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IMPACT OF TRADE OPENNESS ON ECONOMIC GROWTH IN ANGLOPHONE ECOWAS COUNTRIES: THE MODERATING ROLE OF EXCHANGE RATE

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Abstract

This study investigates the impact of trade openness on economic growth in Anglophone ECOWAS countries using the Pooled Mean Group (PMG) estimator, which captures both short-run dynamics and long-run equilibrium relationships. The findings indicate that, in the long run, trade openness significantly boosts economic growth by 4.1%, with the interaction between trade openness and exchange rate contributing positively at 0.08%. Additionally, the exchange rate has a significant positive impact of 0.02% on long-term growth. However, in the short run, neither trade openness nor its interaction with the exchange rate significantly affects growth, although a strong adjustment toward long-run equilibrium is observed. Therefore, it is recommended that Anglophone ECOWAS countries adopt policies that promote trade openness while ensuring exchange rate stability, as both elements are crucial for long-term economic growth. Short-term strategies should also prioritise adjustments toward maintaining long-run equilibrium to sustain growth momentum.

Key Words*:* Trade openness; Economic growth; Exchange Rate; Anglophone ECOWAS

1. Introduction

Trade openness is widely regarded as a key driver of economic growth, as it enables the exchange of goods, services, and ideas essential for development. Researchers like Sachs and Warner (1995), Collier (2007), and Baldwin (2016) emphasize its role in integrating global economies through the removal of trade barriers and the unrestricted movement of labour, capital, and finance (Igudia, 2004). This interconnectedness fosters specialization in areas of comparative advantage, enhancing efficiency, productivity, and access to advanced technologies and foreign investments. However, trade openness also presents challenges, as excessive openness without adequate regulation can lead to dumping—where foreign goods are sold below cost, harming domestic industries—and increased smuggling, which undermines official trade channels and reduces government revenue (Samimi, Ghaderi, Hosseinzadeh, & Nademi, 2012; Haussmann, Hwang, & Rodrik, 2007). Balancing these opportunities and risks is critical for realizing the potential of trade openness while ensuring economic stability.

Trade openness is a critical metric for understanding how deeply an economy is integrated into the global market, typically measured as the ratio of exports and imports to GDP. This measure reflects a country's ability to engage with international trade and leverage its comparative advantages. Greater trade openness often facilitates economic growth by fostering efficiency, encouraging innovation, and providing access to larger markets and advanced technologies. However, it simultaneously increases susceptibility to

global economic fluctuations, such as trade shocks, financial crises, and shifts in demand (Nam & Ryu, 2024; Bleaney & Tian, 2023). This research focuses on Anglophone West African countries—Nigeria, Ghana, Sierra Leone, Liberia, and The Gambia—to investigate the relationship between trade openness and economic growth (Azu, Atta-Mills & Akanegbu, 2023). Additionally, it explores the moderating role of exchange rates in mitigating or amplifying the effects of trade openness on economic growth in these nations. This dual focus seeks to provide nuanced insights into how global integration impacts these economies and the mechanisms through which they can manage associated vulnerabilities.

Global trade openness has experienced a steady upward trend from 1981 to 2022, with notable increases in the early 2000s and after 2010. The ratio of exports and imports to GDP rose from 0.32 in 1981 to over 0.50 in 2022, reflecting enhanced global economic integration. Significant peaks in trade activity occurred in 2008 and 2022, indicating periods of intensified trade (Bleaney & Tian, 2023; UNCTAD, 2024). Trade openness in West Africa has varied from 1981 to 2022, starting at 0.19 and fluctuating significantly. Despite notable peaks, the overall trend shows increased integration into the global economy (UNCTAD, 2024). Anglophone West Africa experienced similar fluctuations, with a general increase over time, reflecting greater global trade integration. However, trade openness in West Africa generally exceeded that of Anglophone West Africa during this period (UNCTAD, 2024).

Trade openness refers to how much a country allows the free flow of goods and services across its borders by implementing policies that lower tariffs, quotas, and other trade barriers. It is usually measured by the ratio of total trade (exports plus imports) to gross domestic product (GDP), indicating integration into the global economy. While trade openness can enhance economic growth, it may also create disparities, as global competition can negatively affect uncompetitive domestic industries, resulting in job losses and increased income inequality (Haussmann et al., 2007). Developing countries may become dependent on exporting primary goods while importing manufactured products, hindering long-term economic development and increasing vulnerability to global market fluctuations. Additionally, trade openness can cause environmental degradation due to unsustainable resource exploitation (Kolcava, Nguyen & Bernauer, 2019).

