MACROECONOMIC SHOCKS, INSTABILITY AND ECONOMIC GROWTH IN SELECTED ECOWAS COUNTRIES

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ABSTRACT
This study investigates macroeconomic shocks, instability, and economic growth in selected ECOWAS countries. Specifically, Benin, Carbo Verde, Côte d'Ivoire, Ghana, Guinea-Bissau, Nigeria, Senegal, Togo, and the Gambia were considered for the study based on data availability and a long history of macroeconomic instability. The study adopts panel structural Vector Auto Regressive (VAR) as a methodology to conscientiously account for the responses of variables of each country to idiosyncratic and common structural shocks. This is achieved by allowing full cross-member heterogeneity of the response dynamics. The data used is a panel that comprises nine ECOWAS countries from 1992 to 2023. The results of the impulse response functions revealed evidence of insignificant shock propagation and transmission among the macroeconomic variables, such as the countries' GDP, inflation, unemployment, and exchange rates. However, the results indicated that macroeconomic instability in the countries is attributable to internal rather than external shocks. This is because the diagonal impulse response functions were more significant than the off-diagonal impulse response functions. The policy implication of these results is that macroeconomic stability is achievable when the ECOWAS countries focus more on controlling inflation and unemployment through effective monetary and fiscal policies. Doing this will not only enhance the attainment of internal balance but also assist them in mitigating the effects of the shocks and foster higher economic growth.
Keywords: Shocks, Economic Growth, Panel-SVAR
JEL Codes: E300, E320

1. INTRODUCTION
Macroeconomic shocks and economic growth in developing countries are widely discussed issues among economists and policy analysts (Bleaney, 1996). Macroeconomic stability is fundamentally the basis for sustainable economic growth (Dhonte & Kapur, 1997). However, the prevalence of macroeconomic instability among ECOWAS countries is often an outcome of macroeconomic shocks that manifest through trade and capital flows with the advent of globalisation. In the 1980s, most African countries had inaugurated the Structural Adjustment Programme (SAP), which led them to embark on a series of exchange rate and trade policy liberalization reforms to solve their Balance of Payments problems and achieve price stability (Imoisi, 2012). The liberalization programme of the 1980s made the governing authorities of these countries focus more on domestic debt financing, leading to huge budget deficits and high inflation rates (Audu and Apere, 2013). Since this period, most ECOWAS countries have been experiencing serious macroeconomic instability and poor economic growth, resulting from price instability, incorrect/erratic fiscal policy, instability of the real exchange rate, and wider output fluctuation (Hausman & Gavin, 1996).

The economic performance of any country is intricately connected to changes in the money supply, exchange rate, and the impact of external shocks. One of the most important objectives of macroeconomic policy is to achieve rapid economic growth (Adeniyi and Adeyemi, 2024). Consequently, this study focuses on the selected ECOWAS countries, considering their long history of economic instability and poor growth among other African Countries. For instance,

in the 1990s, the ECOWAS countries experienced very high inflation; still, between 2007 and 2008, the global economic and financial crisis further subjected the countries to heavy dependence on the international foodstuffs and energy market, thereby making them experience serious inflationary pressures compared to the 1990s. At the end of 2008, all the ECOWAS countries but Senegal recorded high inflation rates from 5.8% in 2007 to 13.0% while Niger, Burkina, Benin and Togo were the most affected countries (Ndiaye, 2021). However, the average inflation in the ECOWAS countries fell from 9.4 to 8.5% in 2019. The main cause of the high inflationary pressure faced by the countries at that period was their high budget problems recorded mainly through erratic fiscal and monetary policies (Audu and Apere, 2013).

Nigeria is the biggest economy among the ECOWAS countries, and one of the top oil exporters in Africa with a substantial portion of its total export revenue made from oil. According to the Central Bank of Nigeria, over 90% of Nigeria's export revenue is derived from oil, this makes it highly susceptible to changes in global oil prices. The country's heavy reliance on oil exports makes its economy vulnerable to external shocks, as observed during periods of drastic declines in oil prices, such as the oil price collapse in 2014 (Alabi and Ojediran, 2024). The oil and gas sector contributed over 90% to Nigeria's export revenue and 60% to the government's revenue between 1971 and 2005 (Alabi and Ojediran, 2024). With an estimated 37.2 billion barrels of oil reserves in 2011, and an average daily production of 2.13 million barrels, the fluctuating prices of oil on the global market, coupled with economic instability and oil discoveries in other parts of the world have led to a decline in Nigeria's oil exports, especially to major economies like the United States, worsening the economy of the country. This had further exacerbated inflation and lowered economic growth through low tax rates and high spending on imported goods (Alabi and Ojediran, 2024). The severe dependence on oil revenue has been a salient feature of Nigeria's economic structure. The COVID-19 pandemic had made clearer the vulnerability of Nigeria's economy to oil price volatility, resulting in budget deficits and an increased reliance on foreign loans to finance government expenditures (Alabi and Ojediran, 2024).

