

Original Article

# Trade Integration and Economic Growth in ECOWAS: Evidence from Disaggregated Trade and Dynamic Causality Analysis

<sup>1</sup>S. S. ABERE\*, <sup>2</sup>S. A. OGUNWALE

<sup>1,2</sup>Department of Economics, Ajayi Crowther University, Oyo, Oyo State, Nigeria.

**ABSTRACT:** *The relationship between trade integration and economic growth has been a central yet unresolved issue in development economics, especially in regional blocks in sub-Saharan Africa. Despite the growth of regional trade agreements on the continent, there is little research on causal relationships between trade integration and growth in the Economic Community of West African States (ECOWAS). This study fills this gap by investigating the causal-effect relationship between trade integration and economic growth in ECOWAS between 1995 and 2022. In particular, the paper identifies the difference between intra-regional and extra-regional trade in order to give a detailed perspective of the integration impacts. The paper uses time series and panel econometric analysis, such as the Autoregressive Distributed Lag (ARDL) method, Vector Error Correction Model (VECM) and Wald coefficient test, to measure both short-term and long-term causal relationships. Empirical findings show that there is short-run causality that is one-directional (trade integration to economic growth), but no bidirectional causality in the long run between the aggregate variables. Nevertheless, in disaggregated form, both intra- and extra-regional trade have a strong long-run effect on economic growth, and there is no reverse causation. The results indicate that the growth-increasing impacts of trade integration in ECOWAS are mostly short-term motivated and conditional on the joint form of the trade flows. The paper concludes that regional integration in itself will not be able to support any substantial growth in the long-term unless accompanied by structural and institutional reforms. It therefore proposes policies that would enhance intra-regional trade, cut non-tariff barriers and enhance the quality of institutions. This paper contributes to the literature as it provides a detailed picture of the trade-growth nexus in ECOWAS by combining disaggregated trade measures with dynamic causal analysis.*

**KEYWORDS:** *Economic Growth, Trade Integration, ECOWAS, Intra-Regional Trade, Causality.*

**JEL Classification Codes:** F15; F43; C32; O55

## 1. INTRODUCTION

Integration of trade and economic growth has been a key issue in both theoretical and empirical economic discourse since the early 1990s, especially in the context of developing and emerging economies whose growth paths are often volatile and reliant on external factors. The integration of trade, which is often viewed as a gradual elimination of tariffs and non-tariff barriers between the members of the state, is likely to improve the efficiency of the market, the distribution of resources and the spread of technology. Empirical data, however, give a mixed picture. Although other studies like Song et al. (2020), Nguyen and Su (2021), and Ma (2022) point to the growth-promoting role of integration as a result of financial connections, economic complexity, and the buildup of infrastructure, other sources, such as Rahman et al. (2020) and Belloumi (2014) show that trade openness can have a negative or neutral effect. These differing results highlight the importance of a context-based analysis, especially in sub-Saharan Africa, where structural hardships, weak institutions, and low potentials remain to limit the anticipated advantages of trade integration.

In this wider context, the Economic Community of West African States (ECOWAS) is an imperative case study of the trade growth relationship. ECOWAS was founded with ambitious goals, which include trade liberalisation, the use of a common external tariff and the harmonisation of economic policies among its fifteen member states. Although these new institutional developments have taken place, including the operationalisation of the ECOWAS Trade Liberalisation Scheme and the customs union, empirical research findings still indicate low rates of intra-regional trade and lopsided growth performances. An example is where Gammadigbe (2021) points out that the institutional quality is a major precursor to the gains of trade integration, and Kamara (2026) does not establish any significant effects of the ECOWAS Free Trade Agreement on the intra-regional trade flows. On the same note, Oloyede et al. (2021) observe mixed growth outcomes in ECOWAS relative to consistent positive growth outcomes in other African blocs. This gap between policy aspiration and the empirical results is a matter of concern in the context of the effectiveness of regional integration as the driver of sustainable economic development in West Africa.

In principle, the correlation between trade integration and economic development is yet to be clear. The neoclassical growth model argues that trade does not change the long-run growth paths, though it can affect income levels, whereas endogenous growth models argue that trade will promote innovation, knowledge spillovers, and long-term growth in productivity. This theoretical difference is seen in empirical studies. Whereas some researchers find positive spillover impacts of integration on growth (Seck et al., 2020; Tinta et al., 2018), others report negative or non-significant effects, especially in the presence of structural bottlenecks and institutional weaknesses (Akalado et al., 2025; Shuaibu and Mamman, 2025). Moreover, there is emerging evidence that trade integration can produce unwanted effects, including increased unemployment or environmental degradation, as Akalado et al. (2025) and Abdullahi et al. (2025) record. Such inconsistencies suggest that the growth impacts of trade integration are not automatic or homogeneous, but are mediated by country-specific and regional processes.

Despite the accumulating literature, there are still a number of gaps that are critical to begin with, most of the literature uses aggregate indicators of trade openness, thus blurring the different contributions of intra-regional and extra-regional trade towards growth outcomes. Second, most empirical studies are concerned with either the short-run or the long-run dynamics without properly describing the interaction between the two horizons. Third, the use of powerful econometric methods that can be used to simultaneously tackle the issues of endogeneity, heterogeneity, and dynamic adjustment processes is limited. The recent research, e.g., Afolabi and Ndamsa (2026) and Shuaibu and Mamman (2025), tries to solve the heterogeneity problem by using quantile regression and system GMM, respectively, but a holistic causal model that considers both time series and panel dimensions is still under-investigated in the ECOWAS setting. This means that the available literature offers partial information, which is not useful in policy formulation.

This paper aims to fill these gaps by giving a detailed and disaggregated discussion of the causal relationship between trade integration and economic growth in ECOWAS between the years 1995 and 2022. In particular, the paper differentiates intra- and extra-regional trade flows, thus providing a more refined perspective on the role of various aspects of integration in growth. In methodology, it is a combination of the Autoregressive Distributed Lag (ARDL) bounds testing model and the Wald coefficients test to include the short-run and long-run causal relationships, as well as panel cointegration models, to make the findings robust. The combination of these methods allows the paper to take the empirical literature further than the traditional one-method analysis and offer a more holistic evaluation of the trade-growth nexus.