Despite these challenges, trade openness remains a vital driver of economic growth, offering countries access to larger markets and enabling specialisation in goods and services where they hold comparative advantages (Chang, Kaltani & Loayza, 2009). This process enhances efficiency, raises productivity, and stimulates innovation, ultimately benefiting consumers through a more diverse range of goods at lower prices. Furthermore, trade openness promotes technology transfer and facilitates the exchange of knowledge, which supports the development of domestic industries and drives economic modernisation (Arshad, Shabbir & Niazi, 2023). These dynamics underscore the transformative potential of global economic integration.

Exchange rates play a crucial role in shaping trade openness by influencing the relative prices of exports and imports. A depreciated currency makes exports cheaper and more competitive in the global market, potentially increasing export volumes. At the same time, it raises the cost of imports, encouraging domestic production and reducing reliance on foreign goods (Sugiharti, Esquivias & Setyorani, 2019; Azu & Nasiri, 2015). However, the volatility of exchange rates can pose significant challenges, creating uncertainty for businesses. This uncertainty often impacts investment decisions, hampers long-term planning, and deters foreign direct investment, thereby affecting the overall stability and effectiveness of trade openness (Agbeyegbe, Stotsky & WoldeMariam, 2006).

This study aims to evaluate the impact of trade openness on economic growth in Anglophone ECOWAS countries from 1981 to 2022, focusing on Nigeria, Ghana, Sierra Leone, Liberia, and Gambia. The research seeks to assess trade openness trends, its short- and long-term impacts on economic growth, and whether these effects differ among the countries. This study fills a gap in the literature by providing insights

specific to these Anglophone West African nations and their unique economic dynamics (Keho, 2017; Coniglio, Vurchio, Cantore & Clara, 2021; Qamruzzaman, 2023). Another gap in this research is the interaction of exchange rate with trade to assess its influence on the impact of trade openness on economic in the Anglophone West African countries.

2. Literature Review

2.1 Conceptual Definitions

2.1.1 Trade Openness

Trade openness refers to the extent of an economy's engagement in international trade. Defined by Abdullah & Anil (2014), it represents the ratio of exports and imports to GDP, indicating how much an economy trades outward (Fujii, 2017). This concept involves analysing extensive data on trade barriers and patterns, making it challenging to create a comprehensive global trade openness index (Harrison, 1996). Trade openness is often associated with free trade and encompasses policies like import/export taxes, exchange rate policies, and other regulatory measures (Baldwin, 2003; Akua, 2012). It also reflects an economy's exposure to external shocks, influenced by trade policies, factor endowments, and geographical factors (Fujii, 2017).

2.1.2 Exchange Rate

The exchange rate measures the value of one country's currency relative to another, facilitating the conversion between currencies, such as how many Nigerian Naira are needed to buy one US dollar. As of March 2024, the exchange rate was $1,592 to $1, which is expected to affect economic development negatively (CBN, 2024). The real exchange rate differs from the nominal exchange rate by considering local and international price levels, indicating the purchasing power of one currency against another. It is calculated using the formula: real exchange rate = nominal exchange rate × domestic price / foreign price. This study defines the exchange rate in terms of currency value against another, with the real exchange rate adjusted for inflation relative to trading partners. In contrast, the nominal exchange rate reflects the direct price comparison of currencies.

2.1.3 Economic Growth

The positive and continuous increase in the total amount of goods and services generated in an economy is known as economic growth. It may be expressed as total production or per capita income, with real growth as well as nominal growth (non-adjusted) being distinguished (Asigbetse et al., 2022). Driven by structural and technological improvements, economic expansion raises living standards and advances society (Todaro & Smith, 2003; Jhingan, 2007). Academics distinguish between economic development and growth, with the latter including enhancements in social fairness, income distribution, and quality of life (Woodford & Smith, 2000). Long-term economic performance is heavily influenced by institutions, governance, and economic freedom, especially in emerging countries (Ebben & de Vaal, 2009; Schumpeter, 1934).

2.2 Theoretical Background

Based on the notion of comparative advantage (Ricardo, 1817) as well as endogenous growth theory (Romer, 1986; Lucas, 1988), this paper explores the intricate and multidimensional link between trade openness and economic development. The notion of comparative advantage in international trade posits that trade fosters economic growth by increasing production and distributing benefits across nations through specialisation, innovation, increased productivity, and better resource allocation (Silajdzic & Mehic, 2018). While trade openness is seen by international trade theory as a catalyst for economic expansion, economic growth theory, particularly Solow's growth theory, examines this relationship from the perspective of factor productivity. Proponents of Solow's model argue that open economies experience increased production as capital shifts from affluent to poorer nations. This model, like the Ricardian comparative advantage method, simplifies the contributions of trade, labour, capital, and knowledge to growth in the economy, considering technological advancement as an exogenous factor unaffected by trade policies.

