARDL model. Technology (T) which appeared in equation (2) is embedded as a component of RGCF, which comprised domestic capital and foreign capital, especially FDI through which foreign technology is channeled into the economy. The test for long-run relationships (or co-integration) involves testing the estimated model for joint significance of the regressors using the computed Wald's F-statistic. The null hypothesis of "no co-integration" ($\pi_1 = \pi_2 = \pi_3 = \dots \pi_5 = 0$) is tested against the alternative hypothesis of co-integration ($\pi_1 \neq \pi_2 \neq \pi_3 \neq \dots \pi_5 \neq 0$). Pesaran et al. (2001) have computed two sets of asymptotic critical values for the F-statistic at different levels of statistical significance. One set comprised of the lower bound critical values, while the other set is made of the upper bound critical values. The null hypothesis of "no co-integration" is rejected if the computed F-statistic is greater than the upper bound critical value at the chosen level of statistical significance, implying that the variables are co-integrated. The null hypothesis is accepted if the

F-statistic is less than the lower bound critical value, implying the variables are not co-integrated. The test is inconclusive if the computed F-statistic is between the lower and upper bound critical values.

The error correction model is derived from the UEC-ARDL model (equation 3) as:

$$\Delta LnRGDP_t = \beta_0 + \sum_{j=1}^{\eta} \left(\alpha_{1j}\Delta LnRGDP_{t-j}\right) + \sum_{j=0}^{\eta} \left(\alpha_{2j}\Delta LnAFTRADE_{t-j}\right) +$$
$$\sum_{j=0}^{\eta} \left(\alpha_{3j}\Delta LnRGCF_{t-j}\right) + \sum_{j=0}^{\eta} \left(\alpha_{4j}\Delta LnCPI_{t-j}\right) + \sum_{j=0}^{\eta} \left(\alpha_{5j}\Delta LnEXRT_{t-j}\right) +$$
$$\sum_{j=0}^{\eta} \left(\alpha_{6j}\Delta LnPOP_{t-j}\right) + \varphi ECT_{t-1} + \mu_t$$

(4)

The αs are estimates of the respective short-run effects of the explanatory variables on the dependent variable. ECT is the error correction term, which *inter alia* measures the speed of adjustment to equilibrium in the event of short-run deviation from the long-run (equilibrium) relationship. To play the role of error correction, its coefficient (φ) is expected to be negatively signed and statistically significant. μ is the error term.

The long-run equation is derived from the ARDL model as:

$$LnRGDP_t = \theta_t + \alpha LnAFTRADE_t + \beta LnRGCF_t + \delta LnCPI_t + \rho LnEXRT_t + \chi LnPOP_t + \varepsilon_t \qquad (5)$$

α, β, δ, ρ, and χ are estimates of the respective long-run effects of the explanatory variables on the dependent variable. ε is the error term.

The *a priori* sign expectations are: $\alpha > 0$, $\beta > 0$, $\delta < 0$, $\rho > 0$, $\chi > 0$.

III.4 Justifications for the Included Explanatory Variables and *A Priori* Expectations

Based on the prediction of positive effect of trade on real output by the neoclassical trade theory and the endogenous growth theory (Baldwin & Forslid, 2000), intensification of intra-African trade is expected to engender expansion in real output in Nigeria, as the country's share of total intra-African exports will likely increase and she would be able to import items from countries in the continent at lower cost as a result of drop in tariffs (Olapade & Onyekwena, 2021). Thus, the sign on the long-run coefficient of intra-African trade is expected to be positive. Various growth theories predict positive growth effect of capital which is seen as the heart of growth models (Baldwin & Forslid, 2000). In view of this, capital formation is predicted to positively impact real output as it is a key input in the production process. Endogenous growth model predicts negative effect of high inflation on

economic growth (Amber & Cardia, 1998). Thus, increase in consumer price index is expected to adversely affect real output in the country. The j-curve effect in international trade predicts deterioration in trade as the initial short-run effect of currency depreciation, as increase in exchange rate engenders increase in prices of imports, especially in an import-dependent economy. However, in the long-run, as a result of adjustments and improvement in a country's production and export capacities, currency depreciation positively affects the trade balance, and hence real output as a country's export becomes cheaper in the foreign market, and imports become more expensive in the domestic market. These effects are, however, dependent on import and export elasticities as posited by the Marshal-Lerner principle. Population being the source of labour supply is expected to positively affect real output considering that labour is a key factor of production.