Over-reliance on oil revenue creates problems which include neglection of other funding sources and hindered development in infrastructure, private sector investment, and the modernization of agriculture and manufacturing sectors (Alabi and Ojediran, 2024). The oil exports constitute a substantial portion of the country's foreign exchange earnings and greatly influence the stability of the Naira. Exchange rate fluctuations affect the prices of imported goods and services thereby contributing to inflationary pressures in the domestic economy. The need for economic diversification has been recognized by policymakers in Nigeria as a strategy to reduce dependence on oil revenue (Alabi and Ojediran, 2024).

The main objectives of macroeconomic policy in the majority of countries are full employment, balance of payment equilibrium, price stability and sustainable economic growth (Madueke *et al*, 2024). Attaining stable macroeconomic environment has been a serious challenge for decades, as most of the countries have been battling enormously with huge fluctuations in output, highly mis-aligned exchange rates, high amplitude of fluctuations in the prices of goods and services (inflation) often as a result of undervalued local currencies and poorly managed interest rates. Consequently, the objective of this study is to investigate macroeconomic shocks, instability, and economic growth in ECOWAS countries like Benin, Carbo Verde, Cote d'voire, Ghana, Guinea-Bisau, Nigeria, Senegal, Togo, and the Gambia. These countries were selected due to data availability and their long history of economic instability and poor growth in the continent. To the very best knowledge of the author, no study has sought to examine issues of macroeconomic shocks and instability with regards to their effects on economic growth. Equally, there is no study that has so far used the panel structural VAR model to

analyze macroeconomic shocks, instability, and their effects on economic growth in ECOWAS countries. This paper is organized into five sections. The first section is the introduction, the second section carries out literature review on issues related to macroeconomic shocks, instability and growth in the countries. The third section presents and discusses the Econometric methodology adopted in the paper. The fourth section reports the results and provides their analysis. The fifth section concludes the paper and draws some important policy implications for the results obtained.

2. LITERATURE REVIEW

The two aspects of literature were reviewed in the paper, namely the theoretical and the empirical issues on macroeconomic shocks, instability and economic growth in selected ECOWAS countries.

2.1 Theoretical Literature

Understanding why the economy fluctuates over time is perhaps one of the main tasks of macroeconomics (Moneta,2015). Theories of economic fluctuations were reviewed in this section but the study adopts the Okun's law and the Phillips curve as its theoretical framework. It is noteworthy that these theories were selected over other theories due to their link with the principal variables used in the study, namely inflation, unemployment and output and relevance to the empirical model as a theoretical hub for the identifying restrictions. Five theories were reviewed under this section, namely the real business cycle theory, the Keynesian theory developed by John Maynard Keynes(1936), the Quantity Theory of Money (QTM) developed by Fisher, the Phillips curve developed by Phillips(1958), and the Okun's law.

The real business cycle theory as discussed in Romer(2012) is based on the assumptions of the neoclassical model of capital accumulation and the role technology plays in productive activity, it is represented by the Cobb-Doughlas production function and the capital accumulation relation as:

$$Y_t = K_t^{\alpha}(A_t L_t)^{1-\alpha} \quad (1)$$

$$K_{t+1} = K_t + I_t - \delta K_t = K_t + Y_t - C_t - G_t - \delta K_t \quad (2)$$

The Keynesian theory is mainly based on the IS-LM framework and asserts that Wages and prices do not respond immediately to changes in demand, because of factors such as institutional arrangements and so forth. The model consists of two parts, namely the goods market and the money market. The goods market relation is given as:

$$Y = C + I + G \quad (3)$$

$$\frac{M^d}{P} = L(Y, i) \quad (4)$$

The Quantity theory of money relates money stock to the price level in the economy; it is the macroeconomic theory that posits a direct and proportional relationship between the money supply and the overall price level of goods and services in an economy. In essence, the theory suggests that changes in the money supply primarily drive changes in the price level, often leading to inflation.

This theory is algebraically expressed as:

$$MV = PT \quad (5)$$

The Phillips curve postulates a negative relationship between unemployment and inflation, it was first discovered by Phillips, Samuelson, and Solow. The relation is algebraically expressed as:

$$\pi_t = (\mu + z) - \alpha u_t \quad (6)$$

where π_t is the rate of inflation at time t, μ and z are some constants, u_t is the unemployment rate at time t and α is the slope. It is noteworthy that the negative mathematical sign in equation 6 reflects a negative relationship between the two variables.