In addition to its methodological implications, the research has also provided significant policy implications, in as much as it has placed its findings in the context of institutional and structural realities of ECOWAS. By doing so, it is directing its response to the issues that the previous research has brought up about poor institutional structures, lack of trade facilitation, and structural imbalances that impede the achievement of the benefits of integration. Finally, the research adds to the body of existing literature by shedding light on the causal relationships between trade integration and economic growth, giving evidence-based information on the potential to use integration in sustainable development, and advancing the discussion of how African regional blocs can better utilise integration to the benefit of sustainable development.

## **2. LITERATURE REVIEW**

### **2.1. THEORETICAL REVIEW**

The theoretical basis of the trade-growth nexus is based on multiple traditions of economic thought. The first formal treatment is the Solow (1956) neoclassical growth model, which states that capital accumulation and exogenous technological change are the major drivers of long-run growth. Trade, in this context, can help accomplish growth by enhancing resource distribution, increasing the capital base, and speeding up convergence to the steady state. Nevertheless, the Solow model assumes that the effects of trade are short-lived; in the long-run, the diminishing returns to capital suggest that all the economies tend to converge to a standard steady-state growth rate, which is only determined by exogenous technology (Mankiw et al., 1992). This means that trade integration has level effects as opposed to growth rate effects.

The drawbacks of the neoclassical model led to the emergence of endogenous growth theories in the late 1980s and 1990s. Increasing returns to capital and spillovers in knowledge created models in which persistent growth is created (Romer, 1986). Lucas (1988) has stressed human capital accumulation as the source of long-run growth. Trade integration, in these models, may have permanent effects on the growth rate with an expansion of the scale of production, effective diffusion of knowledge and technology, and investment in human and physical capital stimulation. The value of economic integration in hastening innovation and growth was formally shown by Rivera-Batiz and Romer (1991) as increasing the marketability of ideas increases the strength of the effect of integration on innovation and growth, and the effect of integration on the marketability of ideas, depending on whether integration is of goods or ideas or both.

The welfare impact of regional trade agreements can be studied in terms of the theory of customs unions, which was first developed by Viner (1950). Viner distinguished trade creation, which increases the welfare by substituting domestic production at high cost with non-member state imports at a lower cost, and trade diversion, which lowers the welfare by replacing imports at low cost with imports at a higher cost by members. These two forces determine the net welfare effect of trade integration depending on their relative magnitudes. The latter was extended later by Meade (1955) and Lipsey and

Lancaster (1957), who introduced the notion of second-best solutions, which indicate that under certain circumstances, welfare can or cannot be increased by regional trade agreements, and that it depends on the particular structure of preferences, endowments, and trade policies.

The Heckscher-Ohlin (H-O) theory, which extends the Heckscher-Ohlin theory, assumes that factor prices will be equalised by trade between trading partners, and this will result in convergence of factor rewards and, ultimately, in the per capita level of income. But empirical testing of the H-O model has shown rather inconsistent results, and the equalisation of factor prices as predicted by the theory has hardly been seen in practice, especially between developed and developing economies with vastly different human capital and technology levels. The theory of New Economic Geography (NEG), which is linked to Krugman (1991) and furthered by Ottaviano et al. (2002), brings in the element of spatial and agglomeration effects in the study of trade and growth. NEG anticipates that geographic concentration of economic activity in core regions through trade integration, resulting in lower trade costs and the realisation of economies of scale, could increase incomes in core and peripheral regions, increasing income inequality. This forecast is especially applicable to the case of ECOWAS, where the economic sizes and the level of development of the member states differ sharply, which implies that the benefits of the integration process may not be equally distributed.

## **2.2. EMPIRICAL REVIEW**

Empirical evidence of trade integration and macroeconomic performance has mixed and, in many cases, context-specific results in different regions and approaches. The emerging and developing economies, as they do not relate to Africa, tend to indicate that there is a positive, yet subtle, relation between integration and economic results. As an example, Song et al. (2020) used panel econometric methods and established that economic integration was an important factor supporting the co-movements of stock markets in Asia, indicating a stronger financial connection. Equally, Nguyen and Su (2021) in their panel regression analysis indicated that trade openness increases the level of economic complexity, though the effect of foreign direct investment was dampening. Similarly, Ma (2022) employed quasi-experimental designs to demonstrate that the Belt and Road Initiative in China has a considerable impact on growth, especially in the low-income economies. A positive long-run relationship between trade openness, financial development, and growth in Bolivia was also established in earlier evidence by Catocala et al. (2012) using cointegration techniques.

Nevertheless, the non-linearity and heterogeneity of the integration-growth nexus have been identified as contradictory results. Rahman et al. (2020), who used panel cointegration analysis, revealed that trade openness has a negative impact on South Asian growth, and Belloumi (2014), who applied time-series causality tests, indicated a lack of significant causal relationships in Tunisia. Similarly, Yuliati et al. (2020) found weak and mostly unidirectional integration impacts between Indonesia and Turkey, which is not sufficient to stimulate both countries to grow. Ejones et al. (2021) also established that the outcomes were very sensitive to the model specification and country coverage, especially in the East African Community, where positive as well as insignificant relationships were found. On the whole, these studies imply that trade integration may spur growth, although its usefulness is subject to structural, institutional and methodological factors.

In Africa, the empirical data are also rather ambivalent but provide more information about the peculiarities of the region. Menyah et al. (2014) applied panel causality methods to discover that trade openness does not always Granger-cause economic growth, but rather growth usually comes first before trade expansion, which suggests reverse causality. Tinta et al. (2018) applied the analysis to ECOWAS through panel models and emphasize that the integration growth effects are strongly related to the institutional quality and complements of member states. Equally, Oloyede et al. (2021), using pooled mean group (PMG) and mean group (MG) estimators, reported that trade openness has a positive effect on growth in SADC but conflicting results in ECOWAS, which highlights the heterogeneity in regions. In line with the institutional view, Gammadigbe (2021) highlighted the role of stronger institutional structures in increasing the benefits of trade integration, and Seck et al. (2020) found that there are positive spillover benefits of intra-African trade within regional blocs.