IV.   Results

The model estimation results are presented and discussed in this section. Prior to this, the descriptive statistics of the variables and the matrix of pairwise correlation coefficients are presented.

IV.1   Descriptive Statistics

The descriptive statistics of variables used in the study are presented in Table 2. The value of intra-African trade ranged between US$335.00 million and US$163.00 billion, and averaged US$53.90 billion during the 1981-2019 period. Within same period, Nigeria's average real GDP ranged between US$108.00 billion and US$480.00 billion and averaged US$224.00 billion. The country's real gross capital formation ranged between US$9.57 billion and US$74.60 billion, and averaged US$33.40 billion. Her consumer price index averaged 61.4 and ranged between 0.5 and 267.5. The nominal exchange rate of the naira to the US dollar ranged between ₦0.62/US$ and ₦306.92/US$ and averaged ₦94.14/US$ within the period under consideration. The country's annual population ranged between 75.4 million and 201 million in the period under review.

All the variables except CPI are normally distributed as indicated by the p-value of the Jarque-Bera Statistic derived from the coefficients of skewness and kurtosis.

Table 2: Descriptive Statistics

	RGDP	AFTRADE	RGCF	CPI	EXRT	POP
Mean	2.42E+11	53894.33	3.34E+10	61.43816	94.14343	1.28E+08
Maximum	4.80E+11	163849.8	7.46E+10	267.5115	306.9200	2.01E+08
Minimum	1.08E+11	335.2409	9.57E+09	0.489360	0.617708	75440502
Skewness	0.702564	0.742305	0.750041	1.301195	0.810179	0.372052
Kurtosis	1.930168	1.982685	1.911192	3.777908	2.854557	1.960311
Jarque-Bera	5.068256	5.263373	5.439937	11.98857	4.300910	2.656294
Probability	0.079331	0.071957	0.065877	0.002493	0.116431	0.264968
Observations	39	39	38	39	39	39

Source: Authors' estimation.

IV.2 Unit Root and Cointegration Tests

The results of the unit root test for the variables are presented in Table 3. The results show that the variables are of mixed order of integration.

Table 3: Unit Root Tests

ADF Test

Variables	Levels			1st Difference			I(d)
	ADF Stat	Critical Value (5 per cent)	Inference	ADF Stat	Critical Value (5 per cent)	Inference	
LnRGDP	-1.51	-3.54	NS	--3.76	-3.54	S	1
LnAFTRADE	-4.54	-3.53	S	-	-		0
LnRGCF	-0.60	-2.95	NS	-4.00	-2.95	S	1
LnCPI	-0.82	-3.54	NS	-3.92	-3.54	S	1
LnEXRT	-1.25	-3.53	NS	-5.61	-3.54	S	1
LnPOP	-4.89	-3.57	S	-	-	-	0

PP Test

Variables	Levels			1st Difference			I(d)
	PP Stat	Critical Value (5 per cent)	Inference	PP Stat	Critical Value (5 per cent)	Inference	
LnRGDP	-3.14	-3.53	NS	-3.65	-3.54	S	1
LnAFTRADE	-4.54	-3.53	S	-	-		0
LnRGCF	-1.01	-2.94	NS	-4.76	-2.95	S	1
LnCPI	-1.80	-3.53	NS	-4.18	-3.54	S	1
LnEXRT	-1.30	-3.53	NS	-5.61	-3.54	S	1
LnPOP	2.93	-3.53	NS	-3.70	-3.54	S	1

Source: Authors' estimation.
Note: I (d) represent the order of integration.
NS represents 'non-stationary'; S represents 'stationary'.