Endogenous growth theories, however, integrate technological advancement as an endogenous variable

influenced by trade policies. These theories have expanded to include the roles of government, various products, shifts in employment, natural resources, geography, social institutions, and globalisation, aspects largely overlooked by Solow's and Ricardian models. The dynamic nature of trade openness necessitates a more comprehensive examination of its actual correlation with economic development, especially in emerging nations like the Anglophone West African countries. Therefore, comparative advantage and endogenous growth theories offer robust explanations for the interdependence of countries on the path to economic growth and international disparities. Since none of these theories can be adopted in isolation, the research model for this study is built on multiple hypotheses made by these theories.

2.3 Empirical Review

Joshua (2022) investigated the effects of financial development and trade openness on Nigeria's economic growth from 1981 to 2018 using Granger causality testing and dynamic ordinary least squares (DOLS). The results, which showed no discernible impact on economic growth, were consistent with the theories of demand-following and trade-led growth. The study provides policy improvements in financial mediation and diversification of the economy to increase exports and competitiveness. It also connects with theoretical frameworks to link the financial sector alongside productive sectors and improve trade performance.

Tetelesti et al. (2022) explored the link between trade openness and the economic growth of Ghana and Nigeria (1998-2017) using pooled OLS, fixed effects, random effects, and the Hausman test. The findings indicate a substantial positive relationship between trade openness and economic growth. Among the suggestions is the implementation of trade policy controls. However, the main flaw in the study is the variables employed to gauge trade openness; they are theoretically dubious and raise questions about the reliability of the findings.

Dorn, Fuest, and Potrafke (2022) analyse the impact of trade openness on income inequality across 139 countries from 1970 to 2014. Using projected openness to address endogeneity and applying the ARDL estimation method, they find that trade openness affects inequality differently depending on the nation's income level. While it reduces inequality in affluent countries, it benefits the poorest in developing nations. Significant effects are observed in China and transitional economies. The study is robust, methodologically sound, and grounded in economic theory, with no notable weaknesses.

Jirbo, Jonathan, and Atayi (2022) studied ECOWAS's economic development, trade openness, and foreign direct investment (FDI) between 1994 and 2019. They discovered a long-term link between the variables using the ARDL estimation approach and the Kao and Pedroni cointegration tests. Growth is favourably impacted by FDI by 0.087%; however, trade openness has conflicting results. FDI has variable short-term effects on growth among ECOWAS countries, with some seeing favourable effects and others experiencing negative ones.

Mashimbye and Fanta (2021) examined trade openness and economic growth in Mozambique (1981–2017) while accounting for government expenditure and exchange rates using Granger causality and VECM. The findings revealed that trade openness is influenced by economic growth rather than being the source of Mozambique's economic progress. Since the VECM standards were met, the results were more valid. This highlights a crucial finding for policymakers and strengthens the research's credibility.

Oloyede et al. (2021) examined the impact of trade openness and economic growth in ECOWAS and SADC areas from 1990 to 2018 using the Durbin-Wu Hausman test, Pooled OLS, Fixed and Random Effects techniques, and economic growth in Africa's ECOWAS and SADC territories. The results indicated a modest but positive relationship between economic growth and trade openness. The report underlines the need for policy implementation to translate economic development into meaningful trade advantages and cites the rigorous approach as a plus, finding no shortcomings.

Rabail et al. (2020) looked at the effects of trade openness and human capital on 19 Asian economies from 1985 to 2017. The results of the Kao and Fisher Cointegration tests showed a long-term relationship. Strong positive correlations with trade openness, human capital, and economic growth were demonstrated by the FMOLS and DOLS models. While it affected Southern Asia, labour force participation helped Western Asia. There were no significant research mistakes found.

Doudu and Baidoo (2020) assessed the relationship between trade openness and economic growth in Ghana from 1984 to 2018 by examining the function that institutions perform in the research. ARDL was used in the investigation, and the findings showed that Both short- and long-term economic growth is boosted by trade openness and high-quality institutions, according to the ARDL assessment. Despite the strong theoretical basis of this study, there is a concern raised by the differences between the data and the authors' conclusions.