More finely methodologically and thematically detailed research is offered by recent research that specifically deals with ECOWAS. In a qualitative and theoretical study based on the functionalist integration theory, Lilly-Inia et al. (2025) concluded that although there are tangible economic benefits, ECOWAS has not met its developmental goals because of endemic structural and political difficulties. Conversely, Afolabi and Ndamsa (2026) used quantile regression to reveal the distributional heterogeneity by demonstrating that trade openness can be a cause of poverty, whereas bilateral trade is a cause of poverty, especially in less-poor countries, indicating the significance of disaggregated analysis. By applying the system GMM estimator, Shuaibu and Mamman (2025) discovered that trade facilitation by itself does not significantly impact growth, but when combined with government size, the interaction of the two has a significant positive impact on growth, which implies the policy environment.

Going further, Akalado et al. (2025) used FMOLS and DOLS methods and stated that openness to trade raises unemployment in ECOWAS, contrary to other studies that found a positive correlation between openness and growth, which implies potential disruptions in the labour market. On the same note, Abdullahi et al. (2025), in their study, which involves the use of PMG and

the strength estimators, determined that trade openness is positively associated with ecological degradation, which demonstrates that integration incurs environmental trade-offs. Structurally, Kamara (2026), who used a structural gravity model with PPML estimation, did not find any significant effect of the ECOWAS Free Trade Agreement on intra-regional trade, which supports the argument that institutional and implementation restrictions limit integration results.

In general, some significant patterns can be identified in the reviewed literature. First, it is not yet agreed which way or how strong the relationship between trade integration and economic performance may be, as the results differ based on the methodology, sample coverage and model specification. Second, although previous researchers mainly employed aggregate panel design, more recent works have incorporated more sophisticated models, including system GMM, quantile regression, and structural gravity models, to measure heterogeneity and endogeneity. Third, the African experience, especially in ECOWAS, continues to indicate the role of quality in institutions, policy frameworks, and structural conditions in determining outcomes. Lastly, there remains a critical gap in separating intra-regional and extra-regional effects of trade and of addressing short-run as well as long-run causal dynamics jointly. This research fills the gaps in the literature by incorporating these gaps into a disaggregated and dynamic analytical framework.

### 3. METHODOLOGY

#### 3.1. THEORETICAL FRAMEWORK AND MODEL SPECIFICATION

The theoretical framework that is used in this study is the endogenous growth theory. The endogenous growth models, especially the ones proposed by Romer (1986) and Lucas (1988), assume that trade integration influences economic growth via the technology diffusion and innovation channels, human capital accumulation and scale effects. The models assume that trade integration will permanently affect the growth rate, unlike the Solow model, which assumes the effects of trade integration to be transitory. The endogenous growth model has been especially applicable in the ECOWAS context, where technology absorption, innovation, and knowledge spillovers continue to be key binding constraints to growth.

In a bid to test the causality between the integration of trade and economic growth in ECOWAS, the study specifies two related models. The former looks at the bivariate causality of aggregate trade integration (defined as the sum of intra-trade and extra-trade as a share of GDP and denoted TIT) and per capita GDP (GDPPC). The second model breaks down trade integration into the intra-regional (IRT) and extra-regional (ERT) components to give a more detailed analysis of causal dynamics. The overall functional equation of growth can be expressed as:

$$GDPPC_t = f(TIT_t, KF_t, LFP_t, INF_t) \quad (1)$$

In which GDPPC is real gross domestic product per capita (an indicator of economic growth), TIT is the total trade integration index, KF is gross capital formation (an indicator of investment), LFP is labour force participation (an indicator of human capital), and INF is the inflation rate. In the case of the disaggregated model:

$$GDPPC_t = f(IRT_t, ERT_t, KF_t, LFP_t, INF_t) \quad (2)$$

where IRT is the intra-regional trade ratio, and ERT is the extra-regional trade ratio. The rationale behind the use of control variables is the endogenous growth model, according to which investment in physical capital (KF), human capital (LFP) and macroeconomic stability (proxied by INF) is an important determinant of growth. In the causal analysis, the research uses the Vector Error Correction Model (VECM), which enables the short-run and long-run causal relationships to be tested. The VECM in the bivariate model (TIT and GDPPC) is expressed as:

$$\Delta GDPPC_t = \alpha_1 + \beta_1 ECT_{t-1} + \sum_{i=1}^k \gamma_{1i} \Delta GDPPC_{t-i} + \sum_{i=1}^k \delta_{1i} \Delta TIT_{t-i} + \varepsilon_{1t} \quad (3)$$

$$\Delta TIT_t = \alpha_2 + \beta_2 ECT_{t-1} + \sum_{i=1}^k \gamma_{2i} \Delta TIT_{t-i} + \sum_{i=1}^k \delta_{2i} \Delta GDPPC_{t-i} + \varepsilon_{2t} \quad (4)$$

where ECT is the error correction term calculated as the result of the long-run cointegrating relationship,  $\beta_1$  and  $\beta_2$  are the speed of adjustment coefficients,  $\gamma$  and  $\delta$  are the short-run dynamic coefficients. Long-run causality from TIT to GDPPC is established if  $\beta_1$  is negative and statistically significant; long-run causality from GDPPC to TIT is established if  $\beta_2$  is negative and statistically significant. Short-run causality is tested using the Wald chi-square test on the joint significance of lagged  $\delta$  coefficients.

#### 3.2. PRE-ESTIMATION TESTS

The study uses a set of pre-estimation diagnostic tests before estimation to verify the validity of the empirical models. They are normality (Jarque-Bera test), multicollinearity (correlation matrix analysis and variance inflation factors), unit roots (Augmented Dickey-Fuller tests and Phillips-Perron tests) and cointegration (Pedroni residual cointegration tests and Johansen-Fisher panel cointegration tests of panel data) tests. These tests are essential since the validity of ARDL bounds

testing methodology and the VECM, relies on the degree of integration of the variables and the fact that the variables have a long-run cointegrating relationship.

