EFFECT OF MONETARY POLICY ON ECONOMIC GROWTH IN WEST AFRICAN COUNTRIES

Joel Ayenajeyi Elisha
Department of Economics,
Federal University of Lafia
08060862742
joelayenajeyi27@gmail.com

Innocent Okwanya
Department of Economics,
Federal University of Lafia

Abdulkareem Alhassan
Department of Economics,
Federal University of Lafia

Corresponding author:
Joel Ayenajeyi Elisha
Department of Economics,
Federal University of Lafia
08060862742
joelayenajeyi27@gmail.com

ABSTRACT

The study examined the effect of monetary policy on economic growth in West African countries covering the period of 2000-2023. The study applied the panel Auto Regressive Distributed Lag (ARDL) model of mean group, dynamic fixed effect, and Hausman test. The study revealed that the exchange rate has significant effect on economic growth in both the short and long run, it was discovered that monetary policy has positive and significant effect on economic growth in the short run while lending interest rate had inverse and insignificant effect on growth. The study further revealed that broad money supply had a significant effect on economic growth while deposit interest rate had insignificant impact on growth. Exchange rates, monetary policy rates, and money supply were discovered to be the major instruments of monetary policy that influence economic growth. The study recommends that policy makers should manage exchange rate effectively so as to promote exports, central banks should lower their interest rate (MPR) to encourage borrowing and investment, and there should be proper coordination of deposit interest rate and lending interest rate so as to encourage investment which in the long run will influence economic growth in West African countries.

Keywords: *Monetary Policy, Economic Growth, Panel ARDL*
JEL Classification: P48, O47, C33,

1.0 Introduction

Monetary policy plays a crucial role in promoting economic growth in both developed and developing economies; in West African countries, the quest for sustainable economic growth and development has been a longstanding challenge. Despite the region's vast natural resources and potential for growth, many countries in the region have struggled to achieve sustained economic growth. It has been proven that resilient monetary policy served as a tool for promoting growth and stability in developed nations like United States, Germany, China, Russia, France and Taiwan (Mustapha, 2018). Incidentally, policy makers in West African countries through the central banks in the region have employed various monetary policy reforms such as uniform currency, exchange rate stabilization, monetary policy rate harmonization and reserve requirement to promote economic stability and growth (Adofu & Wadda, 2021).

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However, the effectiveness of these monetary policy reforms and instruments in promoting economic growth in West Africa region remains a subject of debate. This is because the region is characterized by high rate of informal financing, poor access to credit facility, high inflationary rate, poor financial services, and stifling economic growth (Stilgz, 2017).

Houssem and Hassene (2018) noted that developed nations like the United States, United Kingdom, and Western Europe transitioned from agrarian economies to industrial economies through enhancement of monetary policy instruments and the financial sector. After World War II, these countries experienced rapid economic growth, driven by rebuilding efforts in the financial sector, and increased consumer demand. Similarly, in the 20th and early 21st centuries developed nations like US, UK, Germany, China, Japan and other Western countries took a lead into resilient monetary policy reforms, and financial sector development targeted towards boosting productivity and economic output (Ryanda & Tika, 2021). Over time, many developed nations shifted from manufacturing-based economies to service-based economies which include increased access to credit facility, high formal financing, increased supply of financial services and financial sector development. These countries also benefited from strong legal and financial systems that supported stable economic environments and attracted investment.

In 2000s to 2020 some developing countries like India, Malaysia, and Brazil transitioned into fast-growing emerging markets, becoming major global economic players, with improvements in financial sector. Adebola and Adewumi (2023) stressed that the expansionary monetary policy, and transmission mechanisms in these countries influenced their economic growth. Also, the US federal reserve, bank of England, and European Central bank embarked on the expansionary monetary policy including quantitative easing which helped to stabilize and stimulate their economies during the 2008 financial crisis. This implies that resilient monetary policy plays a significant role in contributing to the economic growth of nations. While most countries in West Africa like Niger, Togo, Nigeria, Benin, Sierra Leon, and others are still posed with the challenge of slow growth in the financial sector, and technology (Kaushal, 2022).