The last theory reviewed under this section is the Okun's law developed by Okun(1963) which postulates a negative relationship between a change in output and unemployment; it is given as:

$$\Delta u_t = -\beta y_t \quad (7)$$

The relationship in equation (7) emphasizes a negative link between a change in output and the unemployment rate.

2.2 Empirical Literature

The empirical literature on macroeconomic shocks and economic growth can be traced to the work of Bleaney (1996); thereafter, numerous studies investigated the relationship. These include Ulvedal (2013), Frimpong (2022), to mention a few. Other relevant works in this connection also include Rasaki and Malikane(2015) who have used the DSGE in examining the role of macroeconomic shocks in generating fluctuations in ten African countries and found that both the internal and external shocks had significantly influenced output fluctuations in African economies. Ehigiamusoe, Lean and Chan (2020) have examined the effects of macroeconomic stability on financial development in the West African region; they used the dynamic panel data models and found that macroeconomic stability had significant effects on financial development in the region. Frimpong (2022) has examined the interconnectedness of country-level macroeconomic variables using the wavelet and Time Varying Parameter VAR; he used four macroeconomic variables, namely consumer price index (CPI), real exchange rate (EXR) and nominal effective exchange rate (NEER) for four selected West African economies, namely Côte d'Ivoire, Gambia, Ghana and Nigeria, and found evidence of significant co-movements between the macroeconomic dynamics in a time–frequency domain.

Adigun and Ogunleye (2021) have examined external shocks and macroeconomic performance in Africa; they found using panel of 20 African countries, from 1980 to 2018, that the global oil price shock had positive impact on the gross domestic product of African countries and that innovative shock to world commodity price index had positive impact on fixed capital formation of African countries. Samuel and Obinna (2022) have investigated the link between petroleum products price changes, exchange rate and price of food items in Nigeria using monthly data from January 2010 to December 2021; they used ARDL model and found that the price of PMS and exchange rate have significant positive impact on prices of food items in Nigeria in both the short run and long run. Ahmed and Habiba (2022) examined the effect of oil price and oil production on economic growth in Nigeria over the period 1989-2020; they found using an ARDL model presence of cointegration among the variables and, estimates of the ARDL model revealed that there was a positive influence of oil price on economic growth both in the short run and long run.

Abaidoo and Agyapong (2023) examined the effect of macroeconomic risk, inflation uncertainty and instability associated with key macroeconomic indicators on the efficiency of financial institutions among economies in sub-Saharan Africa (SSA) from 1996 to 2019; they have found using the Pooled Ordinary Least Squares (POLS) that macroeconomic risk and exchange rate volatility served as constraints to the efficiency of financial institutions, and that inflation uncertainty had a significant influence on the efficiency of financial institutions among economies in the subregion. Toro et al. (2023) have examined effect of monetary policy on financial sector development in Nigeria from 2007 to 2020; using the expost-facto research design method, the findings showed that monetary policy has significant effect on financial sector development in Nigeria. Buthelezi (2023) has investigated effects of macroeconomic uncertainty on economic growth in the presence of fiscal consolidation in South Africa; he used the Markov-switching dynamic regression (MSDR) and time-varying parameter vector autoregression (TVP-VAR) methods with a time series data from 1994 to 2022 and found that macroeconomic uncertainty has had negative impact on 3 states of the country, and that fiscal consolidation had

reduced the negative impact of macroeconomic uncertainty in the states. Asuzu and Anyanwu (2023) have analyzed the relationship among selected macroeconomic variables by using the Toda Yamamoto Vector Autoregressive and Granger causality techniques; the results revealed that an increase in the money supply caused a marginal rise in inflation with no contemporaneous effect on real GDP growth. Gumede et al. (2024) have examined the macroeconomic resilience to shocks of South Africa and other emerging economies, namely Brazil, Nigeria, Malaysia and Poland with the aid of VAR analysis; they observed that South Africa in particular, has been battling with multifaceted issues characterized by high levels of poverty, inequality and unemployment. Abba et al. (2024) have investigated the effect of foreign exchange reserves accumulation on macroeconomic stability proxied by inflation, unemployment, exports, and GDP for a sample of 49 Sub-Saharan African countries from 2009 to 2021 using a panel (longitudinal) fixed model, they discovered that foreign exchange reserves had a significant negative effect on unemployment and inflation; nevertheless, a significant positive effect was observed on exports, while gross domestic product (GDP) revealed no significant relationship with foreign exchange reserves.