### 3.3. ESTIMATION TECHNIQUES

In an investigation, the time series analysis of ECOWAS aggregate data is conducted using the ARDL bounds testing method formulated by Pesaran et al. (2001). The ARDL approach is chosen due to a number of reasons. First, it can be applied to both  $I(0)$  and  $I(1)$  and mixed integration orders, and hence, it is robust to mixed integration orders. Second, it gives the opportunity to use various lag structures of the dependent and explanatory variables. Third, it gives consistent small-sample estimates, which is pertinent in the light of the rather limited time period of 28 years. In the case of the panel analysis, the paper uses Pedroni (1999) residual cointegration test and the Johansen-Fisher panel cointegration test to test the long-run relationships between the variables among the ECOWAS member states.

The study uses the Wald coefficient test as a causality test in the VECM framework. The Wald test is used to test the hypothesis of whether the coefficients of the lagged differences of the potential causal variable are equal to zero. When the null hypothesis is rejected, this is taken to be a short-run Granger causality finding. The significance and sign of the error correction coefficient in every equation of the VECM system are evaluated to evaluate the long-run causality.

### 3.4. DATA

The study utilises annual time series statistics of ECOWAS as a regional aggregate and panel statistics of individual ECOWAS member states between the years 1995 and 2022. The base year used is 1995, based on the availability of data in the UNCTAD statistics database, which is the main source of intra-trade and extra-trade data. The data set includes thirteen (13) of the fifteen (15) ECOWAS member states without Guinea-Bissau and Liberia because of the lack of data on important variables. These are GDP per capita (GDPPC) as a proxy of economic growth); total trade integration index (TIT) (calculated as exports plus imports/GDP); intra-regional trade (IRT) (share of trade with ECOWAS member countries) in total trade; extra-regional trade (ERT) (share of trade with non-ECOWAS partners); and gross capital formation (KF).

**TABLE 1 Variable Description and Data Sources**

Variable	Description	Unit	Source
GDPPC	GDP per capita (constant 2015 US\$)	US Dollars	UNCTAD / World Bank
TIT	Total trade integration index	(X+M)/GDP	UNCTAD
IRT	Intra-regional trade ratio	Share of total trade	UNCTAD
ERT	Extra-regional trade ratio	Share of total trade	UNCTAD
KF	Gross capital formation	% of GDP	World Bank WDI
LFP	Labour force participation rate	% of working-age population	World Bank WDI
INF	Inflation rate (CPI)	% per annum	World Bank WDI

## 4. RESULTS AND DISCUSSION

### 4.1. DESCRIPTIVE STATISTICS

Table 2 shows the descriptive statistics of the study variables between the years 1995 and 2022. In the case of ECOWAS aggregate data, the mean of GDP per capita (GDPP) is about US\$266,717, with a mean of US\$223,000, which indicates the high rate of income variation in the ECOWAS region during the study. The lowest of US\$197,871 is observed in the mid-1990s, and the highest of US\$927,675 is in the early 2020s, which is in line with the overall upward trend in regional income. The average intra-regional trade (IRT) is equal to 0.000365 with a standard deviation equal to 0.001679, which implies that the intra-ECOWAS trade is relatively low in comparison with the overall output. The low mean value indicates the fact that intra-regional trade has been largely hampered in the ECOWAS, as the cross-border barriers to trade, poor transport infrastructure and ineffective institutional systems have limited the integration of trade between countries. The mean value of extra-regional trade (ERT) stands at -0.007414, which is an indication of the net trade position of ECOWAS with respect to the rest of the world.

Descriptive statistics indicate that there is significant skewness of the labour force participation (LFP), whose kurtosis is 24.09 and Jarque-Bera is 622.27 ( $p < 0.001$ ), indicating that there is a significant deviation from normality. Right skewness is also a characteristic of inflation (INFL) with the kurtosis = 3.46 and statistically significant Jarque-Bera statistic = 8.35 ( $p < 0.05$ ). These distributional properties drive the application of log changes on the selected variables in the empirical models.

**TABLE 2 Descriptive Statistics**

Statistic	GDPP	IRT	ERT	KF	LFP	INFL
Mean	522,303.8	0.000365	-0.007414	102,620.2	2.526059	18.59367
Median	530,748.1	0.000110	-0.009010	116,519.9	2.626751	13.01367
Maximum	927,674.5	0.003747	0.000454	171,569.3	2.698943	53.90538
Minimum	197,871.1	-0.003170	-0.015000	35,678.87	0.424360	3.613080

Std. Dev.	266,716.6	0.001679	0.005084	50,055.56	0.420005	14.63450
Skewness	0.0929	0.2458	0.1079	-0.0955	-4.7053	1.3175
Kurtosis	1.3956	2.8682	1.4908	1.3296	24.0906	3.4649
Jarque-Bera	3.044	0.302	2.712	3.298	622.268	8.353
Probability	0.2183	0.8597	0.2577	0.1923	0.0000	0.0154
Observations	28	28	28	28	28	28

#### 4.2. CORRELATION ANALYSIS

Table 3 shows the correlation table of the variables under study. The correlation between intra-regional trade (IRT) and GDP per capita (GDPP) is positive, and  $r = 0.583$  ( $p = 0.0011$ ), which shows that the greater the intra-ECOWAS trade, the higher the per capita income is. Extra-regional trade (ERT) is also positively related to GDPP with a correlation of  $r = 0.318$  ( $p = 0.0996$ ), but marginally. The positive correlation between GDPP and gross capital formation (KF) at  $r = 0.988$  ( $p = 0.0000$ ), on the one hand, substantiates the centrality of the role of investment in the economic growth of the region. Extra-regional trade (ERT) is positively related to inflation (INFL) with an  $r = 0.634$  ( $p = 0.0003$ ), indicating that inflationary pressure is linked to high levels of external trade, potentially because of pass-through effects of import prices. The positive correlation between IRT and INFL is moderate and should be considered ( $r = 0.450$ ,  $p = 0.0163$ ). The labour force participation (LFP) has weak and statistically insignificant associations with most variables, except that it has a moderate negative relationship with GDPP ( $r = -0.174$ ,  $p = 0.3771$ ). The lack of extremely high correlation coefficients between explanatory variables (top  $r = 0.557$  between KF and IRT) indicates that the issue of multicollinearity is not very serious in the regression equations.

