

Economic Integration and Macroeconomic Stability in ECOWAS Countries: Evidence on Inflation

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Published October 2026

Abstract

This study investigates the impact of economic integration on inflation dynamics within the Economic Community of West African States (ECOWAS). Using a panel of 10 ECOWAS countries, which are Nigeria, Ghana, Senegal, Sierra Leone, The Gambia, Liberia, Togo, Guinea-Bissau, Benin, and Côte d'Ivoire, the study examines how trade, financial, and institutional integration influence inflation in both the short and long run. The results show that financial and institutional integration significantly reduces inflation both in the short and long run. This suggests that development and an increase in cross-border asset flows, regulatory quality, and governance stabilize domestic prices. Conversely, trade integration shows no statistically significant impact on inflation in the short and long run, which could be attributed to structural limitations such as limited export diversification and reliance on imports. Overall, the study underscores that economic integration in ECOWAS exerts differentiated effects on inflation depending on the dimension considered. It concludes that strengthening financial and institutional integration, alongside productive investment, is critical for achieving sustainable price stability in the region.

Keywords: economic integration; inflation; macroeconomic stability; ECOWAS; panel data

1 Introduction

The advent of the First and Second World Wars increased the drive to economic integration and cooperation. Major world economies discovered that an increase in economic rivalry results in political rivalry, which eventually leads to war. To curb the menace of reoccurring war, major economies of the world proposed integrating their economies to promote trade, movement of labour, economic cohesion, and strong social and cultural interrelationship. This led to the formation of the Bretton Woods Institutions like the International Monetary Fund (IMF) and World Bank in 1944 to set rules guiding international money and lending; General Agreement on Tariffs and Trade (GATT) in 1947 to reduce tariffs globally; Organization for European Economic Cooperation (OEEC) in 1948 to manage Marshall Plan money to rebuild Europe.

In West Africa, the drive for economic cooperation, peace, and development led to the formation of the Economic Community of West African States (ECOWAS) in 1975. The bloc aims at achieving economic stability and convergence, promoting peace, and increasing economic coordination and free movement of labour by reducing trade barriers such as tariffs and promoting regional trade across its 15 member states (Elias, 2019). In the 1990s, the bloc intensified its integration efforts through a revised treaty and expanding the scope of cooperation into social, cultural, and political spheres. This era witnessed the establishment of key institutions such as the ECOWAS Trade Liberalization Scheme (ETLS). By 2000, the West African Monetary Zone (WAMZ) was established to unify anglophone currencies alongside the West African Economic and Monetary Union (WAEMU).

Trade integration in ECOWAS could be argued to have been a veritable tool in curbing inflation. For instance, the expansion in average trade openness from 0.45 in 1990 to 0.68 in 2020 could be said to have contributed to the noticeable reduction in average inflation rates of the region, as the inflation rate declined from an average of 14.62 percent in 1990 to 3.39 percent in 2020. However, the average inflation thereafter increased to an average of 9.25 percent in 2023, which was attributed to supply-side shocks experienced during the global pandemic (World Bank, 2024). The noticeable growth in the degree of openness in ECOWAS, as expanded through trade and investment, suggests a link between economic integration and moderate inflation.

Furthermore, initiatives like the ECOWAS Monetary Cooperation (EMC), though not fully materialized among the anglophone countries but anchored on the Communauté Financière Africaine (CFA) in the francophone countries, could also be said to have been part of the contributing factors in reducing inflation rates in the region. This is because countries with coordinated currency policies such as the European Union (EU) often experience stable exchange rates and synchronized inflation trends (Oatley, 1997). The francophone bloc has experienced a stable monetary union that enhances low inflation and regulated fiscal policies. Also, the initiative of the West African Economic and Monetary Union (WAEMU) has been argued to have enhanced inter-regional financial transactions. Other financial integration measures, such as the ECOWAS Payment and Settlement System (EPSS), could be said to have improved financial inclusion by lowering remittance costs and increasing regional access to funds among the unbanked population, hence reducing income inequality (Olaiwola, 2022).