Considering that the variables are integrated of different orders with the dependent variable being I (1), the appropriate approach to test for co-integration among the

variables is the ARDL (Bounds) test. The test was performed, and the result is presented in Table 4. The result shows that the null hypothesis of "no long-run relationships" is rejected as the computed F-statistic is greater than the upper bounds critical value even at the 1.0 per cent significance level. Thus, it can be inferred that long-run relationships exist among the variables.

Table 4: Bounds Test

ARDL Bounds Test		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	k
F-statistic	10.49	5
Critical Value Bounds		
Sig.	Lower Bound	Upper Bound
10 %	2.26	3.35
5 %	2.62	3.79
2.5 %	2.96	4.18
1 %	3.41	4.68

Source: Authors' estimation.
Note: k stands for number of explanatory variables.

IV.3   Estimation Results

The results of estimation of the error correction model and the long-run estimates – are presented in Tables 5 and 6, respectively. The error correction result shows that the short-run effect of intra-African trade on Nigeria's real GDP is positive as expected, but not statistically significant. This implies that intra-African trade has no significant effect on economic growth in Nigeria in the short-run. The short-run effect of real GCF on real GDP is positive in conformity with *a priori* expectations, but it is also not statistically significant. This implies that investment in the country may not influence economic growth significantly in the short-run. It could take some time before the growth effect of investment materialises. The sign on the coefficient of consumer price index is negative, as expected and it is statistically significant at the 1.0 per cent level. A 1.0 per cent rise in the price index is associated with 0.1 per cent decrease in real GDP. This indicates that inflation adversely affects economic growth in the short-run in the country.

The exchange rate is negatively related to real GDP contemporaneously, and the relationship is significant at the 5.0 per cent level. A 1.0 per cent rise in the exchange rate is associated with 0.03 per cent decrease in the real GDP. This is contrary to theoretical expectation. Theoretically, depreciation of a currency is expected to reduce import to improve external viability and raise the level of GDP. However, the result shows that currency depreciation will adversely affect economic growth in the short-run in the country. The short-run adverse effect of currency depreciation may be attributed to the increase in general price level as a result of increase in prices of imports in the country, which is highly import-dependent. Population is

positively and highly significantly related to real GDP in the short-run. This conforms to *a priori* expectation. The result is not unexpected considering that the population is the source of labour force, which is a key factor or determinant of production according to various growth models, and also the principal actor of consumption which is a main determinant of the level of investment and national output.

The error correction term is negatively signed as expected and statistically significant at the 1.0 per cent level. Its coefficient implies that about 66.0 per cent of the short-run deviation from equilibrium is corrected annually to restore equilibrium relationship. Thus, the speed of adjustment to equilibrium is quite impressive. The adjusted R^2 indicates that 65.0 per cent of variation in the dependent variable is explained by the model. The F-statistic, which is significant at the 1.0 per cent level indicates joint significance of the regressors in the determination of the dependent variable. The Durbin-Watson statistic indicates absence of the problem of autocorrelation in the model.

Table 5: Error Correction (Short-Run) Model

Dependent Variable: ΔLn (RGDP)		
Selected Model: ARDL (1, 1, 0, 0, 2, 1)		
Sample: 1981 2019		
Variable	Coefficient	t-Statistic
ΔLnAFTRADE	0.01	0.75
ΔLnRGCF	0.04	1.49
ΔLOG(CPI)	-0.10	-4.37***
ΔLOG(EXRT)	-0.03	-2.04**
ΔLOG (EXRT (-1))	-0.04	-1.26
ΔLOG(POP)	52.56	4.63***
ECT (-1)	-0.66	-6.58***

Source: Authors' estimation.
Note: R^2 = 0.75; Adj. R^2 = 0.65; F-stat = 7.62, p-value = 0.00; DW-stat = 1.86.
***, ** represent statistical significance at 1% and 5%, respectively.