TABLE 3 Correlation Matrix

Variable	GDPP	IRT	ERT	KF	LFP	INFL
GDPP	1.0000					
IRT	0.583***	1.0000				
ERT	0.318*	0.375**	1.0000			
KF	0.988***	0.557***	0.226	1.0000		
LFP	-0.174	-0.011	0.046	-0.161	1.0000	
INFL	0.177	0.450**	0.634***	0.092	-0.037	1.0000

Note: \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10% levels respectively.

#### 4.3. UNIT ROOT TESTS

The research uses the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests to identify the order of integration of the variables. The tests are run using intercept only, intercept and trend, and no constant or trend, as suggested by Gujarati et al. (2019). The results are presented in Table 4. In the case of GDPP, the null hypothesis of a unit root is not rejected by the ADF and PP tests at any level of specifications. When initially different, GDPP is stationary at the 1% level in most specifications. The same is true of IRT, ERT, and KF, which are non-stationary at levels but are stationary at first differences. LFP is stationary at levels under the with-constant specification at the 1% level (PP test:  $t = -5.136$ ,  $p = 0.0003$ ), making it  $I(0)$ . Inflation (INFL) remains the same at a level below the with-constant specification of the PP test, but it is non-stationary at the level, which indicates that it may be sensitive to the test specification. These findings suggest the presence of a combination of  $I(0)$  and  $I(1)$  variables, and that is why the ARDL bounds testing method is used, which can be customised to work with mixed integration orders. The presence of variables that are integrated at varying degrees renders the use of classical Johansen cointegration tests unsuitable, and this supports the determination of the ARDL methodology to be used in the time series analysis.

TABLE 4 Unit Root Test Results

Variable	ADF Level	ADF 1st Diff.	PP Level	PP 1st Diff.	Order
GDPP	-0.368 (0.978)	-4.107** (0.004)	0.149 (0.964)	-4.211*** (0.003)	$I(1)$
IRT	-1.366 (0.584)	-5.790*** (0.000)	-1.366 (0.584)	-6.484*** (0.000)	$I(1)$
ERT	-1.163 (0.675)	-5.369*** (0.000)	-1.157 (0.678)	-5.392*** (0.000)	$I(1)$
KF	-0.499 (0.877)	-6.238*** (0.000)	-0.437 (0.889)	-6.158*** (0.000)	$I(1)$
LFP	-5.135*** (0.000)	N/A	-5.136*** (0.000)	N/A	$I(0)$
INFL	1.148 (0.997)	-9.504*** (0.000)	-1.760 (0.391)	-3.684** (0.011)	$I(1)/I(0)$

Note: Values in parentheses are p-values. \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10% respectively.

#### 4.4. ARDL BOUNDS TEST AND LONG-RUN ESTIMATION

The ARDL bounds test is used to determine whether a long-run relationship exists among the variables in the model. Table 5 presents the F-bounds test results. In the case of the ECOWAS aggregate model with TIT and the control variables, the calculated F-statistic of 4.542 is greater than the upper critical value of 3.79 at the 10% level of significance and is close to the upper critical value of 4.25 at the 5% level. This offers moderate support of a long-run cointegrating relationship between the

variables, which favours the application of the ARDL error correction model. In the disaggregated model of IRT and ERT, the F-statistic of 5.350 is greater than the upper critical value at the 5% level (I(1) bound = 4.25), which is more compelling evidence that there is a long-run relationship. These results confirm the estimation of the long-run coefficient and error correction models of both specifications. The Akaike Information Criterion (AIC) was used to arrive at the best lag structure to use in both the aggregate and disaggregated models: ARDL(2,2,0,2,2,1) and ARDL(2,2,2,1,2,2), respectively.

**TABLE 5 ARDL Bounds Test Results**

Model	F-Statistic	Critical Value I(0) 5%	Critical Value I(1) 5%	Decision
Aggregate TIT Model	4.542	3.12	4.25	Cointegration (10%)
Disaggregated IRT/ERT Model	5.350	3.12	4.25	Cointegration (5%)

Table 6 shows the long-run coefficients of the ARDL model of the aggregate ECOWAS data in the levels equation. The statistically significant negative effect of intra-regional trade (IRT) on GDP per capita is negative ( $\beta = -33.71$ ,  $t = -4.22$ ,  $p = 0.01$ ). Although counterintuitive, this observation is in line with the general trend in the African trade blocs and could be indicative of the low complementarity of the ECOWAS economies, trade diversion effects, and the lower content of value added in intra-ECOWAS trade flows. The long-run effect of extra-regional trade (ERT) is statistically significant ( $\beta = 5.08$ ,  $t = 3.57$ ,  $p < 0.01$ ), indicating that ECOWAS economies gain more when they trade with more technologically advanced non-member partners due to the access to technology, capital goods, and better knowledge spillovers. The long-run effect of gross capital formation (LNKF) on GDPP is positive and statistically significant ( $\beta = 0.818$ ,  $t = 21.84$ ,  $p < 0.001$ ), which proves the central role that investment plays in the growth. The indirect impact of labour force participation (LFP) has a negative and significant long-run effect ( $\beta = -0.062$ ,  $t = -3.74$ ,  $p < 0.01$ ), which could be the quality dimension of labour provision but not the quantity aspect in the ECOWAS economies. The long-term effect of inflation (LNINFL) is a positive but insignificant ( $\beta = 0.063$ ,  $t = 5.79$ ,  $p < 0.001$ ) effect, potentially indicating the relationship between monetary expansion and growth over the period of study.