Moreover, it has been argued that integrated economies could enjoy diversification through regional value chains, which enables countries to reap the benefits of specialization. This will improve efficiency, trade, and competition among firms and help in achieving moderate inflation. Furthermore, integration supports infrastructure development (as noticed between Nigeria and Niger Republic in 2019), transportation, and energy, through pooled resources. These will further improve employment, reduce inflation pressure, and in turn promote economic growth of the region (Black et al., 2021; Crescenzi & Harman, 2023).

However, despite the increasing effort towards economic integration, the ECOWAS bloc could still be viewed as susceptible to global economic shocks, which often reflect on the average price level, as noticed by the increase in the average inflation rate from 3.39 percent in 2020 to 9.25 percent in 2023. This shows that economic integration in ECOWAS might not provide enough buffer to ameliorate external shocks.

Also, the impact of trade openness on inflation cannot be said to have yielded positive outcomes given the rising inflation rate, especially among the major economies in the region. For instance, the value of inflation in Nigeria in 1990 was 13.0%. This value increased to 18.87 in 2000, but declined to 13.25% in 2020, and further increased to 24.66% in 2024. Also, Ghana has consistently experienced decades of rising inflation rates despite its integration efforts. The inflation rate in Ghana in 1991 was 18.03%, and later increased to 41.51% in 2021. The value declined to 10% in 2020, but later increased to 38.11% in 2023. Even in Senegal, the impact of economic integration on inflation has yielded mixed results. Senegal's inflation rate in 1991 stood at -1.57 percent but later rose to 2.97 percent in 2000. As of 2020, the value declined to 2.54 percent. This value has recently increased to 9.69 percent in 2023, showing the uncertainty in the inflation rate in Senegal (Macrotrends, 2025). The value of inflation in most of the integrated ECOWAS countries has been experiencing double-digit inflation rates, suggesting macroeconomic instability.

The aforementioned therefore pinpoint the fact that the impact of economic integration in reducing the inflation rate is not a clear-cut issue, as its impact in reducing inflation needs to be examined both in the short- and long-run. To this effect, this research examines the impact of economic integration in disaggregate form, by focusing on trade, financial and institutional integration on inflation both in the short- and long-run in ECOWAS bloc.

2 Literature review

2.1 Open-economy New Keynesian theory of inflation

The Open-Economy New Keynesian (OENK) model builds on traditional New Keynesian theory by taking into account how outside factors such as foreign trade, foreign exchange rates, foreign prices, and external shocks affect domestic inflation levels. The theory assumes that prices are sticky. Thus, companies are unable to change prices immediately, even when they need to respond to changes in demand, production costs, or other economic factors. As a result, temporary shocks may create long-lasting fluctuations in inflation and output levels.

In an open economy, inflation is formed not only by domestic factors but also by events that take place in the economies of trading partners. Importantly, the New Keynesian Phillips Curve operates as a basic mechanism linking current inflation levels with future inflation expectations and the domestic output gap. In an open economy, this correlation will also account for exchange rate fluctuations and foreign prices. Thus, when the domestic currency becomes cheaper, imported goods become more expensive, increasing production costs and prices in the end, thus creating imported inflation. The opposite effect may occur if the domestic currency strengthens in relation to its foreign partners.

The OENK model highlights the phenomenon of inflation spillover across borders. The increasing level of economic integration results in more interconnectedness between countries in terms of trade and production, so that inflationary shocks impacting one country are likely to affect its trading partners. Because of this, changes in the foreign demand for goods and services, commodity prices, production expenses, and inflation can affect the formation of domestic prices. At the same time, integration can lead to the convergence of prices and more efficient operations, but also make economies more likely to receive external shocks.

2.2 Empirical review

The impact of trade integration in reducing inflation was supported by [Berger & Nitsch \(2010\)](#), in their study titled "Globalization and Inflation: Evidence from Panel Data," by examining the relationship between trade openness and inflation across OECD and developing countries. They found that reduction in tariff contributes to lower inflation by increasing supply elasticity and reducing monopolistic pricing. Their results support the view that openness enhances price stability. Also, [Bergh & Nilsson \(2014\)](#), in their research titled "Do Liberalization and Globalization Increase Inflation?" use cross-country panel data to assess the inflationary effects of trade liberalization. They found that tariff reductions are associated with low inflation, particularly in countries with strong institutions. Their results suggest that openness disciplines domestic pricing and enhances monetary policy effectiveness. Furthermore, [Bussière & Pérez-Barreiro \(2013\)](#), in "Trade Integration and Inflation in the Euro Area," use panel cointegration techniques to study the impact of trade openness on inflation. Their analysis shows that tariff reductions contribute to lower inflation by increasing