The long-run results are reported in Table 6. The results show that the long-run effect of intra-African trade on real GDP is positive and significant at the 5.0 per cent level. A 1.0 per cent rise in the value of intra-African trade is associated with 0.04 per cent rise in the real GDP. This implies that intra-African trade will enhance Nigeria's economic growth in the long-run. Thus, it is expected that Nigeria will benefit from the implementation of the African Continental Free Trade Area in the long-run. This corroborates evidence from similar previous studies such as Miron et al. (2010), which found positive growth effect of EU trade in Romania and Kitavi (2015), which found positive long-run growth effect of intra-African trade in the EAC. The long-run effect of gross capital formation on real GDP is positive and significant at the 10.0 per cent level. A 1.0 per cent rise in real GCF is associated with about 0.05 per cent rise in real output. Thus, investment will engender improvement in economic growth in the country. The weak statistical significance may be associated with the low level of investment in the country.

The effect of exchange rate on real output is positive and statistically significant at the 1.0 per cent level in the long-run. Considering that the short-run effect was observed to be negative and significant, both observations are indicative of evidence of a j-curve effect. Currency devaluation could adversely affect the balance of trade (and real output) in the short-run. However, its long-run effect may be positive. These effects are dependent on a host of factors, including the level of domestic production, the elasticity of demand for a country's exports in foreign markets and the country's elasticity of demand for import according to the Marshall-Lerner principle. Population positively affects the real GDP and the effect is significant at the 1.0 per cent level. A 1.0 per cent rise in population is associated with 2.0 per cent rise in the real GDP. Thus, population growth stimulates economic growth in the country in the long-run.

Table 6: Long-Run Coefficients based on ARDL (1, 1, 0, 0, 2, 1)

Variable	Coefficient	t-Statistic
LnAFTRADE	0.04	2.03**
LnRGCF	0.05	1.71*
LnCPI	-0.15	-5.02***
LnEXRT	0.07	3.56***
LnPOP	2.00	9.90***
C	-14.69	-4.78***

Source: Authors' estimation.
Note: ***, ** represent statistical significance at 1% and 5%, respectively.

IV.4   Diagnostics

Diagnostic tests were performed to ensure the reliability of the estimated model. The tests include the residual normality test, the serial correlation test, the heteroscedasticity test and the Ramsey's regression equation specification error test (RESET). The results of the test are presented in Table 7.

The result of the Jarque-Bera test for residual normality indicates that the residuals are normally distributed. The serial correlation test result shows absence of problem of serial correlation. The heteroscedasticity test indicates that the residuals are not heteroskedastic, but rather they are homoscedastic. The Ramsey RESET test results indicate that the specification of the regression equation is error-free. Thus, the model is quite reliable and can be employed for policy purposes.

Table 7: Diagnostic Tests

Tests	Test Stat	p-value
Residual Normality (Jarque-Bera)	1.44	0.49
Serial Correlation (Breusch-Godfrey LM test)	0.46	0.64
Heteroscedasticity (Breusch-Pagan-Godfrey)	1.00	0.47
Ramsey RESET	0.34	0.57

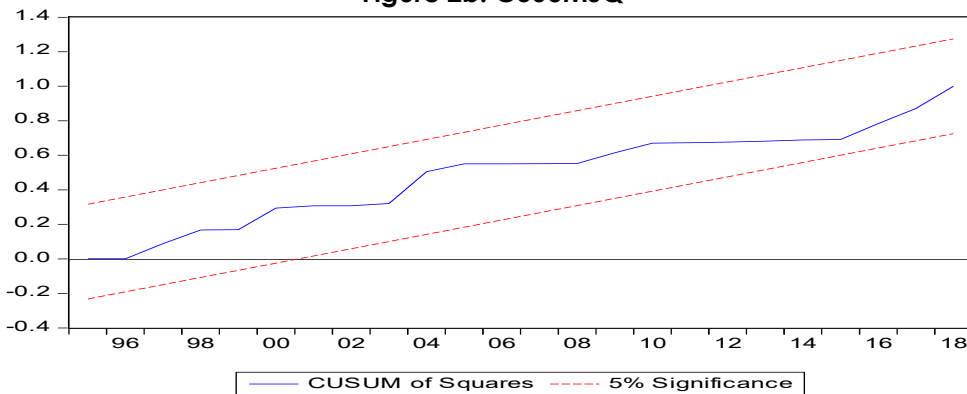Source: Authors' estimation.