Malefane and Odhiambo (2021) investigated the dynamic impact of trade openness on Lesotho's economic growth through the use of ARDL-bound testing. There were four trade openness metrics used. Results showed that, regardless of the trade openness proxy employed, there was no discernible effect on economic growth over the short and long periods. For the advantages of inclusive growth, the report advises policymakers to concentrate on measures that promote both economic development and foreign commerce at the same time. Its excellence is increased by the solid economic theory upon which it is based.

Victor (2019) investigated the relationship between trade liberalisation and economic growth in the ECOWAS member states between 1975 to 2017. Because of the prominence of the time dimension, non-stationary heterogeneous dynamic panel models were used; PMG was selected using the Hausman test, along with MG and PMG estimators. The results revealed that trade openness produced long-term growth benefits, although short-term consequences varied across ECOWAS members.

Keho (2017) examines the link between trade openness and economic growth in Cote d'Ivoire from 1965 to 2014, addressing the roles of labour and capital often overlooked in previous studies. Using the ARDL estimation method within a multivariate framework, the study finds that trade openness positively impacts both short- and long-term growth. Cointegration and causality tests reveal a significant correlation between trade openness and capital formation, reinforcing its contribution to economic development.

Omoke, Opuala-Charles, and Camarero (2021) explore the connection between Nigeria's economic growth and trade openness between 1984 and 2017, taking institutional quality into account. They examine overall trade, import trade, and export trade using the ARDL bounds testing method. The results show a long-term correlation between trade openness and economic growth, particularly import trade, which has a negative impact on expansion. Nonetheless, the adverse consequences of import trade decrease as institutional quality rises. According to the report, strengthening governance may aid in maximising the advantages of trade openness, hence bolstering economic development plans in Nigeria.

Ramoni-Perazzi and Romero (2022) explored the effect of exchange rate volatility on economic growth. They utilised panel data from 194 countries between 1995 and 2019. The primary variable is exchange rate volatility, which is assessed using GARCH models. Economic openness, financial development, investment, government spending, and education are examples of control elements. According to the research, exchange rate volatility substantially impedes economic development; however, in more advanced financial systems, this impact is mitigated. It's interesting to note that high-corruption countries seem to be less affected—possibly because they have more experience with economic instability.

Morina et al. (2020) examined the impact of real effective exchange rate volatility on the development of economies in Central and Eastern European (CEE) nations from 2002 to 2018. Using yearly data for fourteen CEE nations, the research investigates the

effect using several indicators of volatility. Exchange rate volatility has a negative impact on real economic growth, according to the fixed effects model for panel data. The results highlight the negative impact of exchange rate changes on economic performance since they hold up well when compared to different metrics like standard deviation and z-score.

Rapetti (2020) evaluates the impact of the level and volatility of the real exchange rate (RER) on economic growth, particularly in developing countries. Empirical work highlights a positive association between RER levels and growth, with undervaluation fostering growth and overvaluation hindering it. RER volatility negatively impacts growth. The study uses panel growth regressions with data from the Penn World Table. It reviews mechanisms explaining the positive effects of an undervalued RER, such as reduced macroeconomic volatility and enhanced capital accumulation in tradable activities.

Touitou, Laib, and Boudeghdegh (2019) examine the impact of the exchange rate on economic growth in Algeria using a vector autoregressive model (VAR). The model includes the real effective exchange rate, economic growth, financial development, and money supply. The results confirm that a decline in the real effective exchange rate of the dinar boosts economic growth through increased public consumption and oil taxation. This finding aligns with theoretical expectations and highlights the significant role of exchange rate movements in influencing Algeria's economic performance.

Jibrin, Jelilov, and Gayypov (2017) analyse the impact of the exchange rate on GDP and other macroeconomic variables in ECOWAS from 1990 to 2014. Using a Classical Linear Regression model (CLRM) for ten countries, the study establishes a relationship between real GDP and exogenous variables like exchange rate, interest rate, and inflation. The analysis shows that the exchange rate significantly influences GDP in four countries, while inflation and interest rates are significant in three and one countries, respectively. This underscores the critical role of exchange rate policies in shaping economic outcomes in ECOWAS.

Mwinlaaru and Ofori (2017) study the effect of the real effective exchange rate on economic growth in Ghana from 1984 to 2014 using ARDL cointegration estimation. Data from the World Bank, Bank of Ghana, and Ghana's Ministry of Finance indicate that the real exchange rate positively and significantly affects economic growth in both the long and short run. The cointegration results suggest a stable long-term relationship between the exchange rate and economic growth, highlighting the importance of exchange rate stability for sustained economic development in Ghana.