**TABLE 6 Long-Run Coefficient Estimates (Levels Equation)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Significance
IRT	-33.708	7.985	-4.221	0.0018	***
ERT	5.076	1.421	3.572	0.0051	***
LNKF	0.818	0.037	21.836	0.0000	***
LFP	-0.062	0.017	-3.739	0.0039	***
LNINFL	0.063	0.011	5.793	0.0002	***

Note: Dependent variable: LNGDPP. \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%.

**4.5. SHORT-RUN DYNAMICS AND ERROR CORRECTION**

Table 7 shows the short-run dynamics of the ARDL error correction model. The coefficient of CointEq (-1) = -2.025 ( $t = -6.394$ ,  $p < 0.001$ ) is negative and statistically significant, which proves the existence of the long-run equilibrium relationship and shows that the deviations of the long-run equilibrium are adjusted at the rate of about 202.5% per period. Although a coefficient of error in absolute value exceeding one can seem unnatural, it can be found in the economic systems that have a tendency to overshoot in the adjustment process, especially in areas where the patterns of trade and policy shocks are very volatile.

Economic growth has a strong positive impact on lagged intra-regional trade ( $D(IRT(-1)) = 32.115$ ,  $t = 3.312$ ,  $p = 0.01$ ), indicating that intra-ECOWAS trade expansions in the short run do provide a positive growth impulse. The modern modification in the IRT ( $D(IRT)$ ) is negatively but statistically insignificantly related, which indicates that there is an adjustment cost at the beginning of the trade. The short-run effects of gross capital formation ( $D(LNKF)$ ) are strong positive ( $\beta = 0.666$ ,  $t = 9.758$ ,  $p = 0.001$ ) and lagged capital formation ( $D(LNKF(-1))$ ) has negative significant ( $\beta = -0.458$ ,  $t = -4.189$ ,  $p = 0.01$ ) effects, which The contemporaneous impact of labour force participation ( $D(LFP)$ ) is high ( $\beta = -0.036$ ,  $t = -4.193$ ,  $p < 0.01$ ), which could reflect negative growth impact of high labour force growth in the situation of low job creation.

**TABLE 7 Short-Run ECM Results for ECOWAS**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.153	1.114	6.423	0.0001
@TREND	0.029	0.005	6.194	0.0001
D(LNGDPP(-1))	0.726	0.143	5.082	0.0005
D(IRT)	-8.259	4.762	-1.734	0.1135
D(IRT(-1))	32.115	9.695	3.312	0.0078
D(LNKF)	0.666	0.068	9.758	0.0000
D(LNKF(-1))	-0.458	0.109	-4.189	0.0019
D(LFP)	-0.036	0.009	-4.193	0.0018

D(LFP(-1))	0.047	0.012	3.974	0.0026
D(LNINFL)	0.070	0.011	6.303	0.0001
CointEq(-1)*	-2.025	0.317	-6.394	0.0001

Note: R-squared = 0.936; Adjusted R-squared = 0.893; F-statistic = 21.91; DW = 2.092.

**4.6. PANEL COINTEGRATION TEST**

In order to supplement the panel evidence with the time series analysis, the study uses the Pedroni (1999) residual cointegration test and the Johansen-Fisher cointegration test on panel data of 13 ECOWAS member states. Table 8, Pedroni test results, reveals that the within-dimension (panel) test statistics provide uniform evidence, with both the panel v-statistic and panel PP-statistic rejecting the null hypothesis of no cointegration. Between-dimension (group) statistics are the rho-statistic (-5.398,-stat0.000), the 8PPP-statistic (-8.582,-stati.0000), and the ADF-statistic (-4.543,-statistic(-4.543, p = 0.0000) are all strongly rejecting the null hypothesis of no cointegration. These findings support the hypothesis that there are long-run cointegrating relationships between GDP per capita, trade integration, and the control variables within the ECOWAS member countries.

The cointegration test by the Johansen-Fisher panel is further confirmation. The null hypothesis of no cointegrating equation is rejected at the 1% level of significance at all the hypothesised ranks under both the trace and maximum eigenvalues tests, showing the presence of more than one cointegrating vector. The Fisher statistic is between 72.49 and 100.2 with p-values of 0.0000 in both trace and max-eigenvalue tests, which confirms a strong relationship among the variables in the long-run equilibrium relationship between variables among ECOWAS panel members.

**TABLE 8 Pedroni Panel Cointegration Test Results (Between-Dimension)**

Test Statistic	Value	Probability	Decision
Group rho-Statistic	-5.39805	0.0000	Reject H0
Group PP-Statistic	-8.5824	0.0000	Reject H0
Group ADF-Statistic	-4.54312	0.0000	Reject H0

**4.7. LONG-RUN CAUSALITY ANALYSIS**

The results of the long-run causality test on the basis of the VECM framework are provided in Table 9. The test pays attention to the coefficient of the error correction term (ECT) in each equation of the VECM system. In the case where the economic growth (GDP) is the dependent variable, the ECT coefficient (C(1)) takes a positive value with a statistically significant value (beta = 0.004, t = 3.155, p = 0.01). The affirmative value of the ECT coefficient breaches the condition of a valid error correction mechanism (that is, the negative and significant value of ECT) and shows that there is no long-run causality between trade integration and economic growth in the bivariate model. Likewise, in the case of trade integration (TIT) as the dependent variable, the coefficient of the ECT (C(7)) is positive and statistically significant (beta = 6.95e-7, t = 2.350, p < 0.05). Once again, the positive sign does not satisfy the required condition of long-run causality. These findings suggest that there are no long-run causal relations between trade integration and economic growth in both directions in the bivariate ECOWAS model. This observation is in line with the perspective that the aggregate trade integration indicator might not adequately represent the differentiated causal effects of intra- and extra-regional trade on economic growth.

But once the analysis is furthered to the trivariate model with both IRT and ERT as independent regressors, the ECT of the economic growth equation is negative and statistically significant (C(1) = -0.084, t = -2.682, p < 0.01) and signifies the presence of long-run causality between the joint effect of intra-trade and extra-trade. The coefficients of ECT are not notable in both the IRT and ERT equations, and they are positive, which confirms that intra- and extra-trade are the causes of long-run causality between the two variables, but not the other way round.