competitive pressures and reducing markups. They argue that openness enhances the transmission of monetary policy. Similar result was also obtained by [Egert & Mihaljek \(2008\)](#), in their study "Determinants of Inflation in Emerging Economies," using panel regression. They found that trade liberalization, including tariff reductions, lowers inflation by improving supply-side efficiency and reducing monopolistic pricing. Their study supports the view that openness enhances macroeconomic stability. Moreover, [Jin & Kim \(2011\)](#), in "Trade Liberalization and Inflation: Evidence from East Asia," use panel data from six East Asian economies to examine the inflationary effects of tariff reforms. Their findings show that tariff reductions lead to lower consumer prices by increasing import competition and reducing production costs. They emphasize the importance of exchange rate stability in amplifying these effects. Supporting this argument is the work of [Gruben & McLeod \(2011\)](#), in "Trade Openness and Inflation: Evidence from Latin America," use panel cointegration techniques. They found that trade openness significantly lowers inflation in countries with flexible exchange rates. Their study emphasizes the role of exchange rate regimes in mediating the inflationary effects of trade.

However, some researchers have found that trade integration leads to volatility/stability. For instance, the empirical work of [Bleaney & Tian \(2014\)](#), in "Trade Openness and Inflation Volatility," examines the relationship between openness and inflation variability. Using GARCH models, they found that trade openness reduces inflation volatility in emerging markets. Their study suggests that openness acts as a stabilizer, especially when supported by fiscal discipline. Also, [Haile & Assefa \(2016\)](#), in "Trade Liberalization and Inflation in Ethiopia," apply VECM and impulse response analysis. They found that trade liberalization initially increases inflation due to import price shocks, but leads to long-term price stability. Their study recommends gradual liberalization and domestic production support. Furthermore, [Berti & Mikuš \(2016\)](#) studied "Economic Integration and the Dynamics of Inflation in Peripheral EU Countries" using Dynamic Panel Data Analysis (System GMM). Their results show that peripheral EU states experience more fluctuations in the inflation rate as a result of structural vulnerabilities and weak economic integration compared to other core EU countries. Hence, they conclude that strengthening economic integration and addressing structural vulnerability/weakness are the key instruments in achieving price stability in peripheral EU countries. Moreover, [Fischer & Lopez \(2014\)](#), in their study "inflation differentials in the Eurozone: the role of economic integration", adopted panel data analysis. The study identifies continuous inflation rate differentials across EU to structural economies, as well as disparities and varying degrees of economic integration. Hence, they identify the need for policy harmonization with deeper economic integration to ameliorate inflation rate differentials and promote price stability within the Eurozone.

Some researchers have also ascertained the transmission channel of economic integration in reducing inflation. For instance, the empirical work of [De Haan & Sturm \(2017\)](#) in their study of "Economic Integration, Exchange Rate Pass-Through, and Inflation in the Euro Area" employed the Structural Vector Autoregression (SVAR). The study observed that economic integration has reduced exchange rate volatility and moderated the exchange rate pass-through effect on inflation within the Euro Area, leading to a more stable inflation rate. Hence, they conclude that economic integration within the EU has helped in moderating exchange rate volatility, contributing to overall price stability. Also, [Dincer & Eichengreen \(2013\)](#), in "Central Bank Transparency and Inflation in Open Economies," explore how openness interacts with monetary policy. They find that trade openness reduces inflation more effectively in countries with transparent and accountable central banks. Their study advocates for institutional reforms alongside trade liberalization.