Razzaque, Bidisha, and Khondker (2017) assess the impact of exchange rate movements on economic growth in Bangladesh. Using a constructed real exchange rate series and cointegration techniques, the study finds that a 10% depreciation in the real exchange rate leads to a 3.2% increase in aggregate output in the long run but a 0.5% GDP decline in the short run. This dual effect suggests that while real depreciation can promote long-term growth, it may also induce short-term economic contraction and inflationary pressures, necessitating careful consideration in exchange rate policy formulation.

3. Methodology

This study uses an ex post facto design, following pragmatism. This study's general goal of analysing trade openness's impact on economic growth in Anglophone ECOWAS countries requires objective, accurate, and verifiable aggregate economic data. Compared to subjective, perception-based data, which is susceptible to biases such as socially desired replies and respondent weariness. In addition, this study's variables have been conceptualised using economic growth as the dependent and trade openness as the independent variable.

3.1 Model Specification

Keho (2017) used the Cobb-Douglas production function, which made the economic growth model endogenous and was also essential in Keho's (2017) attempt to estimate the influence of trade openness on economic growth in Cote d'Ivoire. This study adapts Keho's (2017) model, which is represented as follows:

$$GRT_{it} = \theta_0 + \theta_1 CPL_{it} + \theta_2 LBR_{it} + \theta_3 OPN_{it} + \mu_{it} \quad (1)$$

GRT_{it} Stand for real GDP per capita growth for the country, i at time t.

OPN_{it} Stand for trade openness of country i at time t. Calculated as $\frac{export+import}{real\ GDP}$

CPL_{it} Stand for capital stock t for country i at time t

LBR_{it} Stand for labour force proxy with population growth for country i at time t.

However, it is understood that the exchange rate plays a significant role in trade and economic growth (Sugiharti et al., 2019; Azu & Nasiri, 2015; Agbeyegbe et al., 2006). Therefore, this research would like to integrate the exchange rate as a control variable. Thus, the amended model is stated as follows:

$$GRT_{it} = \theta_0 + \theta_1 CPL_{it} + \theta_2 LBR_{it} + \theta_3 OPN_{it} + \theta_4 EXC_{it} + \mu_{it} \quad (2)$$

EXC_{it} Stand for the real exchange rate.

However, it is relatively unknown whether the exchange rate would alter the direct impact of trade openness on economic growth. Again, in the case of Nigeria, it has been reported that the exchange rate exhibits a negative impact on economic growth (Ewubare & Ushie, 2022). Therefore, this research would contribute to trade literature, capturing the role of exchange rate on the impact of trade openness in promoting economic growth by interacting exchange rate with trade openness following Omoke et al. (2021). Thus,

$$GRT_{it} = \theta_0 + \theta_1 CPL_{it} + \theta_2 LBR_{it} + \theta_3 OPN_{it} + \theta_4 EXC_{it} + \theta_4 (OPN * EXC)_{it} + \mu_{it} \quad (3)$$

The estimation of Equations 2 and 3 will be carried out using an appropriate estimation technique, which will contribute towards realising the objective of this study. To avoid biases throughout the estimating process, the choice of method will be logically followed.

3.2 Data and Sources

This study will use panel secondary data from five Anglophone ECOWAS countries. The period covered by the data will range from 1981 to 2022. Capital Stock, labour force, and exchange rate will be obtained from World Development Indicators (WDI). At the same time, Real GDP per capita growth and trade openness data will be computed using data from the United Nations Conference on Trade and Development (UNCTAD). Both sources are considered to be trustworthy sources. Table 1 summarises the source of data and A prior expectation for each variable.

Table 1 Data Sources and Expected Signs of Coefficients

Variables	Expectation	Sources
Real GDP per capita growth (GRT_{it})	Dependent	UNCTAD
Capital Stock (CPL)	Positive (+)	World Development Indicator (WDI), World Bank
Labour Force (LBR)	Positive (+)	World Development Indicator (WDI), World Bank
Trade Openness (OPN_t)	Positive (+)	UNCTAD
Real Exchange rate (EXC_t)	Positive (+)	World Development Indicator (WDI), World Bank

3.3 Techniques of Data Analysis

The research employs a dynamic panel data analysis technique, specifically the Panel Autoregressive-Distributed Lag (Panel ARDL) model, for data spanning five countries over 42 years (1981-2022). Both dependent and independent variables must be

stationary at level or first difference to apply this technique. The Panel ARDL model, as developed by Pesaran and Smith (1995) and Pesaran, Shin, and Smith (1999, 2001), includes lags of both dependent and independent variables. The model can use two estimators: the Mean Group (MG) estimator, which mitigates bias from diverse slopes and provides reliable average long-term coefficients but is inefficient for uniform slopes, and the Pooled Mean Group (PMG) estimator, which assumes homogeneity in long-term coefficients while allowing short-term heterogeneity. To choose the appropriate estimator, the study will use the Hausman test, with a null hypothesis that PMG is more efficient, to be rejected if the p-value is less than 0.05.