Adofu and Wada (2021) asserted that monetary policy is considered an essential component for the establishment of a robust financial deepening, which ultimately fosters a stable and well-diversified economy. Paul (2017) stressed that countries in West Africa with lower interest rates have the tendency of experiencing rapid economic growth because lower interest rates reduce borrowing costs and increase access to credit which eventually stimulate investment and economic development. This implies that lower interest rates, lower

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reserve requirements can increase the amount of credit available in West African countries which in the long run can stimulate economic growth.

Also, developed economies like China, Germany, Russia, Saudi Arabia, USA, Taiwan, and United Kingdom typically have used monetary policy to achieve a deepened financial system, sustainable economic development, highly developed financial markets, including robust stock exchanges, efficient banking systems, and well-established capital markets. These economies ensured that credit facilities were readily made available to private sectors and individuals who needed it for investment. Also, India being an emerging economy used monetary policy reform to ensure citizens have full access to financial services to enhance business activities in the country. In fact, it was reported that as from 2005-2015 in India, 415 million population exited poverty due to effective implementation of monetary policy reforms which was geared towards stimulating economic activities in the country for ten years (United Nations [UN], 2021). This holistic approach embarked upon was able to lift millions of Indians from poverty and it contributed significantly to her gross domestic product. Similarly, developed economies were at the forefront of adopting monetary policy reforms which include flexible interest rates, and flexible exchange rate regime which have allowed their currencies to adjust to changes in economic conditions. The reserve bank of Australia and Canada reviewed its monetary policy interest rates to a flexible framework which eventually helped their economies to maintain stable growth and sustainable economic development (Stilglz, 2022).

Consequently, West African countries have undertaken various efforts to ensure monetary policy were implemented to enhance economic growth, they went further to foster financial deepening, recognizing the importance of these initiatives for sustainable economic development even though their specific actions varied among the countries, noteworthy is the establishment of West African countries regional economic blocs formed. This includes West African Economic and Monetary Union (WAEMU) and the West African Monetary Zone (WAMZ); these were formed to enhance economic integration among the countries. These blocs constitute the Anglophone countries and Francophone countries aimed at coordinating monetary policies, promoting financial stability, and creating common framework for economic development amongst various blocs.

Efforts were also made by other countries within West Africa to review their monetary policy rate and reserve requirement to suit their prevailing economic conditions, but this attempt could not yield significant result. For instance, the Central of Bank of Nigeria adjusted its monetary policy rate (MPR) 27 times between 2000-2022,

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with the rates ranging from 14%-18%, the Bank of Ghana (BoG) reviewed its MPR 25 times during the same period with rates fluctuating between 12.5%-26.5%. Similarly, the Central Bank of West African States (BCEAO) adjusted its MPR 22 times which eventually affected Senegal, Ivory Coast, Niger, and some other Francophones countries negatively (World Bank, 2022). Despite these efforts, West African countries are still faced with the challenges of poor implementation of monetary policy and weak financial system. These two major factors have contributed to the slow growth of the region.

Also, a large segment of the population in West Africa remains excluded from formal financial services due to limited access to banking, and other financial bodies. These challenges are prevalent in the rural areas, and these have constrained the impact of monetary policy, and it has hampered the potential for financial deepening to spur economic growth in the region (Hassan, 2017). It is worth stating that the inability of leaders within the West African countries to address these prevailing issues will slow down economic activities, increase unemployment, discourage borrowing and investment. Addressing these challenges requires government of West African countries to adopt a comprehensive and tailored approach, taking into account the specific circumstances of each country. Monetary policy remains an essential strategy that when effectively utilized, it will help to overcome the hurdles encountered in the pursuit of better and resilient financial system in West Africa. The actualization of these policies in the region will significantly influence inclusive growth. It is in the light of the aforementioned factors, that this study intends to examine the effect of monetary policy on growth in the West African countries from 2000-2023.

2.0 Literature Review

2.1 Conceptual Clarification

Monetary Policy

Monetary policy can be referred to any policy measure designed by the federal government through the CBN to control cost availability and supply of credit. It is also referred to as the regulation of money supply and interest rate by the CBN in order to deepen financial system, control inflation, and to stabilize the currency flow in an economy". It is referred to as either being expansionary or contractionary, where an expansionary policy increases the total supply of money in the economy more rapidly than usual, and contractionary policy expands the money supply more slowly than usual or even shrinks it (Bank, 2018). Notably, monetary policy instruments/tools are divided into two: the Direct and indirect instruments. The direct monetary control tools are the reserve requirement, interest rate policy, sectoral allocation of credit, maximum credit expansion,