In examining the role of institutional and policy complementarities in curbing inflationary pressure, Chang et al. (2009) examine “Openness Can Be Good for Growth: The Role of Policy Complementarities.” They argue that trade openness boosts growth and stabilizes inflation only when accompanied by strong institutions and macroeconomic stability. Their cross-country regressions show that tariff reduction alone is insufficient unless supported by complementary reforms. Also, Dabla-Norris et al. (2016), in “Structural Reforms and Inflation in Emerging Markets,” assess how tariff cuts interact with other reforms to influence inflation. Their findings suggest that tariff reductions reduce inflation when combined with labour market flexibility and fiscal transparency. They argue that sequencing and coordination are key to successful outcomes.

Although existing studies provide valuable insights into the relationship between economic integration and inflation, most of the evidence comes from advanced economies such as the OECD, the EU, and East Asia, with limited focus on West African countries. The findings are also mixed: while some studies emphasize the stabilizing effect of trade openness, others highlight volatility, structural vulnerabilities, and the need for complementary reforms. Importantly, prior research tends to concentrate on trade liberalization alone, without adequately disaggregating the roles of trade, financial, and institutional integration in shaping inflation outcomes. Furthermore, much of the literature emphasizes long-run dynamics, leaving insufficient understanding of how integration affects inflation in the short run. These gaps underscore the need for a study examining the distinct impacts of trade, financial, and institutional integration on inflation in ECOWAS countries, considering both short- and long-run perspectives.

3 Methodology

This analysis employs the open economy new Keynesian model, analyzing inflation in integrated economies through price rigidity, cross-border spillovers, and currency-driven import channels. Production networks amplify foreign demand pressures, while Central Banks balance inflation anchoring with exchange rate stability. ECOWAS integration reduces domestic volatility through risk-sharing but heightens commodity sensitivity, necessitating policies that strategically reconcile output stabilization with exchange rate management in interconnected markets.

Beginning with the household utility-maximizing function, the Euler equation is given in Equation (1):

$$C_{it}^{-\sigma} = \beta E_t [(1 + r_{it}) C_{i,t+1}^{-\sigma}] + \vartheta \text{Int}_{it} \quad (1)$$

where C_{it} is consumption in country i at time t , Int_{it} is the economic integration index for country i at time t and ϑ is the integration-induced consumption-smoothing parameter.

Likewise, the firm aims to maximize profit; the optimal pricing can be written as Equation (2):

$$\pi_{it}^H = k E_t \left(\sum_{k=0}^{\infty} \beta^k mc_{i,t+k} \right) + \gamma \text{Int}_{it} \quad (2)$$

where π_{it}^H is domestic inflation, mc_{it} is real marginal cost and γ is the effect of integration-induced competition on markups.

In the open economy, global price shocks are transmitted to the domestic economy through the import channel, given in Equation (3):

$$\pi_{it}^F = \sum_{j=1}^N w_{ijt} \pi_{jt}^H + \mu \Delta E_{ijt} \quad (3)$$

where w_{ijt} is the trade share with partner j , E_{ijt} is the bilateral exchange rate and μ is the exchange-rate pass-through.

This imported inflation adjusts domestic inflation to Equation (4):

$$\pi_{it} = (1 - \alpha)\pi_{it}^H + \alpha\pi_{it}^F + \delta\text{Int}_{it} \quad (4)$$

where α is the import penetration ratio.

The panel transformation of the model, with other explanatory variables, gives Equation (5):

$$\pi_{it} = \beta_0 + \beta_1 \text{Fin}_{it-1} + \beta_2 \text{Tin}_{it} + \beta_3 X_{it} + \beta_4 E_{it} + \beta_5 \text{Int}_{it} + \beta_6 \text{Gcf}_{it} \quad (5)$$

Generating the econometric model gives Equation (6):

$$\ln \text{INF}_{it} = \beta_0 + \beta_1 \ln \text{FIN}_{it} + \beta_2 \ln \text{TI}_{it} + \beta_3 \ln \text{GEF}_{it} + \beta_4 \ln \text{GCF}_{it} + \beta_5 \ln \text{RER}_{it} + \beta_6 \ln \text{INT}_{it} + \theta_i + \mu_t + \varepsilon_{it} \quad (6)$$

where INF is the inflation rate, FIN is financial integration, TIN is trade integration, IIN is institutional integration, GCF is gross capital formation, RER is the real exchange rate, INT is the interest rate and $\theta_i + \mu_t + \varepsilon_{it}$ are the error terms. The error term was decomposed as $\mu_{it} + \eta_i + \varepsilon_{it}$, where μ_{it} is the standard or stochastic error term, which varies across countries and years; η_i is a set of group (country)-specific characteristics or effects; and ε_{it} is the time-specific effect.