**TABLE 9 Long-Run Causality Test (VECM) - Selected Coefficients**

Target Equation	ECT Coefficient	Std. Error	t-Statistic	Prob.	Long-Run Causality
GDP = f(TIT) [Bivariate]	0.003978 (+)	0.001261	3.155	0.0017	No (positive ECT)
TIT = f(GDP) [Bivariate]	6.95e-7 (+)	2.96e-7	2.350	0.0191	No (positive ECT)
GDP = f(IRT, ERT) [Trivariate]	-0.083564 (-)	0.031153	-2.682	0.0098	Yes (IRT+ERT -> GDP)
IRT = f(GDP, ERT) [Trivariate]	1.11e-9 (+)	1.02e-9	1.083	0.2841	No
ERT = f(GDP, IRT) [Trivariate]	4.44e-9 (+)	2.81e-9	1.580	0.1203	No

Note: Long-run causality requires a negative and statistically significant ECT coefficient.

**4.8. SHORT-RUN CAUSALITY ANALYSIS (WALD TESTS)**

Table 10 shows the Wald coefficient test results of short-run causality. The findings indicate that the unidirectional short-run causal relationship between total trade integration and economic growth is statistically significant (chi-square = 14.183, df It seems Granger-caused changes in the economic growth in the short-run are caused by changes in ECOWAS trade integration. Nonetheless, the causal relation of the economic growth to trade integration is not mutual (chi-square = 3.162, df = 2, p =

0.2057), which proves the one-way causal relation. The short-run causality tests in the trivariate model indicate that the intra-trade, extra-trade, and economic growth have no significant Granger causal relationships in either direction. Specifically, the test for causality from IRT to GDPP yields chi-square = 3.848 ( $p = 0.1460$ ); from ERT to GDPP yields chi-square = 3.158 ( $p = 0.2061$ ); from GDPP to IRT yields chi-square = 3.511 ( $p = 0.1728$ ); from ERT to IRT yields chi-square = 4.204 ( $p > 0.05$ ); from GDPP to ERT yields chi-square = 0.580 ( $p > 0.05$ ); and from IRT to ERT yields chi-square = 1.861 ( $p > 0.05$ ). The above findings suggest that intra- and extra-trade are disaggregated, and neither Granger-causes economic growth within the short-run. Rather, the causal association in the short-run in the bivariate model does so via the composite trade integration variable.

**TABLE 10** Wald Coefficient Test for Short-Run Causality

Causal Direction	Chi-Square	Df	Probability	Decision
TIT -> GDPP (bivariate)	14.18309	2	0.0008	Causality (***) YES
GDPP -> TIT (bivariate)	3.162474	2	0.2057	No causality
IRT -> GDPP (trivariate)	3.848488	2	0.1460	No causality
ERT -> GDPP (trivariate)	3.158447	2	0.2061	No causality
GDPP -> IRT (trivariate)	3.511357	2	0.1728	No causality
ERT -> IRT (trivariate)	4.203500	2	> 0.05	No causality
GDPP -> ERT (trivariate)	0.580000	2	> 0.05	No causality
IRT -> ERT (trivariate)	1.861000	2	> 0.05	No causality

Note: \*\*\* denotes significance at 1% level.

#### 4.9. POST-ESTIMATION DIAGNOSTIC TESTS

Post-estimation diagnostic tests are used to determine the validity of the estimated ARDL models. Table 11 shows the outcomes of the Breusch-Godfrey serial correlation LM test and the Breusch-Pagan-Godfrey heteroskedasticity test of the aggregate and disaggregated models. In the case of the aggregate TIT model, the Breusch-Godfrey test has F-statistic = 2.205 ( $p = 0.176$ ), and does not reject the null hypothesis of no serial correlation at any of the first one lags. The ObsR-squared value of 5.618 ( $p = 0.018$ ) shows borderline evidence, but the F-test is more valid when the sample size is small. The heteroskedasticity test has an F-statistic of 1.916 ( $p = 0.142$ ), which does not reject the null of heteroskedasticity. In the disaggregated IRT/ERT model, the serial correlation test returns a value of  $F = -0.144$  ( $p = 0.713$ ) and Obs\*R-squared = 0.409 ( $p = 0.522$ ), confirming that there is no serial correlation. The heteroskedasticity test shows that  $F = 0.818$  ( $p = 0.649$ ) is not less than 1.00. Both CUSUM and CUSUM of squares stability tests are used to verify that the structural stability of both estimated models is stable at the 5% significance level because the test statistics are within the 5% critical values at all times during the sample period. These diagnostic findings confirm the accuracy of the estimated models and soundness of the causal inferences made out of the same.

**TABLE 11** Post-Estimation Diagnostic Tests

Test	Model	F-Statistic	P-Value	Decision
Serial Correlation (BG LM)	Aggregate TIT	2.2053	0.1758	No serial correlation
Serial Correlation (BG LM)	Disaggregated IRT/ERT	0.1440	0.7132	No serial correlation
Heteroskedasticity (BPG)	Aggregate TIT	1.9161	0.1418	Homoskedastic
Heteroskedasticity (BPG)	Disaggregated IRT/ERT	0.8181	0.6486	Homoskedastic
CUSUM Stability	Both Models	—	—	Stable at 5% level

#### 4.10. DISCUSSION OF FINDINGS

The empirical findings are subtle in supporting the relationship between trade integration and economic growth in ECOWAS, especially when the findings are viewed against the context of recent empirical studies. The fact that the short-run causality is unidirectional, with trade integration as the cause and economic growth as the effect, implies that high regional trade activities relay instantaneous growth shocks in the bloc. This is in line with the recent empirical works that have stressed that trade openness can be used to spur economic activity in terms of the short-term efficiency benefits and market expansions. Indeed, e.g., the research of Song et al. (2020) and Nguyen and Su (2021) demonstrates that integration promotes economic exchanges and productive potential, but the intensity of these effects can be determined by complementary conditions. Nevertheless, the lack of reverse causality in the short-run implies that the ECOWAS growth has not reached maturity to cause additional trade growth, which is consistent with the results of Yuliati et al. (2020), who find weak and mostly directional integration effects in the developing world.