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stabilization of securities and loans to indigenous borrowers. While the indirect monetary policies include Open Market Operation (OMO), discount rate mechanism, liquidity ratio, selective credit control and cash reserve requirement (CRR). Similarly, Adofu and Wada (2021) viewed monetary policy as specific actions taken by the Central bank to regulate the value, supply and cost of money in the economy with a view to achieving government's macroeconomic objectives. A close observation of these definitions shows that monetary policy boils down to adjusting the supply of money in the economy to achieve macroeconomic goals as well as influence economic growth. The study conceptualizes monetary policy as a measure undertaken by the federal government of a nation through the apex bank to control the supply of money, credit facility, and exchange rate in order to achieve macro-economic goals.

Economic Growth

Economic growth is the sustained annual increase of an economy's real national income over a long period of time (Asteriou & Spanos, 2021). The common measure of economic growth across the world is the Gross Domestic Product (GDP) growth rate which is an annual rate that shows the changes in a nation's GDP as compared to the previous year. The term economic growth refers to the level of total output recorded in an economy within a particular time period which is usually one year. It represents the goods and services produced and sold as a result of the activities of its citizens and those residing in the country (Onyimadu, 2015). This simply means that the soundness of a nation's financial system helps in enhancing its economic growth. Therefore, the sum of all the measures of financial assets gives the approximate size of a nation's economic growth, this means that the widest range of such assets as broad money, liabilities of non-bank financial intermediaries, treasury bills, value of shares in the stock market, money market funds, etc., will have to be included in the measure of growth in the economy.

Economic growth can be conceptualized as a sustained increase in the actual output of goods and services and is proxied by GDP, it means that economic growth is the annual increase in real per capita income of a country over a period usually one year. It represents the goods and services produced and sold as a result of the activities of its citizens and those residing in the country. Another point that is worth mentioning in regard to the above adopted definition of economic growth is that it brings about an increase in national income, per capita income or output, and it must be a 'sustained increase' over a period of time. The unit of measurement is in percentage (%).

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2.2 Theoretical Framework

Quantity Theory of Money

This study is anchored on the Quantity theory of money propounded by Fisher (1911). The theory popularized the idea that changes in the stock of money supply will be translated into equi-proportionate change in the general price level. This is based on the assumption that at full employment, the level of transaction (national output) and velocity is constant, or at least change slowly. Thus, economic growth will be directly proportional with the quantity of money made available for individual borrowers and businesses. The starting point of the quantity theory of money is the popular identity:

$$MV=PY \quad (2.1)$$

Where M = money supply, V = velocity of money in circulation, Y = real national output, and P = aggregate price level. From the equation above, it can derive another equation as follows:

$$P=MV/Y \text{ or } V=PY/M \quad (2.2)$$

Sequel to the above, the proportional relationship between the money stock and general price level can be shown in the elasticity of the price level with respect to the money supply is:

$$E_{pm}=\partial P/\partial M.M/P \quad (2.3)$$

Differentiating equation 2.1 totally yields:

$$M\partial V+V\partial M=P\partial Y+Y\partial P \quad (2.4)$$

But Y and V are constant at full employment. That is, change in Y and V is zero at full employment. Thus equation 2.4 yields:

$$V\partial M=Y\partial P \quad (2.5)$$

$$\partial P/\partial M=V/Y \quad (2.6)$$

Substituting equation 2.6 into 2.3 yields:

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$E_{pm}=V/Y.\ M/P$ (2.7)

From equation 2.2, V=PY/M. Substituting this into equation2. 7 yields:

$E_{pm}=1/Y\ .\ PY/M.\ M/P=1$ (2.8)

Equation 8 above depicts that there is a direct proportional relationship between the general price level, growth of the economy (economic activities) and the growth rate of money supply, when velocity and output are constant. i.e., money supply influences economic activities in a country, it stimulates aggregate demand and economic expansion. The coefficient of money is estimated to be unity (1). The proportional relationship implies that a permanent increase in money supply leads to an equal increase in the economic growth rate.