3.1 Measurement, proxy and regression expectation

The variables, their measurement and their expected effects are given in Table 1.

Table 1. Measurement, proxy and regression expectation.

Dimension	Variable	Measurement	Expected effect
Trade integration	TIN	Trade openness	
Financial integration	FIN	Cross-border capital flow	
Institutional integration	IIN	Institutional quality	
Gross Capital Formation	GCF	Gross Fixed Capital Formation	+/-
Exchange rate	LF	Exchange rate	
Interest rate	GCF	Interest rate	+

Source: Researchers' computation.

3.2 Diagnostic tests for model robustness

To ensure the reliability of the regression estimates, several diagnostic tests were conducted:

- **Heteroskedasticity Testing.** The Breusch-Pagan/Cook-Weisberg test was used to determine if heteroskedasticity was present in the residuals. The test checks to see if there is a constant variance of the errors across all data points, and if the test results show significance, it implies that there was heteroskedasticity present, which was then corrected through the application of robust standard errors.

- **Autocorrelation Testing.** The Wooldridge test for autocorrelation in panels was carried out in order to detect if there is a serial correlation of the errors through time. Autocorrelation leads to inefficient estimates, thus resulting in distorted standard errors, and when the presence of autocorrelation was confirmed, correction of the estimators was carried out through the use of robust estimation techniques.
- **Cross-Sectional Dependence Testing.** The Pesaran CD test was performed in order to test if cross-sectional dependence exists among the ECOWAS countries. Because of the high degree of relations among the countries in the region, if cross-sectional dependence exists, then the results could not be valid. In that case, the application of the Driscoll-Kraay standard errors to address the issue of spatial correlation will be needed.

4 Results

4.1 Unit root test result

Once the nature of the variables in the model has been understood, it is necessary to conduct a stationarity test for those variables. In this approach, the Levin-Lin-Chu (LLC) unit root test will be employed. Using the LLC test, an analysis can confirm whether each variable is time-stable and therefore produces valid regression results. If any of the variables are non-stationary, they will either have to be differenced or transformed before they can be stabilized in the model. This is an essential step for avoiding false correlations and producing sound policy conclusions from the econometric model. The results are given in Table 2.

Table 2. Unit root test of the variables.

Variables	LLC Statistic at Level	Prob. Value	LLC Statistic at First Difference	Prob. Value	Order of integration
Log(INF)	-1.6762	0.0469			I(0)
Log(GCF)	-3.3143	0.0005			I(0)
Log(TIN)	-2.3613	0.0091			I(0)
Log(RER)	-2.9524	0.0016			I(0)
Log(INTR)	-2.7572	0.0029			I(0)
Log(FIN)	-1.7752	0.0379			I(0)
Log(IIN)	-0.7943	0.2135	-4.0482	0.0000	I(1)

Source: Authors' computation.

The results of the stationarity tests indicate that most of the variables used are stationary at the level form, meaning that they were stable without any transformations. Specifically, log of inflation; gross capital formation, trade and financial integration, real exchange rate, and interest rate are all stationary at level form. Only institutional integration was stationary at first difference.

4.2 Cointegration result

Variable relationships were tested for cointegration using a modified version of the test developed by Westerlund (2007) for the panel data analysis. Since stationarity has been confirmed at different levels of stationarity, it is essential to check if there are any long-term relationships between

variables through a cointegration test. Cointegration tests will measure whether the error correction term is significant in the totality of the panel or for each member of the panel. The results are given in Table 3.

Table 3. Westerlund cointegration test.

Statistic	Value	Z-value	p-value
Gt	-2.545	-1.741	0.041
Ga	-8.380	2.667	0.048
Pt	-7.044	-1.525	0.064
Pa	-8.872	-1.193	0.117

Source: Researchers' computation.