Lawal et al. (2024) have examined the impact of fiscal shocks on financial system stability in Sub-Saharan Africa; with the aid of dynamic panel least squares, they were able to find that fiscal shocks arising from public expenditure, growth and innovation had adversely affected financial system stability and that debt and the interest rate had positively and significantly affected the stability of the financial system in SSA countries. Yoganandham (2025) has investigated the unique features of developing market economies in low-income countries; the results revealed that the countries worked to find their way toward sustainable development, as frequently characterized by their developing infrastructure, restricted access to capital, and changing political environments. (Madueke *et al* ,2024) have used the multiple regression model and examined the macroeconomic effect of monetary and fiscal policy coordination on economic growth in Nigeria from 1985 to 2021. They found that the money supply, government expenditure, government revenue, inflation, and exchange rate had a statistically insignificant and positive effect on Nigeria's economic growth except monetary policy rate which had a statistically significant impact on economic growth; moreover, the results revealed that coordination between fiscal and monetary policy had a substantial impact on economic growth in Nigeria.

Alabi and Ojediran(2024) examined the effect of international oil price changes on Nigeria's export revenue and the direction of Granger causality between 1985 and 2022; the results revealed a positive relationship between changes in international oil price and changes in Nigeria's export revenue in the short run, and that a one-unit increase in oil price results to a 2.17 unit increase in export revenue. The long-run results revealed a negative relationship between oil price and export revenue. Additionally, evidence of a unidirectional causality has been found running from oil price to export revenue. Mashao(2024) has examined the influence of selected macroeconomic indicators, namely unemployment rate, economic growth proxied by gross domestic product (GDP), inflation, government expenditure, gross fixed capital formation and interest rate on unemployment in South Africa, Botswana, Namibia, Lesotho, and Eswatini using annual panel data from 1990 to 2022. Using the Pooled Mean Group (PMG) model, the results revealed that government expenditure, interest rate and GDP have an inverse and significant impact on unemployment rate in the long run, and that gross fixed capital formation and inflation have a positive impact on unemployment rate in the long run but only the impact of inflation is significant. Taty (2025) has used six CEMAC economies and provided a comprehensive analysis of persistence of fiscal imbalances in the countries; the results revealed that the overall fiscal

deficits and current account imbalances in the countries were highly correlated. Additionally, the results revealed that the CEMAC zone had shifted from an environment of fiscal surpluses, high GDP growth, a low debt-to-GDP ratio, and foreign inflows to one characterized by persistent fiscal deficits, subdued growth, a higher debt-to-GDP ratio, and net FDI outflows on average between 2012 and 2022. Chukwuka and Chukunalu (2025) have investigated the tradeoff between inflation and unemployment and its implications on the growth of the Nigerian economy from 1981 to 2024; they found that inflation rate negatively affected economic growth but not significantly; unemployment rate negatively affected economic growth of Nigeria significantly during the period.

3. **METHODOLOGY**

This section discusses the methodology used in the paper. The section describes the types of data used in the study and the Econometric technique that was used in obtaining the results. The panel structural VAR was used in this study because of its advantages and superiority over the standard VAR. The standard VAR model has been criticized of being atheoretical; hence, the structural VAR supersedes it as it allows for the use of an economic theory. This model was used in the study in analyzing the transmission and propagation of macroeconomic shocks among the countries.

3.1 Data Source

The data used for the purpose of this study is panel time series from 1992 to 2023 and was obtained from the World Bank. Nine Countries of ECOWAS were selected in the study based on data availability. The countries covered include Benin, Carbo Verde, Cote d'voire, Ghana, Guinea-Bisau, Nigeria, Senegal, Togo, The Gambia.

3.2 Theoretical Framework

The theoretical framework of this paper is built on two theories, the Okun's law and the Phillips curve. These theories form the theoretical hub of the empirical model of the study, namely the panel structural VAR and guide identification of the shocks.

3.3 Model Specification:

The panel structural vector autoregressive (PSVAR) model developed by Pedroni (2013) was used in this study in analyzing the macroeconomic shocks in the selected countries; the model was estimated by the Ordinary Least Squares (OLS) Estimator given as:

$$A_{i,s} = \alpha_s + \beta_s' x_i + \eta_{i,s} \quad (8)$$

The compact structural form of the model is algebraically expressed as:

$$By_{it} = B_{i0} + \Gamma_{it} y_{it-1} + u_{it} \quad (9)$$

The reduced form of the model can be written as:

$$y_{it} = \mu_{it} + \varphi_{i,t} y_{it-1} + \upsilon_{it} \quad (10)$$

where $y_{it} = \begin{pmatrix} Y_{1t} \\ \vdots \\ Y_{nt} \end{pmatrix}$ is the vector of the variables, $\mu_{it} = \mathrm{B}^{-1}\mathrm{B}_{i0}$, $\varphi_{i,t} = \mathrm{B}^{-1}\Gamma_{it}$, $\upsilon_{it} = \mathrm{B}^{-1}U_{it}$, $B_{i0} = \begin{pmatrix} \beta_{10} \\ \vdots \\ \beta_{i0} \end{pmatrix}$ is the vector of the constants, $B_{it} = \begin{pmatrix} \beta_{11} & \cdots & \beta_{it} \\ \vdots & \ddots & \vdots \\ \beta_{n1} & \cdots & \beta_{nt} \end{pmatrix}$ is the matrix of