The re-parameterised panel ARDL (p, q, q…, q) error correction model for this paper is represented as follows with all variables are in natural logarithm.

$$GRT_{it} = \theta_i\left[\Delta GRT_{i,t-1} - \phi_i'(OPN_{i,t} + CPL_{i,t} + LBR_{i,t} + EXC_{i,t})\right] + \sum_{j=1}^{p-1}\lambda_{ij}\Delta GRT_{i,t-j} + \sum_{j=0}^{q-1}\varphi_{ij}'\Delta OPN_{i,t-j} + \sum_{j=0}^{q-1}\varphi_{ij}'\Delta CPL_{i,t-j} + \sum_{j=0}^{q-1}\varphi_{ij}'\Delta LBR_{i,t-j} + \sum_{j=0}^{q-1}\varphi_{ij}'\Delta EXC_{i,t-j} + \alpha_i + \varepsilon_{it} \quad (4)$$

IPS proposes employing the Dickey-Fuller first autoregressive estimate to model the test specification as follows;

$$y_{it} = (1-\beta_i)\varphi_i + \beta_i y_{it-1} + \varepsilon_{it} \quad (5)$$

where there are N individuals; and T time periods, that are: $i = 1, \dots, N$; and $t = 1, \dots T$. The transformation of the equation 4 is as follows:

$$\Delta y_{it} = \gamma_i + \theta_i y_{it-1} + \varepsilon_{it} \quad (6)$$

The transformation from (4) to (6) shows that: $y_{it} = (1-\beta_i)\varphi_i$; $\theta_i = -(1-\beta_i)$; and $\Delta y_{it} = y_{it} - y_{it-1}$. The specification includes deterministic variables, such as the intercept. The application of the time trend is also evident in the testing procedures employed for the computation of test statistics. The test's null hypothesis posits the presence of a common unit root test within the panel, that is $H_0: \theta_i = \theta = 0\ for\ all\ i$. However, there is a difference between the alternative hypothesis and that of an LLC. The alternative hypothesis of IPS is $H_1: \theta_i < 0, i = 1, \dots, H; and\ \theta_i = 0, i = H+1, \dots, N$. Particularly, there is a subset of the series y_{it} not stationary. This makes IPS less restrictive than the alternative LLC.

In considering the heterogeneity and serial correlation in the error terms (the first case), ϵ_{it} is i.i.d across all individuals and periods. The test procedure involves estimating the t-statistic for the individual coefficient of the autoregressive factor using the standard DF regression (Model 6) for each individual i. These parameters are then averaged across all individuals to derive the average statistic for the entire panel.

To achieve the second objective of the study, there is need to estimate the interaction of exchange rate and trade, hence the estimated model is augmented as follows:

$$GRT_{it} = \theta_i\left[\Delta GRT_{i,t-1} - \phi_i'(OPN_{i,t} + CPL_{i,t} + LBR_{i,t} + EXC_{i,t} + (OPN * EXC)_{i,t})\right] + \sum_{j=1}^{p-1}\lambda_{ij}\Delta GRT_{i,t-j} + \sum_{j=0}^{q-1}\varphi_{ij}'\Delta OPN_{i,t-j} + \sum_{j=0}^{q-1}\varphi_{ij}'\Delta CPL_{i,t-j} + \sum_{j=0}^{q-1}\varphi_{ij}'\Delta LBR_{i,t-j} + \sum_{j=0}^{q-1}\varphi_{ij}'\Delta EXC_{i,t-j} + \sum_{j=0}^{q-1}\varphi_{ij}'\Delta(OPN * EXC)_{i,t-j} + \alpha_i + \varepsilon_{it} \quad (7)$$

4. Results and Discussion

The table presented is divided into two panels: Panel A, which provides descriptive statistics for each variable, and Panel B, which shows the correlation matrix for these variables. Let's interpret each panel in detail. Panel A offers summary statistics for six variables over 210 observations: GDP growth rate (GRT), capital (CPL), population growth rate (LBR), openness (OPN) and exchange rate (EXC). For each variable, the table presents the mean, standard deviation (Std. Dev.), minimum (Min), and maximum (Max) values.