2.3 Empirical Literature

Gad (2023) Conducted a comparable investigation across five Latin American nations concerning monetary policy, and economic growth utilizing a generalized method of moments (GMM) panel estimation technique. The results indicated that both monetary policy instruments significantly influence economic growth positively. Additionally, the study revealed that broad money supply and monetary policy rate are the major instruments that impact economic growth while cash reserve ratio and deposit interest rate were found to have less effect on economic growth. Ultimately, the study concluded that monetary policy has a positive and significant effect on economic growth.

Nguena (2023) examined the impact of monetary policy on economic development in West African and Economic Monetary Union. The study used an empirical investigation in both static and dynamic panel data econometrics, along with a hypothetical-deductive theoretical approach, to identify some stylised facts on this issue. It discovered that the region's monetary policy coordination has strengthened economic development in the countries. The study emphasised that economic development is impacted both directly and indirectly by an efficient monetary policy regime. The study found empirically that exchange rate, open market operation, and interest rate stimulates regional economic activity.

Aduda (2023) investigated the relationship between monetary policy reforms, e-banking and economic growth in Kenya. The study revealed that monetary policy and e-banking have strong and significant marginal effects on economic growth in Kenya. It also revealed that monetary policy reforms have significantly influenced the

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adoption of electronic banking amongst commercial banks and other financial institutions. The study stressed that a strong relationship exists between monetary policy reforms, e-banking, and economic growth in Kenya.

Ikpefan and Enobong (2023) examined the relationship between monetary policy, electronic banking and economic growth in Malaysia. Four measures of monetary policy were used, namely ratio of broad money to GDP, credit provided by the banking system, open market operation and deposit money banks to GDP. By employing the autoregressive distributed lag approach, the study found out that ratio of broad money to GDP, and credit provided by the banking system have a positive and statistically significant impact on economic growth in the long run. The results further indicated that a rise in investment will enhance economic growth in the long run. The study further stressed that credit provided by commercial banks stimulates aggregate demand in the country which in the long run enhanced economic growth; it added that deposit money by banks has a negative relationship with economic growth, but it was discovered to be statistically significant.

Adebola and Adewumi (2023) conducted research on the effect of monetary policy reforms, financial deepening on economic growth in Nigeria. The study revealed that open market operation, and monetary policy rate are the major instruments that influence economic growth in Nigeria, the study discovered that credit to the private sector enhances financial deepening. It concluded that financial deepening in the country is enhanced by credit to the private sector and market capitalization.

Stiglz (2022) examined the effect of monetary policy reforms, financial deepening on economic growth in Sub-Saharan African countries using Auto Regressive Distributed Lag (ARDL) model. The study found that there is a long-term relationship between economic growth, money supply, and market capitalization. The outcome of the study showed that broad money supply is the major influencer of economic growth followed by market capitalization and liquidity ratio. The study stressed that the financial system in SSA is weak due to her backwardness in the usage of modern machines which enhances financial deepening. The study further stressed that most African countries are faced with low financial system due to distortions in the market system and poor access to financial services.

Similarly, a study conducted by Bakang (2022) on the effect of monetary policy, financial deepening and economic growth in West Africa Economic and Monetary Union countries. The study used Generalized Moment Method (GMM) to examine the impact of financial deepening on economic growth in the region. The study revealed that monetary policy has yielded a dismal success due to low technological knowledge; further assertion made by the study revealed that financial deepening in the region affects growth significantly. The

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study concluded that monetary policy and financial deepening have positive and significant effects on economic growth in the region.

Adofu and Wada (2021) employed robust least squares using time series analysis for Nigeria covering 1990-2019 and the results revealed that monetary policy positively impacts financial deepening which in the long run influence economic growth positively. The study also established that monetary policy and economic growth have a positive and significant relationship. Similarly, Adeoye and Alenoghena (2019) investigated the relationship between monetary policy reforms, financial inclusion and economic growth in Nigeria using the time series data for the period. The results showed that monetary policy reforms and broad money supply have a positive and significant effect on financial inclusion. The study recommended that government should strengthen and improve monetary policy so as to enhance growth.

The study of Ndebbio (2004) was on the impact of monetary policy, financial deepening on economic growth in developing economies of sub-Sahara countries. The study used broad money supply/GDP and the growth rate in per capita income in its estimation of financial deepening. Three modelled equations were estimated with multiple OLS regression procedure. One of the findings is that financial deepening variables are neither statistically significant nor positive in explaining economic growth in the cross-country regression analysis. The study further revealed that money supply has a negative and insignificant effect on economic growth. The study concluded that financial deepening is not the determinant of economic growth in most of the Sub-Saharan African countries.