coefficients of the variables, $\Gamma_{it} = \begin{pmatrix} \gamma_{11} & \cdots & \gamma_{it} \\ \vdots & \ddots & \vdots \\ \gamma_{n1} & \cdots & \gamma_{nt} \end{pmatrix}$ is the matrix of the coefficients of the lagged variables, $y_{it-1} = \begin{pmatrix} Y_{1,t-1} \\ \vdots \\ Y_{n,t-i} \end{pmatrix}$, $u_{it} = \begin{pmatrix} U_{1t} \\ \vdots \\ U_{nt} \end{pmatrix}$ is the vector of the disturbances/errors of the model which are assumed to be independently and identically distributed as: $u_{it} \sim (0, \Omega_{it})$.

3.3.1 Shocks Estimation

The estimated shocks were decomposed into common and idiosyncratic shocks as:

$$\varepsilon_{it} = \Lambda_i \varepsilon_{it} + \tilde{\varepsilon}_{it} \quad (11)$$

Where $E[\xi_{it}\xi'_{it}] = \begin{bmatrix} \Omega_{i,\bar{\varepsilon}} & 0 \\ 0 & \Omega_{i,\tilde{\varepsilon}} \end{bmatrix} \quad \forall_{i,t}$

$E[\xi_{it}] = 0 \; \forall_{i,t}$

$E[\xi_{it}\xi'_{it}] = 0 \;\; \forall_{i,} \quad s \neq t, \;\; E[\tilde{\varepsilon}_{it}\, \tilde{\varepsilon}'_{it}]=0$

$\forall_{i,} \;\; i \neq j,$

The shocks are algebraically represented by the following equation:

$$\mu_i = A_I(0)\varepsilon_{it}\forall_{i,}, \bar{\mu} = \bar{A}(0)\bar{\varepsilon}_{it} \quad (12)$$

3.3.2 Short-run identification of shocks

The identification of the shocks is based on the following equation:

$$A_i(L) = \bar{A}_i(L) + \tilde{A}_i(L) \quad (13)$$

3.3.3 Responses:

The responses of the member variables to a unit of shock are given as:

$$F_i(L)A_i(0) = A_i(L)\forall_{i,} \quad (14)$$

$$\bar{F}(L) = \bar{A}(0) = \bar{A}(L) \quad (15)$$

4. RESULTS AND ANALYSIS

This section presents and discusses the results obtained in the paper. It begins with a preliminary statistical analysis of the series' properties as can be seen in Table 1.

4.1 Preliminary analysis of the series

The Table 1 reports the panel descriptive statistics. These statistics include the mean, median, maximum, minimum, standard deviation, skewness and kurtosis of the series of each member country in the panel. It can be observed from the Jacque-Bera statistic that the null hypothesis

that the panel probability distribution is normal is rejected as indicated by the associated probability values of the statistic which are all less than 0.05.

Table 1: Panel Descriptive Statistics of the Series:

Variables	*lgdp*	*uemp*	*Cpi*	*Exr*
Mean	22.85711	5.197944	99.86053	332.7501
Median	22.81052	3.857000	90.29360	470.2934
Maximum	27.03436	14.69000	609.9726	732.3977
Minimum	19.68114	0.690000	2.443333	0.043685
Std. Dev.	1.870247	3.545426	70.83654	251.4683
Skewness	0.437360	1.104175	3.355109	-0.128694
Kurtosis	2.361574	3.064179	19.68727	1.330739
Jarque-Bera	14.07268	58.57113	3881.904	34.23217
Probability	0.000879	0.000000	0.000000	0.000000
Sum	6582.847	1497.008	28759.83	95832.03
Sum Sq. Dev.	1003.876	3607.603	1440113.	18148817
Observations	288	288	288	288

Source: Author's Computation (2025)

However, the results reported in Table 2 indicate absence of cross-sectional dependence among the countries, because the probability values associated with the Breusch-Pagan LM, Pesaran scaled LM and the Pesaran CD statistics of the tests are all less than 0.05. This implies that the null hypothesis of cross-sectional dependence can be rejected at the 5% level. These results obviate the need for conducting any panel unit root or cointegration tests that accommodate cross-section dependence.