The average GDP growth rate (GRT) is 0.71, with a high standard deviation of 10.27, reflecting significant variability, ranging from -44.43 to 90.76. The average

capital (CPL) is 9.65, with a standard deviation of 5.52, spanning from 0 to 27.30. The average population growth rate (LBR) is 2.58, with a standard deviation of 1.87, ranging from -13.06 to 10.2. Openness (OPN) averages 0.50, with a standard deviation of 0.69 and values from 0.08 to 6.36. The exchange rate (EXC) has a mean of 42.59 and a high standard deviation of 71.60, ranging from 0.000275 to 425.98.

Table 2: Descriptive and Correlation Matrix

Panel A: Descriptive Statistics					
Variable	GRT	CPL	LBR	OPN	EXC
Obs	210	210	210	210	210
Mean	0.705048	9.651112	2.575143	0.504936	42.59082
Std. Dev.	10.26821	5.520797	1.870673	0.694446	71.60231
Min	-44.43	0	-13.06	0.081376	0.000275
Max	90.76	27.30121	10.2	6.363636	425.9792
Variable	GRT	CPL	LBR	OPN	EXC
GRT	1				
CPL	0.032	1			
LBR	0.4254	0.092	1		
OPN	-0.0478	-0.2727	-0.0978	1	
EXC	0.0113	0.2244	-0.0162	0.0482	1

Panel B presents the correlation coefficients between pairs of variables, indicating the strength and direction of their linear relationships on a scale from -1 to 1. The GDP growth rate (GRT) has a moderate positive correlation with the population growth rate (LBR) at 0.4254. Capital (CPL) shows weak correlations with other variables, with its strongest correlation being with the exchange rate (EXC) at 0.2244. Openness (OPN) is negatively correlated with GRT (-0.0478), CPL (-0.2727), and LBR (-0.0978). The exchange rate (EXC) demonstrates weak positive correlations with CPL (0.2244) and openness (OPN) (0.0482). The GDP growth rate shows notable variability and a moderate positive correlation with population growth. Capital remains relatively stable and weakly correlated with other variables. Trade openness has negative correlations with several factors but is strongly correlated with its interaction term with the exchange rate. The exchange rate and its interaction with openness display high variability and are significantly correlated with each other and openness. These interpretations provide a clear overview of the statistical properties and relationships in the dataset.

Table 3: IPS Unit Root Test

	Level		1st difference		
Variable		Trend		Trend	Remark
GRT	-7.0682***	-5.8741***	-12.9489***	-12.3470***	I0
CPL	-2.5713***	-1.5767*	-7.5003***	-7.8074***	I0
LBR	-4.4585***	-4.5141***	-13.9171***	-13.0818***	I0
OPN	0.0708	-0.2630	-8.9278***	-8.0285***	I1
EXC	8.5136	6.4898	-2.3636***	-3.7027 ***	I1

Source: Author's Computation

Table 3 shows IPS unit root test results, evaluating the stationarity of variables in Anglophone West Africa. Stationarity is vital in time series analysis to avoid spurious regression from non-stationary data. The test

distinguishes between variables analysed at their levels and those after taking first differences, providing insights into their integration properties. In terms of levels, GDP growth rate, capital, and Population growth rate all exhibit highly significant test statistics, indicating they are stationary at level I(0). This suggests that these variables do not possess unit roots and are already in a stationary state, making them suitable for direct modelling without the need for further differencing.

Upon examining the first differences, which assesses the presence of unit roots in the variables after adjusting for trends, GRT, CPL, and LBR continue to show significant statistics at the 1% level. This confirms their stationary nature at I(0) even after differencing, reinforcing their stability over time. Conversely, variables like Trade Openness and Exchange Rate exhibit different patterns. OPN shows significant results in the trend component but not at the level, indicating it is integrated of order I(1) before differencing, suggesting it has a unit root. Similarly, EXC displays significant test statistics for both level and trend, implying it is also integrated of order I(1) before differencing.

These unit root test results provide a foundation for time series modelling in Anglophone ECOWAS countries, highlighting variables that require differencing to achieve stationarity and those already suitable for direct modelling. Understanding these integration properties is crucial for accurate economic forecasting and policy analysis in the region.