These previous studies emphasized on the relationship of monetary policy and economic growth and failed to look at the key instruments of monetary policy effect on economic growth in West African countries. In a bid to fill the gap, this study examined the effect of monetary policy instruments taking into account key variables such as exchange rate, monetary policy rate and broad money supply on economic growth in ECOWAS countries.

3.0 Methodology

3.1 Nature and Sources of Data

This study utilized panel data covering the period of 2000-2023 spanning 23 years. This period was considered appropriate because of the availability of comprehensive data on all the selected variables. The period was also

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considered because it evaluates the four major economic policies embarked upon by the Economic Community of West African States (ECOWAS). The data were basically sourced from World Development Indicators (WDI), and International Monetary Fund. The growth of West African countries was proxied by GDP growth rate while monetary policy was proxied by broad money supply, monetary policy rate, exchange rate, lending and deposit interest rate. The 16 countries considered for this study include Nigeria, Niger, Benin Republic, Burkina-Faso, Gambia, Ghana, Mali, Togo, Liberia, Senegal, Sierraleone, Mauritania, Guinea, Cote d'Ivoire (Ivory Coast), Guinea-Bissau, and Cape Verde. These countries were selected because the study intends to examine and evaluate the four major economic policies embarked upon by the West African Economic and Monetary Union bloc.

3.2 Model Specification

This study developed a model to examine the effect of monetary policy on economic growth in West Africa. The model is specified based on the monetary policy and economic growth theory and adapting the work of Stilgz (2022). The study examined the effect of monetary policy reforms, financial deepening on economic growth in Sub-Saharan African countries using ARDL. The model was specified as.

GDP = f (M2, DINTR, LINTR, EXCHR, DCREPRS) (3.1)

GDP represents Gross Domestic Product, M2 broad money supply, DINTR deposit interest rate, EXCHR exchange rate, and represents DCREPRS domestic credit to private sector. The model was modified by introducing monetary policy rate (MPR) in place of DCREPRS because it is one of the major tools of monetary policy authority. Therefore, the functional and econometric forms of the modified model is presented as thus:

$$\mathrm{GDP}_{it} = f(\mathrm{MPR}_{it}, \mathrm{M2}_{it}, EX\mathrm{CR}_{it}, \mathrm{DINTR}_{it}, \mathrm{LINTR}_{it}) \quad (3.2)$$

$$\mathrm{GDP}_{it} = \rho_0 + \rho_1 \mathrm{MPR}_{it} + \rho_2 \mathrm{M2}_{it} + \rho_3 EX\mathrm{CR}_{it} + \rho_4 \mathrm{DINTR}_{it} + \rho_5 \mathrm{LINTR}_{it} + \mu_i + \lambda_i + e_{it} \quad (3.3)$$

GDP is Gross Domestic Product which is the proxy for growth rate in West African countries; MPR represents Monetary Policy Rate; M2 represents Broad Money Supply, EXCR represents Exchange rate, DINTR represents Deposit Interest Rate; and LINTR represents Lending Interest Rate, i signifies the selected countries (i=1-16), t signifies the time specification, φ_0 is the constant term, $\rho_1 - \rho_5$ are the coefficients of the variables, μ_i represents the country-specific effects, λ_i stands for the time- specific effects and e_t is the error term.

Apriori Expectation: $\rho_1, \rho_3, \rho_4, \rho_5 < 0 \quad \rho_2 > 0$

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3.3. Panel ARDL Estimation Procedure

The study adopted the Panel Autoregressive distributed lag (PARDL) to examine the objective of the study. Within this framework there are three estimation techniques viz: pooled mean group (PMG), mean group (MG) and dynamic fixed effects (DFE) and the choice of the best estimation is based on the Hausman test.