In order to prove the existence of cointegration among the variables of interest, at least one of Ga, Gt, Pt, or Pa must have a P-value less than 5%. Based on the tests performed, Gt and Ga have p-values under 5%, demonstrating cointegration within the pooled model as well as a country under consideration.

4.3 Estimation technique selection (Hausman test)

The Hausman test has been utilized to evaluate the appropriateness of using either a fixed-effects model or random-effects model, as it examines the correlation between the unique errors (u_i) of the model and the regressors. In the context of this test, the null hypothesis is that no correlation exists between the unique errors (u_i) and the regressors, and if the null hypothesis is rejected, this indicates that a fixed-effects model would be more suitable for estimating the parameters of interest due to the presence of bias from any correlation between errors and regressors. This test should ensure that the selected model provides unbiased estimates of the population parameters for panel data analysis (Greene, 2008). The result is given in Table 4.

Table 4. Hausman test result.

Chi-square	Probability	Decision
24.71	0.0001	FE

FE = fixed effects. Source: Authors' computation (Appendix D).

The information provided from the Hausman test shows that the model has a Chi-square test statistical probability value less than the 0.05 level, which indicates the rejection of the null hypothesis of no correlation between each of the unique errors (u_i) and the regressors within each of the models. The rejection of the null hypothesis leads to the conclusion that the fixed-effects model is more appropriate in estimating the parameters of the population and in addressing unobserved heterogeneity.

4.4 Regression result

This section presents the results for the second objective, which aims to examine the impact of economic integration (trade integration, financial integration, and institutional quality) on inflation in ECOWAS countries. The results are summarized in Table 5.

Table 5. Impact of economic integration on the inflation rate in ECOWAS countries.

Long-run variable	Coefficient	t-value	Prob.	Short-run variable	Coefficient	t-value	Prob.
C	0.1383357	0.20	0.838	C	-0.0100295	-0.69	0.510
Log(FIN)	-0.1213472	-2.94	0.004	Δ Log(FIN)	-0.0398302	-1.97	0.014
Log(TIN)	0.0031225	0.04	0.965	Δ Log(TIN)	-0.0574504	-1.00	0.344
Log(IIN)	-0.3596139	-5.54	0.000	Δ Log(IIN)	-0.2976695	-2.51	0.034
Log(GCF)	-0.1950496	-3.54	0.000	Δ Log(GCF)	0.0341565	1.90	0.028
Log(RER)	-0.1446086	-2.25	0.025	Δ Log(RER)	0.1396677	0.56	0.592
Log(INTR)	0.1367276	2.95	0.003	Δ Log(INT)	0.1000232	4.55	0.001
				ECT(-1)	-0.5328627	-4.10	0.003

Long run and short run: fixed-effects regression with robust standard errors. Source: Authors' computation.

The effect of financial integration on inflation was found to be negative and statistically significant with a coefficient of -0.1213 and -0.0398 in the long and in short run, indicating that for every 1% increase in financial integration there would be an approximate reduction of 0.12% and 0.04% in inflation in the long and short run respectively. This suggests that increased access to international financial capital will help stabilize domestic prices. When nations are financially integrated, their economies have access to foreign capital which can help alleviate liquidity problems and decrease reliance upon inflationary financing. Similar results were also obtained by Lane & Milesi-Ferretti (2007) and Badinger (2009). Hence, financial integration helps in reducing inflation.

Although trade integration was found to have a coefficient of 0.0031, its relationship with inflation was not statistically significant both in the short-run and in the long-run. Meaning that variations in trade integration do not, in themselves, result in direct changes to price levels within the study area. The lack of significance may be due to structural limitations (limited export diversification, reliance on imported goods, limited competitiveness in global markets, etc.) which may prevent price-setting mechanisms from having a material impact on domestic inflation.

Institutional Integration has a negative relationship with inflation. The coefficient of -0.3596 and -0.2976 in the long and short run indicates that a 1% increase in the quality of institutions will decrease inflation by approximately -0.36% in the long run and 0.3% in the short run. This finding is consistent with the theoretical expectation that improved regulations will lead to higher levels of investment and productivity and consequently decreased levels of inflation.