Table 4: Impact of Trade Openness on Economic Growth in Anglophone ECOWAS

LONG RUN			SHORT RUN		
VARIABLES	MODEL 1	MODEL2	VARIABLES	MODEL 1	MODEL2
-	-	-	ECT	-0.743***	-0.737***
-	-	-		(0.0964)	(0.106)
CPL	0.143	0.147	D.CPL	-0.763	-0.701
	(0.141)	(0.141)		(0.659)	(0.703)
LBR	1.783***	1.729***	D.LBR	4.337	4.386
	(0.586)	(0.611)		(6.272)	(6.236)
OPN	4.091**	-	D.OPN	-2.025	-
	(1.930)	-		(7.203)	-
EXC	0.0212**	0.00259	D.EXC	-0.666	-1.890
	(0.00935)	(0.0149)		(0.424)	(1.301)
OPN∗EXC	-	0.0777*	D.OPN*EXC	-	2.130
	-	(0.0425)		-	(1.816)
-	-	-	Constant	-6.052***	-5.207***
-	-	-		(1.615)	(1.665)
Observations	205	205	Observations	205	205

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Table 4 presents regression results analysing the impact of trade openness on economic growth in Anglophone West Africa, focusing on both long-run and short-run effects. Two models (Model 1 and Model 2) are used for each time frame, examining variables like capital (CPL), population growth (LBR), trade openness (OPN), exchange rate (EXC), and their interaction (OPNEXC). The short-run models also include an error correction term (ECT), which captures the speed of adjustment toward long-run equilibrium.

In the long run, both models show that capital (CPL) has a positive but statistically insignificant effect on economic growth, implying that while capital contributes positively, its impact is not strong enough to be significant. Conversely, population growth (LBR)

demonstrates a highly significant positive effect ($p<0.01$) in both models, highlighting its critical role in driving long-term economic growth. In Model 1, Trade Openness (OPN) has a positive and significant effect ($p<0.05$), highlighting its importance for long-run economic growth, though it is omitted in Model 2. The exchange rate (EXC) also shows a positive and significant impact ($p<0.05$) in Model 1, but this effect becomes insignificant in Model 2 when the interaction term is introduced. The interaction between trade openness and the exchange rate (OPN*EXC) in Model 2 reveals a positive, marginally significant effect ($p<0.1$), suggesting their combined influence benefits long-run growth. Both models display negative, highly significant constants, indicating that factors not included in the analysis negatively affect growth.

In the short run, the error correction term (ECT) is highly significant ($p<0.01$) and negative in both models, indicating a robust adjustment mechanism toward long-run equilibrium. Specifically, the coefficients of -0.743 in Model 1 and -0.737 in Model 2 suggest that about 74% of any disequilibrium is corrected within one period. Changes in capital (D.CPL) show negative but statistically insignificant coefficients, implying that short-term variations in capital do not significantly affect economic growth. Similarly, changes in population growth (D.LBR) have positive but insignificant coefficients, indicating that short-term changes in population growth are not impactful on economic growth. The coefficient for changes in trade openness (D.OPN) in Model 1 is negative and insignificant, and short-term fluctuations in trade openness do not significantly impact growth, as indicated by the insignificant coefficients.

Similarly, changes in the exchange rate (D.EXC) show negative but insignificant effects, meaning short-term shifts in the exchange rate also have no notable impact on growth. The interaction term between trade openness and exchange rate (D.OPN*EXC) in Model 2, though positive, remains insignificant, suggesting their combined short-term effects are not substantial. Both short-run models feature negative, highly significant constants, implying the presence of other negative factors influencing economic growth not captured by the included variables.

In summary, the long-run analysis highlights the significant positive contributions of population growth and trade openness to economic growth, with the combined effect of openness and exchange rate proving beneficial. The short-run analysis shows a strong adjustment toward equilibrium but finds that short-term changes in critical variables do not significantly affect growth. Negative and significant constants across both models and timeframes suggest the presence of other negative factors influencing economic growth that are not captured by the variables included in the models.

5. Conclusion and Recommendations

The regression analysis indicates that trade openness significantly enhances long-term economic growth in Anglophone West Africa, while its short-term effects are not statistically significant. The exchange rate has a positive impact on growth in the long run but not in the short run. Additionally, the interaction between trade openness and the exchange rate is marginally significant in the long term, suggesting their combined effect benefits sustained economic growth. However, the short-term influence of this interaction remains insignificant, implying that the positive impacts of trade policies and exchange rate dynamics materialise over a longer period.

Based on the findings, it is recommended that policymakers in Anglophone ECOWAS countries prioritise enhancing trade openness to foster long-term economic growth. Efforts should focus on creating a stable and favourable trade environment, including reducing trade barriers and improving infrastructure to facilitate international trade. Additionally, maintaining a stable exchange rate is crucial, as it positively interacts with trade openness to support growth. Short-term measures should also aim to ensure macroeconomic stability. Still, the emphasis should be on long-term strategies that harness the synergies between trade openness and a stable exchange rate to achieve sustainable economic development.

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