Table 2 Cross-Section Dependence Tests & Panel Heterogeneity Tests

Tests	Statistic	d.f.	Prob.
Breusch-Pagan LM	392.5527	36	0.0000
Pesaran scaled LM	42.02014		0.0000
Pesaran CD	8.558308		0.0000

Source: Author's Computation (2025)

The panel heterogeneity tests reported in Table 3, indicate rejection of the null hypothesis that the panel members are homogeneous.

Table 3: Hsiao Test for Panel Heterogeneity

Hypotheses	F-Stat	P-Value
H1	147.0251	0.0000
H2	14.92917	0.0000
H3	245.7059	0.0000

Source: Author's Computation (2025)

The results of the Fisher PP unit root test are reported in Table 4. The test reveals that the variables are integrated of order one i.e *I(1)* and hence non-stationary at level. This necessitated carrying out the test at first difference, and at first difference the series were found stationary; as can be seen from the table, the probability values of the test statistics are all less than 0.05 which implies rejection of the null hypothesis of a unit root in the series.

Table 4: Fisher PP- Unit root Test

	At Level		At First Difference	
Variable	**Statistic**	**Probability**	**Statistic**	**Probability**
CPI	16.1180	0.5843	66.3685	0.0000*
GDP	1.89600	1.0000	101.106	0.0000*
UEMP	17.8641	0.4646	124.649	0.0000*
EXR	23.5219	0.1713	120.878	0.0000*

Source: Author's Computation (2025)

The Pedroni (2004) panel cointegration test results reported in Table 5 reveal that the five macroeconomic variables of the panel members are not cointegrated. Hence, no evidence of any long-run relationship among the variables has been detected from these results. These results alongside the earlier results of the panel unit root test validate the use of the structural panel VAR model adopted in this paper with all the variables in their first differences since all the variables are *I(1)* and not cointegrated**.**

Table 5: Panel Cointegration Tests

	Statistic	**Prob.**	**Weighted Statistic**	**Prob.**
Panel v-Statistic	-2.175586	0.9852	-0.880598	0.8107
Panel rho-Statistic	3.148356	0.9992	1.686338	0.9541
Panel PP-Statistic	4.208296	1.0000	1.697923	0.9552
Panel ADF-Statistic	3.471652	0.9997	1.912746	0.9721
Group rho-Statistic	2.788226	0.9974		
Group PP-Statistic	2.810790	0.9975		
Group ADF-Statistic	2.904307	0.9982		

Source: Author's Computation (2025)

4.1 Estimation Results

The estimation begins with selection of optimal lag length to use in estimating the model. If lags to use in a VAR mode were inappropriately selected that could lead to either a quicker erosion of degrees of freedom when too many lags were used, or entire mis-specification of the model if the number of the lags used was too small. The asterisks against the lags in Table 6 below indicate the optimal number of lags selected which guides the estimation of the model at lag 1.

Table 6: Panel VAR Lag Lengh Selection Criteria

Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-7051.854	NA	4.75e+24	68.17250	68.23690	68.19855
1	-6727.538	632.9646	2.42e+23	65.19360	65.51561*	65.32382*
2	-6706.35	40.53325	2.30e+23	65.14348	65.72308	65.37787
3	-6697.897	15.84442	2.47e+23	65.21640	66.05360	65.55495
4	-6667.561	55.68961	2.16e+23	65.07788	66.17269	65.52061

5	-6632.941	62.21491	1.80e+23	64.89798	66.25039	65.44489
6	-6602.566	53.41296	1.57e+23	64.75909	66.36910	65.41017
7	-6584.408	31.22915	1.54e+23	64.73824	66.60585	65.49349
8	-6556.46	46.98401*	1.38e+23*	64.62281*	66.74802	65.48222

Source: Author's Computation (2025)

However, in Table 7, the PVAR stability results are reported and interestingly, all the eigen values of the model are less than unity which implies stability of the PVAR system. This suggests that the impulse response functions generated from the model are finite and calculable. Therefore, the macroeconomic impacts of the shocks can be conveniently analyzed.