The ARDL model is specified as follows:

$$\Delta yit = \sum_{k=1}^{p-1} \lambda ik \Delta yit - k + \sum_{k=0}^{q-1} \delta ik \, \Delta xi, t - k + \varphi i(yit - 1 + Bi\, xt) + \omega i + \varepsilon it \qquad (3.4)$$

In the model above $\lambda ik \Delta yit - k$ is the short run lag dependent variable, $\boldsymbol{\delta ik}$ are the short run coefficients of the independent variables, $\boldsymbol{\varphi i}$ is the cointegration term coefficient, $\boldsymbol{\omega i}$ is the fixed effects term and $\boldsymbol{\varepsilon it}$ is the idiosyncratic error term. In the PMG, the long run coefficients $\boldsymbol{Bi}$ are same across cross sections, while the short run coefficients $\boldsymbol{\delta ik}$ and cointegration coefficients $\boldsymbol{\varphi}$i vary across groups, in the mean group the long run, short run and cointegration coefficients vary across groups, in the dynamic fixed effects the short run, long run and cointegration coefficients are the same across groups.

Before conducting the ARDL analysis, there were some pre-estimation tests that were carried out. This includes the descriptive Statistics Test which considers the mean, the minimum and maximum values, followed by Pairwise Correlation, after which the Cross-section Dependence Test the (CDS) was conducted to investigate whether the variables are cross sectionally dependent or not. Thereafter, the Panel Unit Root Test using CIPS was performed on the model to ascertain the order of stationarity, the Panel Co-integration Analysis for the examination of long-term associations among non-stationary variables using Westerlund cointegration test which is suitable test in the presence of cross-sectional dependence. The test allows for heterogeneity in the cointegration relationship across individuals or groups, it makes it suitable for panels with diverse units. Also, the Westerlund test has been shown to have higher power than some other panel cointegration tests, especially in the presence of cross-sectional dependence. After the pre-estimation tests, the analysis was achieved through the use of the PMG, MG, Dynamic Fixed Effect (DFE), and Hausman Test was carried out to determine the best technique.

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4.0 Results and Findings

4.1 Presentation of Result

This section presents the results of the study, ranging from descriptive statistics, cross section dependence test, unit root test results, panel ARDL-Bounds test results, and Panel ARDL regression results.

Table 1: Descriptive Statistics

	GDP	M2	MPR	LENINTR	DINTR	EXCR
Mean	1.4387E+10	1.2197E+12	12.267205	8.02859772	7.74100473	672.681007
Maximum	2.7111E+12	44.552E+13	26.387988	48.0909546	30.8541667	10293.8768
Minimum	-30.145133	-30.8604547	3.076542	-123.625	0.66916629	23.8203333
Standard Dev.	1.93E+25	4.64E+27	5.547016	20.57192	3.67497	1578.74
Observations	368	368	368	368	368	368

Source: ***Author's computation using STATA version 15***

Table 1 shows the panel descriptive test result. The mean of GDP is 1.438 indicating a relatively low growth rate, the mean is within the minimum and maximum values, with a standard deviation of 1.93 implying moderate variation in economic growth in West Africa. The implication is that low growth rate in the region will discourage investment, both domestic and foreign which eventually will reduce capital inflows and limited economic expansion. It can exacerbate poverty and cause heavy reliance on external aid which in the long run can create over dependency and undermine domestic economic growth.

The mean of broad money supply (M2) is 1.219 with the range of 30 to 44% annual injection of money into West African countries economy, it also depicts variations of money supply across countries and the standard deviation of 4.64 money supply rate reflects moderate variability in money supply across observations. This implies that money supply is relatively stable with no extreme outliers or erratic fluctuations which suggest that it is a stable instrument of monetary policy that is effective in regulating the economy in West African countries. The mean of monetary policy rate (MPR) is 12.267 falls within the range of minimum and maximum values, but it has an insignificant variation (standard deviation 5.54) indicating thin disparities across West Africa. This could imply that the MPR value is likely to cluster around the mean indicating a relatively stable monetary policy stance. It also implies that apex banks in West African countries always adjust their MPR in response to changing economic conditions and moderate variability in MPR value reduces the risk of currency fluctuations, it also indicates a stable and responsive monetary policy which contributes to predictable interest rates, and stable economic growth.

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Lending interest rate (LINTR) has a mean of 8.028 which is slightly below the mean of MPR, it implies that commercial banks in West African countries usually set her interest rate within the threshold of the apex banks. The mean of LINTR is within the minimum and maximum values in absolute terms, it also revealed that there is significant variation (standard deviation 20.57) indicating wide disparities across West Africa. Deposit interest rate DINTR has a mean of 7.741 which is slightly below MPR and LENINTR imply that financial institutions charge higher amount when lending money to clients than deposit. DINTR shows that there is a wide variation between the minimum and maximum values. The mean for exchange rate is 672.68, which is the highest. The value falls within the minimum and maximum values, it also revealed that it has a significant variation (standard deviation 1578.74) indicating wide disparities across West African countries. This also implies that the exchange rate is the most viable instrument that influences economic activities within the region.