IV.5   Stability Test

To further ensure reliability of the model, it was tested for stability as this enhances its reliability for policy. The approach developed by Brown et al. (1975) for testing the constancy of regression parameters overtime was employed for the test. The test involves plots of the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squared recursive residuals (CUSUMSQ). The results are presented in Figures 2a and 2b. The plots of CUSUM and CUSUMSQ lie between the 5.0 per cent critical bounds. It can therefore be inferred that the model is stable.

Figure 2a: CUSUM
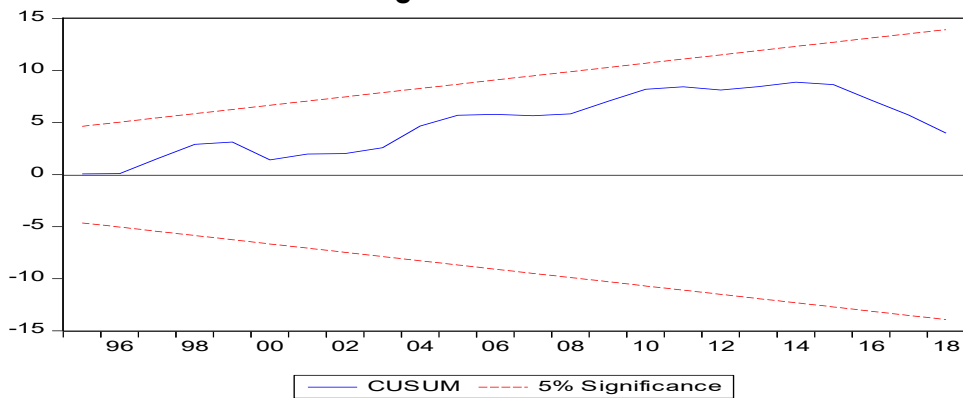
Source: Authors' estimation.

Figure 2b: CUSUMSQ

Source: Authors' estimation.

IV.6   Robustness Checks

To check the robustness of the long-run estimation results from the baseline estimation, the dynamic ordinary least squares (DOLS) and the robust least squares (RLS) estimators were employed. The DOLS estimator yields consistent and efficient long-run estimates, while the RLS yields robust estimates of the regression parameters.

The results from the alternative estimation techniques are presented in Table 8. The results further confirm positive and significant long-run growth effect of intra-African trade in Nigeria. The result is therefore robust, and suggests that in the long-run, Nigeria's economy will benefit significantly from the expansion in intra-African trade expected to result from the implementation of the African Continental Free Trade Area. There is also evidence of robustness in respect of the long-run effects of capital formation, consumer price index, exchange rate and population on real output in the country.

The estimated models have very high explanatory powers as indicated by their R^2 and adjusted R^2. The deviance statistic of the RLS estimates confirms the explanatory ability of the model. The scale statistic indicates absence of outlier effects, and the highly significant R_n^2 indicates that the explanatory variables are jointly significant in explaining real output.

Table 8: Alternative Estimation Results

Regressors	Dependent Variable is	
	DOLS	RLS MM Estimation
LnAFTRADE	0.05** (2.53)	0.04*** [3.30]
LnRGCF	0.18*** (4.13)	0.18*** [7.44]
LnCPI	-0.20*** (-8.48)	-0.12*** [-4.62]
LnEXRT	0.12*** (4.88)	0.04*** [1.74]
LnPOP	1.78*** (9.09)	1.86*** [10.40]
C	-12.03*** (-3.99)	-13.21 [-4.59]
R^2	0.999	0.867
Adj. R^2	0.998	0.846
Deviance	-	0.06
Scale	-	0.043
R_n^2	-	4058.372***

Source: Authors' estimation.
Note: ***, **, *represent statistical significance at 1%, 5% and 10%, respectively.
t ratios are in (). z ratios are in [].