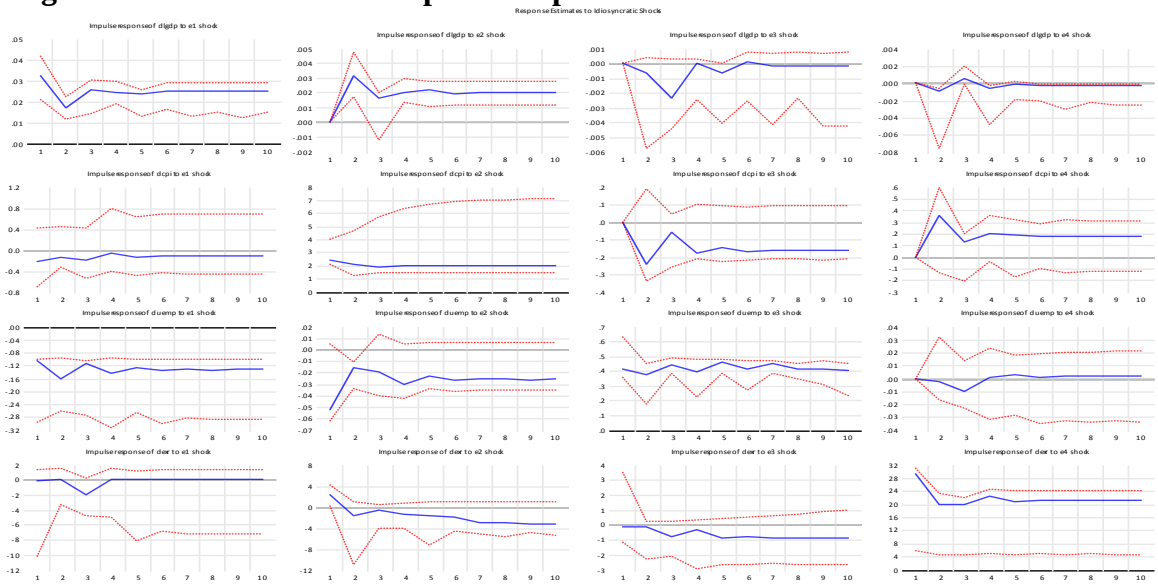
Table 7: Panel VAR Stability Test

Real	Imaginary	Modulus
0.37275	0	0.37275
0.00000	0	0.00000
0.00000	0	0.00000
0.00000	0	0.00000

Source: Author's Computation (2025)
Notes: All eigen values lie inside the unit circle

In this study, the dynamic macroeconomic interdependencies among the selected ECOWAS countries were analyzed using the impulse response functions; this is achieved by tracing out how a shock to a variable impact other in the system over time. The impulse response functions were decomposed into common and idiosyncratic shocks to enable easier analysis of the shocks. The impulse response functions are depicted in figures 1 & 2 below

Figure 1: Common Shocks Impulse Response Functions

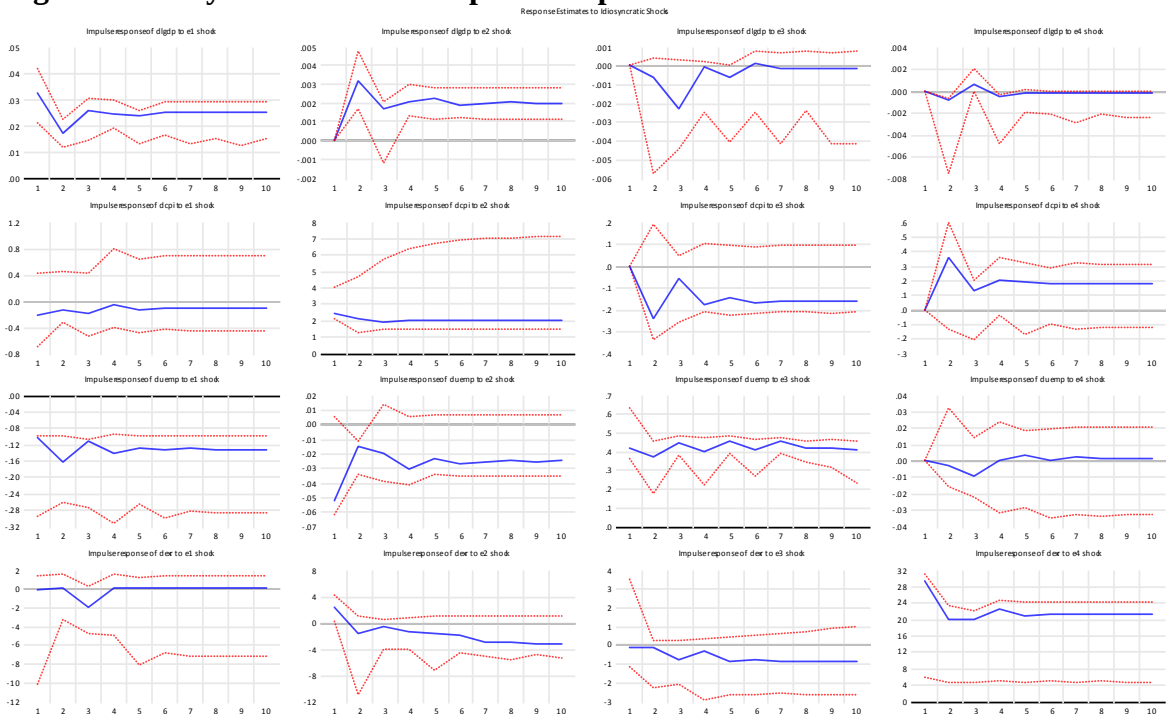


Source: Author's depiction (2025)