Another factor that has a negative and statistically significant relationship with inflation is gross capital formation. The coefficient for gross capital formation -0.1950 in the long run indicates that for every 1% increase in gross capital formation through investment, inflation will decrease by -0.20% in the long run. However, increase in investment shows a positive relationship with inflation in the short run. This shows the dampening effect of productive investment on overall inflation. As capital formation increases, both supply side (the economy's capacity to supply) and demand side (the ability to produce) bottlenecks are reduced and efficiencies are created. Therefore, when demand side price increases exist, productive investments will help mitigate (or diminish) some portion of that demand side pressure on pricing. Investing in infrastructure, manufacturing and technology also creates long-term growth potential, which can help stabilize inflation levels even further over time. Therefore, gross capital formation is a critical component for controlling inflation because it

addresses structural weaknesses within the economy and creates a sustainable base for long-term economic expansion. Other researchers have also found similar result (De Long, & Summers, 1991; and Ndikumana, 2000).

Inflation is inversely related to the real exchange rate in a highly statistically significant manner, as evidenced by a coefficient of -0.1446 in the long run, but highly insignificant in the short run. A 1% depreciation of exchange rate is associated with a reduction in the level of inflation of approximately 0.14% in the long-run. This negative relationship is somewhat contrary to the typical view that a depreciation of the local currency will lead to an increase in the cost of imported goods and, thus, higher inflation. One reason for this finding could be the fact the area being studied is characterized by structural features that limit the economy's reliance on imports or are less competitive in the global marketplace. If there is greater reliance on local production rather than on imported products, then a depreciation may not result in higher prices for consumers, but instead may actually lead to local production being encouraged, thereby reducing inflationary pressure. This result is similar to that obtained by Kamin & Rogers (2000).

Likewise, nominal interest rates have a positive and statistically significant relationship with levels of inflation both in the long-run and short-run, as indicated by a coefficient of 0.1367 and 0.10 respectively. A 1% increase in the level of nominal interest rates will be related to an increase in the level of inflation of about 0.14% over the long-run and 0.1% in the short-run. Again, this is at odds with the general expectation that increases in nominal interest rates will decrease demand and inflation rates. One potential explanation is that, due to the increased cost of borrowing, firms incur higher costs of production and pass these additional costs on to consumers in the form of higher prices. Higher nominal interest rates may also decrease levels of investment in economies with weak financial systems, reducing levels of supply and increasing upward pressure on prices. Therefore, in the context of this study, nominal interest rates are inflationary rather than stabilizing influences on overall inflation levels. This was also depicted in the empirical work of Barro (1995).

The ECT (Error Correction Term) measured in this study has a significant value of -0.5329, indicating that nearly 53% of the deviation from the long-term inflation trend is corrected each period. The ECT also provides evidence that the long-term relationship between inflation and its economic fundamentals exists. The discovery of significant ECT values indicates that the inflationary process will adjust to equilibrium very rapidly, supporting the stability of the inflationary models tested for this research. This finding points to the importance of considering both short-term dynamics and long-term convergence when evaluating economic behaviors relating to inflation.

4.5 Serial correlation (autocorrelation) test

In macro panel analyses, serial or autocovariance presents itself as a serious problem, especially with long ranges of macro panel data (20–30 years of data). The existence of serial correlation violates the independence of the error terms in the regression model so that the error terms exhibit a correlation pattern across multiple time periods. This, in turn, creates an understatement of the standard error, therefore, making the estimates of the coefficients seem more reliable than they actually are. The results are given in Table 6.

Table 6. Serial correlation test.

Short-run <i>F</i>	Prob.	Long-run <i>F</i>	Prob.
13.513	0.0846	51.238	0.0001

Source: Authors' computation.

The result above shows that the short-run has probability greater than 5%, which leads to the rejection of the null hypothesis of autocorrelation. However, the probability of the long-run shows a probability below 5%, indicating the presence of autocorrelation. Hence, the justification for the regression with robust standard errors.

4.6 Heteroscedasticity test

In a fixed effects regression (where errors are assumed to be homoscedastic), a logistical null hypothesis (H0) test is applied to test whether or not variances of residuals across a set of cross-sectional units remain constant. Because heteroscedasticity (error term variance across observations is not equal) can lead to inefficient estimators and incorrect statistical inference, the original model had issues with heteroscedasticity. The results are presented in Table 7.