## IV.7   In-sample and Out-of-Sample Simulations

Hitherto, our analysis of the growth effect of intra-African trade in Nigeria was based on historical data spanning 1981-2019 when Nigeria officially signed into the African Continental Free Trade Agreement. No doubt our findings from the use of historical data analysed with various econometric techniques have some implications for the growth of the nation's economy when the AfCFTA is fully implemented. To ascertain this, a three-equation system of simultaneous equations was estimated, using the indirect least squares (ILS) and used for in-sample (deterministic-static) and out-of-sample (deterministic-dynamic) simulations of the endogenous variables. This was done after the identification status of the model (or system of equations) was determined. The model (system of equation) estimated is shown as equation (6). It comprised three endogenous variables – private consumption (PCON), real gross capital formation (RGCF) and real GDP (RGDP).

$$\log(pcon) = c(1) + c(2)*\log(rgdp(-1)) + c(3)*\log(iat)$$
$$\log(rgcf) = c(4) + c(5)*\log(rgdp(-1)) + c(6)*\log(iat)$$
$$\log(rgdp) = c(7) + c(8)*\log(rgdp(-1)) + c(9)*\log(iat) \tag{6}$$

Using the order condition for identification, it can be deduced that each equation of the system is exactly identified. This is also confirmed using the rank condition. This necessitated the use of the ILS for estimation.

The essence of the in-sample simulation was to determine how well the model performs against historical data by comparing baseline (simulated) values against actual values. The results of the in-sample simulations are presented in Figure 3.

Figure 3: In-Sample Simulations of Endogenous Variables
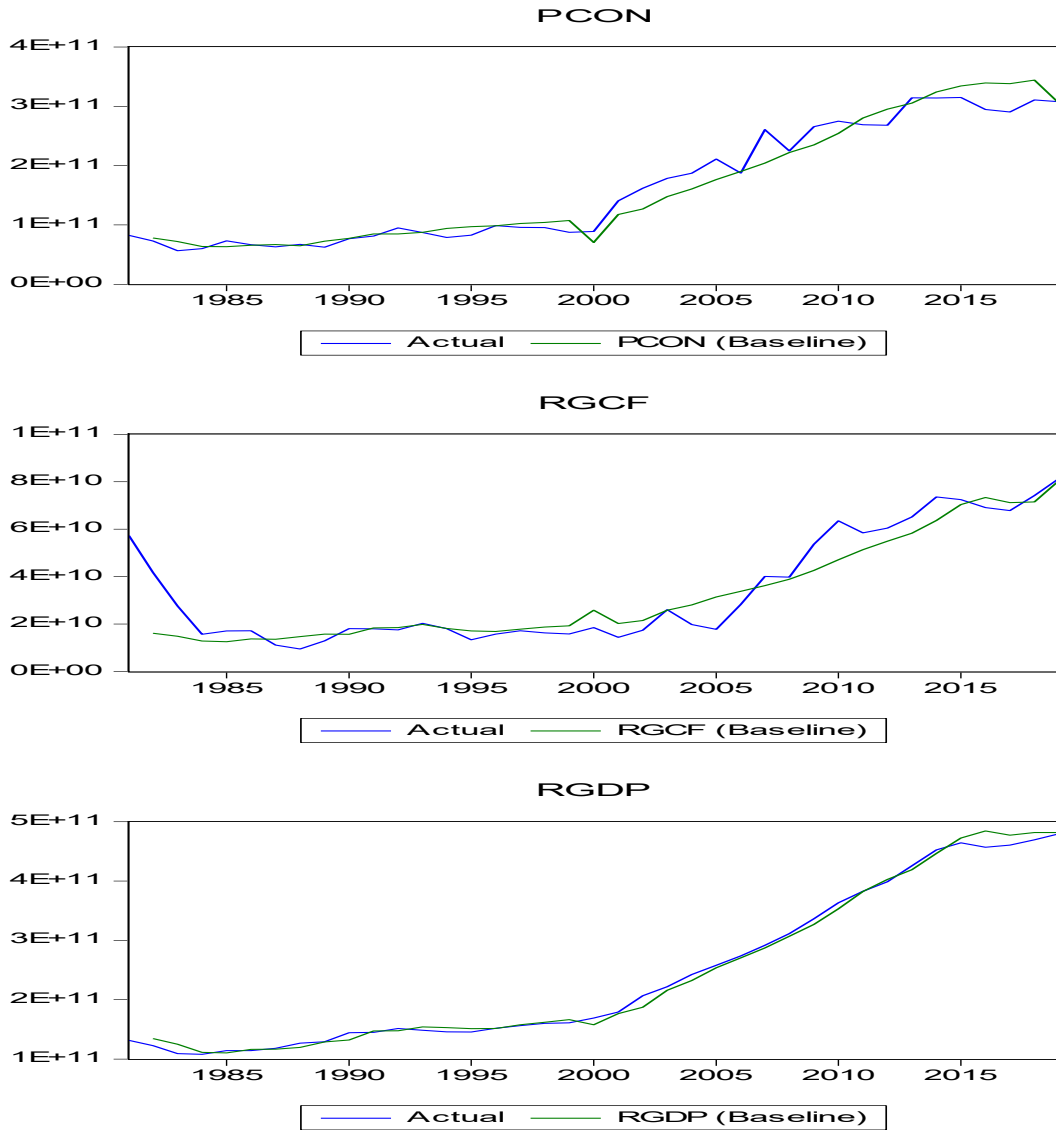
Source: Authors' estimation.