In Figures 1 and 2, the impulse response functions are depicted. It is noteworthy that the shocks as represented by the impulse response functions are decomposed into common and idiosyncratic shocks as can be seen in the Figures. It can be observed from figure 1 that the responses of the countries' macroeconomic variables to internal shocks (diagonal impulse response functions) are more significant than their responses to external shocks (off-diagonal

impulse response functions). However, in Figure 2 it can be observed that the impulse response functions of the idiosyncratic shocks display almost same results as those of the impulse response functions of the common shocks in Figure 1. Essentially, the results of the diagonal impulse response functions seem to be more significant than those of the off-diagonal impulse response functions throughout the period horizon. This implies that the source of the shocks that cause macroeconomic instability in the countries be traced to internal external economic factors. This underscores the need for paying more attention by the authorities / law makers of the countries to the pursuit of economic policies that would help them attain internal macroeconomic balance/equilibrium. Therefore, macroeconomic adjustment should be tailored towards the attainment of internal rather than external balance through the implementation of more optimal expenditure changing policies, namely monetary and fiscal policies.

Figure 2: Idiosyncratic Shocks Impulse Response Functions



Source: Author's depiction (2025)

Table 8: Panel Granger Causality Tests

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
UEMP does not homogeneously cause LGDP	2.44914	2.54840	0.0108
LGDP does not homogeneously cause UEMP	1.94507	1.61227	0.1069
CPI does not homogeneously cause LGDP	2.14261	1.97913	0.4780
LGDP does not homogeneously cause CPI	6.62386	10.3014	0.0000
EXR does not homogeneously cause LGDP	1.70729	1.17069	0.2417

LGDP does not homogeneously cause EXR	0.84177	-0.43671	0.6623
CPI does not homogeneously cause UEMP	1.69038	1.13927	0.2546
UEMP does not homogeneously cause CPI	1.30130	0.41669	0.6769
EXR does not homogeneously cause UEMP	1.62194	1.01217	0.3115
UEMP does not homogeneously cause EXR	0.70594	-0.68897	0.4908
EXR does not homogeneously cause CPI	1.49842	0.78279	0.4338
CPI does not homogeneously cause EXR	1.04472	-0.05981	0.9523

Source: Author's computation (2025)

The results of panel Granger causality tests are reported in Table 6. The results reveal that unemployment Granger causes GDP, and not vice-versa; and CPI Granger causes GDP and not vice-versa, GDP causes CPI not vice-versa**.** The economic implications of these results are that unemployment in each of the countries could be used as a guide to the law makers / authorities of the countries in forecasting GDP and targeting its growth over time. These results imply that the policy makers / law makers in these countries can use the results to guide them in projecting economic growth given unemployment rate at any point in time. Moreover, CPI as a proxy of inflation provides some guide for forecasting and, for targeting the GDP growth in the countries. These results could to a large extent help and guide authorities of the countries in the design of optimal macroeconomic policies that would alleviate macroeconomic instability. These results are similar to the findings of Mashao(2024) who studied the effect of macroeconomic indicators on unemployment in South Africa, Botswana, Namibia, Lesotho, and Eswatini where he found that GDP had an inverse and significant impact on unemployment rate in the long run, and inflation had a positive and significant impact on unemployment rate in the long run; and Chukwuka and Chukunalu (2025) in Nigeria who proved existence of a negative relationship between inflation and unemployment for Nigeria as embedded in the Phillips curve.

5. Conclusion and Recommendations

This study has analyzed macroeconomic shocks in the selected countries of ECOWAS. The results have revealed evidence of insignificant shock propagation and transmission among the macroeconomic variables of the countries, namely GDP, inflation, unemployment, and exchange rates. Put another way, the diagonal impulse response functions were found to be more significant than the off-diagonal impulse responses. This implies that internal rather than external shocks are the principal source of macroeconomic instability in the countries. Based on the results, the study draws two strands of policy recommendations. One, the countries should place more emphasis on the internal than external macroeconomic management as source of the shocks was traced to internal rather than external factors.[1] Two, the countries should pay more attention to managing unemployment and inflation given their effects on

[1] As indicated by the results of the impulse response functions

economic growth.[2]The findings by Mashao (2024) in Africa and Chukwuka and Chukunalu (2025) in Nigeria corroborate the facts in this study that unless inflation and unemployment are effectively managed, attaining faster economic growth in Nigeria and other African countries as a whole is a mirage.

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[2] As revealed by the panel Granger causality tests

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