Table 7. Wald test for group-wise heteroscedasticity.

Short-run chi-square	Prob.	Long-run chi-square	Prob.
947.32	0.0000	4912.18	0.0000

Source: Authors' computation.

Given the above output with p-values (probabilities) of less than 5%, therefore we reject the H0 of homoscedasticity and conclude that our model has heteroscedasticity. To correct for heteroscedasticity in our model, we used the Huber/White or Sandwich estimator to provide us with heteroskedasticity-consistent (using the variance of the sample rather than an assumed constant variance) robust standard errors.

4.7 Cross-sectional dependence/contemporaneous correlation

This study uses a diagnostic test to verify whether cross-sectional dependence exists by examining whether residuals have correlated residuals among various cross-sectional units to determine if there is evidence of serial correlation among those residuals. According to Baltagi (2008), this problem is particularly strong for macro panels with long time series currently represented over the past 20 – 30 years. The Pesaran CD test determines whether there is any residual correlation among entities; therefore, the Pesaran CD test will provide for robust inferences to panel data analysis. The result is presented in Table 8.

Table 8. Pesaran cross-sectional dependence (CD) test.

Short-run Pesaran statistic	Prob.	Long-run Pesaran statistic	Prob.
129.845	0.0000	209.424	0.0000

Source: Authors' computation.

Based on the results presented above, the Pesaran statistic for both models have a probability less than 5% for both the short and long run therefore we cannot reject the null hypothesis of serial correlation in the error terms for both models. To resolve the issue of serial correlation and obtain a robust result, the research employed the Driscoll and Kraay standard error for the estimate result presented and interpreted in Table 5.

5 Summary, conclusion and policy recommendations

The purpose of this research is to explore the relationships analysed between the three variables of Economic integration and macroeconomic stability in the ECOWAS member states, with evidence on inflation. Research findings are based on the use of a panel dataset of ten (10) ECOWAS countries; being Nigeria, Ghana, Senegal, Sierra Leone, The Gambia, Liberia, Togo, Guinea-Bissau, Benin, and Côte d'Ivoire, using data provided from 1991 to 2024.

The result shows that in the short and long run, financial and institutional integration have a negative relationship with inflation, while trade integration shows no meaningful effect. Other control variables such as investment shows a positive relationship with inflation in the short run, but negative in the long run which was attributed to demand side shock in the short run. Also, exchange rate also shows negative impact on inflation in the long run. Interest rate shows positive relationship with inflation both in the short and long run. The overall analysis results indicate that over an extended period of time, financial and institutional integrations tend to lower inflation rates, but trade integration does not. This finding emphasizes the importance of having an open economy and a well-functioning institutional framework to maintain stable prices through monetary discipline and increased efficiency.

This result indicates that while integration plays a role in providing stabilised prices in the long-term, there needs to be caution taken to manage volatility during transitions. Thus, to mitigate sudden inflationary shocks and achieve long-term macroeconomic stability, policymakers in the Economic Community of West African States (ECOWAS) should focus on strengthening regulations in their financial systems, improving governance within their countries, and coordinating their monetary systems across the region.

In conclusion, the results of the study indicate that financial and institutional integration have a significant effect on lowering inflation. For this reason, the research states that in order for the volume of benefits of economic integration to be fully utilized or to be able to achieve the level of economic stability associating with an economically integrated area; substantial financial and institutional integration needs to be improved.

5.1 Recommendations

Development of deeper connections between capital markets and increased cross-border movement of capital should be a priority for member states in ECOWAS. A unified financial system would provide a mechanism to reduce unemployment over time, decrease inflationary pressures. Additionally, by expanding financial market integration, investor confidence will also be enhanced if stability within financial markets denotes the likelihood of resiliency and growth over time.

To mitigate increasing inflationary pressures and create macroeconomic stability, it is essential for governments within ECOWAS to invest in building strong institutions, increasing transparency, and implementing the rule of law. By creating effective governance processes, the likelihood exists that confidence will be increased in potential investors. Furthermore, equitable distribution of benefits arising from integration results must come from credible institutions capable of sustaining reform initiatives over time and effectively managing external shocks.

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