Overall, in the long-term, the outcomes indicate a more convoluted dynamic. Although the bivariate model does not demonstrate any long-run causality between aggregate trade integration and economic growth, the addition of the disaggregated elements of trade (intra-regional and extra-regional trade) provides a considerable adjustment mechanism. The negative and statistically significant error correction value supports the presence of a stable long-run relationship in the case of trade integration being adequately decomposed. This observation confirms current arguments in the literature that the growth effects of integration are not homogeneous but rather have different transmission channels. Research works like Seck et al.

(2020) and Tinta et al. (2018) also stress that the advantages of integration in Africa depend on structural complementarities and the interplay of various trade flows. Therefore, the evidence indicates that aggregate indicators of trade integration can potentially cover significant underlying dynamics, which supports the necessity of disaggregated analysis that can be found in recent studies concerning ECOWAS.

One of the most notable findings was a negative long-run impact of intra-regional trade on economic growth. This paradoxical but a priori result is in line with the new empirical evidence on African regional blocs. In the case of ECOWAS, Oloyede et al. (2021) and Gammadigbe (2021) record that the effect of trade openness on growth is usually weak or negative, mostly because of structural inefficiencies. The negative sign can indicate the prevalence of low-value-added products and informal trade in the region, which restricts productivity gains. Also, the absence of diversification and homogeneity of production systems in the countries of ECOWAS decreases the potential of positive specialisation and exchange. This interpretation is further supported by structural analyses done recently, like Kamara (2026), which demonstrate that intra-regional trade flows have not improved significantly because of formal regional trade agreements in terms of implementation and institutional constraints.

Conversely, the high and desirable effect of extra-regional trade on economic growth implies that the ECOWAS economies gain more from the interaction with technologically advanced external partners. This observation is consistent with recent empirical literature that external trade can improve growth due to the transfer of technology, learning and availability of higher-quality inputs. Ma (2022) reports that other studies have proved that trade connections with more developed economies are likely to produce more developmental effects, especially in low- and middle-income nations. The finding is also aligned with Abdullahi et al. (2025), who, although they include an environmental cost, affirm that trade openness has the capacity to catalyse structural change.

The results support the recent literature tendency to believe that the integration-growth nexus within the ECOWAS is extremely contingent. Integration of trade is capable of fostering growth, but it is determined by the nature of the composition of trade, institutional quality, and the interaction of regional and global trade channels. The present study, therefore, adds to the literature by showing that the growth impacts of the integration of trade in ECOWAS are not only dynamic but also structurally differentiated, with extra-regional trade being more significant in supporting long-run economic performance and intra-regional trade being limited due to structural and institutional deep-seated problems.

## **5. CONCLUSION AND POLICY IMPLICATIONS**

### **5.1. CONCLUSIONS**

This paper explored the cause and effect relationship between trade integration and economic growth in ECOWAS during the ECOWAS years 1995-2022 using the ARDL bounds test, Wald causality tests in VECM, and a panel cointegration test. The key results include the following. To begin with, there is a unidirectional and short-run Granger causal relationship between total trade integration and economic growth ( $\chi^2 = 14.18, p < 0.01$ ), though not vice versa. This validates the hypothesis of trade-led growth of ECOWAS in the short run. Second, the long-run causal relationship between aggregate trade integration and economic growth in either direction does not exist in the bivariate model. Nevertheless, disaggregated intra-trade and extra-trade in the trivariate model, long-run causality flows in both directions are positive between the two trade variables and economic growth ( $ECT = -0.084, p < 0.01$ ), but not in the opposite direction. Third, the impact of intra-regional trade on economic growth is negative and significant, whereas that of extra-regional trade is positive and significant, which is also indicative of the structural constraints of intra-ECOWAS trade and the stimulative effects of external trade relations. Fourth, it is the most stable and strong source of economic growth in both the short and long run and proves the primacy of capital accumulation as the key driver of the ECOWAS growth process. Fifth, panel cointegration tests affirm the presence of strong long-run cointegrating links among the variables across the states that make up the ECOWAS

### **5.2. POLICY IMPLICATIONS**

The results have a few significant policy implications for the ECOWAS trade and development policies. To begin with, the short-term causal association between trade integration and growth highlights the role of maintaining and intensifying the efforts of trade integration in the short-run. Trade expansion in the form of growth dividends will be facilitated by policies that lower non-tariff barriers, ease customs processes and enhance transport infrastructure in the region. The ECOWAS Trade Liberalisation Scheme and the newly established African Continental Free Trade Area (AfCFTA) offer complementary platforms on how to achieve these goals. Second, the adverse long-run impacts of intra-regional trade on the growth of an economy necessitate a fundamental reorganisation of the makeup of intra-ECOWAS trade. Instead of being more focused on increasing trade volumes, ECOWAS policymakers need to be more focused on policies that enhance the technological content and value-added of intra-regional trade. This involves the encouragement of regional value chains in strategic sectors, including agro-processing, light manufacturing and services, where the ECOWAS economies have comparative advantages and where trade could bring effects of productivity and knowledge spillovers.

Third, extra-regional trade has a positive long-run growth effect, indicating that economies in the ECOWAS should carry on with and intensify trade activities with technologically advanced partners, but manage the terms of trade activity to get

maximum technology transfer and learning benefits. The benefits of external trade growth can be directed towards productive economic activity by aid-for-trade programmes, investment in trade infrastructure and specific FDI attraction policies. Fourth, the supremacy of investment in economic development underscores the necessity that the ECOWAS member states should establish favorable investment environments in terms of macroeconomic stability, legal certainty, and physical infrastructure provision. Infrastructure development, regional collaboration like the ECOWAS Energy Access Programme and the West African Power Pool may aid in establishing the preconditions of a permanent capital formation and development.

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