It can be observed that graphs of the actual (historical) values of the endogenous variables closely follow those of the baseline values, especially for real GDP, which is the key endogenous variable of interest in this study. This indicates that the performance of the model against the historical data used for its estimation is quite satisfactory. This encouraged us to undertake out-of-sample simulation of the endogenous variables. The idea was to simulate values for Nigeria's real income and other key variables (consumption and investment) when the value of intra-African trade increases as envisaged by the AfCFTA. In doing this, linear trend forecasts were generated for 10.0 per cent, 15.0 per cent and 20.0 per cent

increments in the value of intra-African trade, and the responses of private consumption, real gross capital formation (investment) and real GDP were simulated. The results are presented in Tables 9, 10 and 11, respectively.

Table 9: Intra African Trade Increases by 10 per cent Annually

Years	PCON ($)	RGCF ($)	RGDP ($)
2020	3.14E+11	8.23E+10	4.93E+11
2021	3.25E+11	8.49E+10	5.07E+11
2022	3.37E+11	8.76E+10	5.21E+11
2023	3.50E+11	9.05E+10	5.37E+11
2024	3.63E+11	9.36E+10	5.54E+11
2025	3.76E+11	9.69E+10	5.71E+11
2026	3.91E+11	1.00E+11	5.90E+11
2027	4.07E+11	1.04E+11	6.09E+11
2028	4.23E+11	1.08E+11	6.30E+11
2029	4.40E+11	1.13E+11	6.52E+11
2030	4.59E+11	1.17E+11	6.75E+11

Source: Authors' estimation.

Table 10: Intra African Trade Increases by 15 per cent Annually

Years	PCON ($)	RGCF ($)	RGDP ($)
2020	3.16E+11	8.21E+10	4.93E+11
2021	3.29E+11	8.44E+10	5.08E+11
2022	3.42E+11	8.70E+10	5.23E+11
2023	3.57E+11	8.98E+10	5.40E+11
2024	3.73E+11	9.29E+10	5.59E+11
2025	3.90E+11	9.63E+10	5.78E+11
2026	4.09E+11	1.00E+11	6.00E+11
2027	4.28E+11	1.04E+11	6.22E+11
2028	4.50E+11	1.08E+11	6.47E+11
2029	4.73E+11	1.13E+11	6.73E+11
2030	4.97E+11	1.18E+11	7.01E+11

Source: Authors' estimation.

Table 11: Intra African Trade Increases by 20 per cent Annually

Years	PCON ($)	RGCF ($)	RGDP ($)
2020	3.17E+11	8.18E+10	4.93E+11
2021	3.32E+11	8.40E+10	5.09E+11
2022	3.48E+11	8.64E+10	5.25E+11
2023	3.65E+11	8.92E+10	5.44E+11
2024	3.83E+11	9.23E+10	5.64E+11
2025	4.04E+11	9.58E+10	5.85E+11
2026	4.26E+11	9.96E+10	6.09E+11
2027	4.50E+11	1.04E+11	6.35E+11
2028	4.77E+11	1.09E+11	6.64E+11
2029	5.05E+11	1.14E+11	6.94E+11
2030	5.37E+11	1.20E+11	7.28E+11

Source: Authors' estimation.

The simulation results show that annual rise in the value of the intra-African trade is associated with expansion or growth of private consumption, real gross capital formation (investment) and real GDP. Focusing on the main variable of interest, which is real GDP, it can be ascertained that a 10.0 per cent annual rise in the value of intra-African trade will potentially cause annual rise in the real GDP (and private consumption and investment) as seen in Table 8. The real GDP is expected to rise by about 36.9 per cent between 2020 and 2030 if intra-Africa trade rises by 10.0 per cent annually. Similarly, a 15.0 per cent annual rise in intra-African trade is also expected to bring about annual expansion of the real GDP (and private consumption and investment) as shown in Table 9. It will potentially engender 42.2 per cent rise in real GDP between 2020 and 2030. The expected responses of real GDP, private consumption and investment to 20.0 per cent annual expansion of intra-African trade are shown in Table 8. The key macroeconomic variables respond positively to 20.0 per cent annual expansion in intercontinental trade. Real GDP is expected to rise by 47.7 per cent between 2020 and 2030. Thus, the expansion of intra-African trade envisioned by the AfCTFA would have positive implications for Nigeria's economic growth when fully implemented.

V.   Conclusion and Recommendations

The objective of this paper was to examine the effect of intra-African trade on Nigeria's economic growth and the possible growth implications of the African Continental Free Trade Area in the years ahead. This was achieved by employing the ARDL Bounds testing approach to co-integration and error correction modeling to investigate the short-run and long-run effects of intra-African trade on economic growth in Nigeria. The study found positive short-run and long-run growth effects of intra-African trade in Nigeria, though only the long-run effect is significant. In view of these results, it is concluded that increased intra-African trade, which is envisaged to result from the implementation of the African Continental Free Trade Area, would be beneficial to Nigeria's economic growth in the long-run (considering that the country is Africa's largest market), stimulate greater domestic investment, and enhance knowledge, skill and technology spillover effects (Olapade & Onyekwena, 2018; CBN, 2022). The results of out-of-sample simulation also indicate that yearly expansion in intra-African trade would cause private consumption, investment and real GDP to rise annually. Thus, the signing of the African Continental Free Trade Agreement in 2019 by the Nigerian government was a step in the right direction towards achieving higher economic growth in the country in the long-run. Other conclusions that can be drawn from the study are that control of inflation, increase in investment, population and favorable exchange rate of the domestic currency (which may be achieved by implementing an optimal balance of payments strategy) would be favorable to economic growth in Nigeria in the long-run.

Based on the empirical evidence, it is recommended that countries in the AfCFTA, including Nigeria which is currently Africa's largest economy (Naidoo, 2020) should be strongly committed to the continental free trade agreement to ensure the realisation of its goals. Nigeria should increase the share of her intra-African trade (exports and import) in her total trade. The government should take measures to raise the level of capital formation in the country through implementation of investment-friendly policies and programmes such as favorable tax regimes, infrastructural development (especially energy and transportation infrastructure), security tightening, reduction in cost of doing business, among others, all of which are expected to encourage domestic investment and attract foreign investment thereby positioning the country to benefit maximally from the free trade area agreement. The country's monetary authority should sustain its effort at controlling inflation and ensure a stable exchange rate for the domestic currency. The Central Bank of Nigeria should have a well-thought-out intervention strategy in the real sector and in the foreign exchange market to boost economic growth. There is also the need to constantly develop the population's labour force to enhance its productivity and contribution to the nation's economic growth.

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