Table 2: Correlation Matrix

	GDP	M2	LINTR	EXCR	DINTR	MPR
GDP	1.000					
M2	-0.0122	1.000				
LEINTR	0.1036	0.8918	1.000			
EXCR	0.5035	0.5628	0.7357	1.000		
DINTR	0.1170	0.1909	0.2989	-0.1323	1.000	
MPR	0.4321	0.5714	0.0030	0.0127	0.5168	1.000

Source: ***Author's computation using STATA version 15***

Table 2 depicts that Gross Domestic Product (Gross Domestic Product) has a weak and negative correlation (r=-0.012), suggesting that inadequate supply of money in a given economy is associated with slow economic growth. The lending interest rate (LEINTR) also has a very weak correlation (r=0.103), indicating a similar but positive relationship compared to M2. Exchange rate (EXCR) has a positive and strong correlation (r=0.505), implying that volatile exchange rate greatly influences economic activities in West African countries. Deposit interest rate (DINTR) has shown that there is a positive and weak correlation (r=0.117), implying that DINTR has little effect on GDP, the correlation is similar to LINTR. Monetary policy rate (MPR) indicates a positive and moderate correlation (r=0.432), suggesting that MPR also influences GDP in West African countries.

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Table 3: Cross Section Dependence Test (CDS Test)

Variables	CD-Test	P-Value	Corr.	Abs (corr)
GDP	2.62***	0.009	0.050	0.191
M2	14.82***	0.000	0.282	0.465
LINTR	19.44***	0.000	0.370	0.484
lnEXCR	11.27***	0.000	0.215	0.548
DINTR	22.22***	0.000	0.423	0.564
MPR	5.540***	0.000	0.105	0.586

Note: Null hypotheses states that there is no cross-section dependence or correlation. *** indicates rejection of the null hypotheses at 1 percent level of significant.

Table 3 shows the results of the cross-section dependence test. The test indicated that GDP, M2, LINTR, EXCR, DINTR, and MPR have high positive values with P-values= 0.000, so we reject the null hypotheses of no cross-sectional dependence at 1% level of significance. This simply implies that there is cross section dependence in all variables. This also implies that a shock in one of the selected countries tends to be transmitted to other countries within the region. Based on these findings, the use of second-generation unit root test will be incorporated for GDP, M2, LINTR, lnEXCR, DINTR, and MPR.

Table 4: Pesaran's CADF Unit Root Test in the presence of Cross-sectional dependence

Variables	Levels(t)	1%	5%	10%	1st Diff	1%	5%	10%	Remarks
GDP	-2.715	-2.38	-2.2	-2.11	-3.977	-2.38	-2.2	-2.11	1(0)
M2	-2.132	-2.38	-2.2	-2.11	-4.708	-2.38	-2.2	-2.11	1(1)
LINTR	-2.151	-2.38	-2.2	-2.11	-5.053	-2.38	-2.2	-2.11	1(0)
EXCR	-2.767	-2.38	-2.2	-2.11	-4.227	-2.38	-2.2	-2.11	1(0)
DINTR	-3009	-2.38	-2.2	-2.11	-5.168	-2.38	-2.2	-2.11	1(0)
MPR	-1.242	-2.38	-2.2	-2.11	-4.016	-2.38	-2.2	-2.11	1(1)

Source: ***Author's computation using STATA version 15***

Table 4 reveals the panel unit roots test of the six variables in level and first difference for individual effect and trend. The table reveals that the variables are stationary at level and 1st difference. The table further shows that monetary policy rate (MPR) and broad money supply (M2) are not stationary at level while the rest variables were stationary at Pesaran level. However, after taking the first difference, the series all became stationary at first difference, the series became stationary as the null (H_0) of a unit root process is strongly rejected at 1%

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significance level. Therefore, the result implies that some variables are non-stationary and are integrated of order one. To account for the cross-section dependence, the panel cointegration test was conducted to examine whether long run relationship exists between the dependent variable and explanatory variables. The result of the cointegration test is shown in table 5.

Table 5: Co-integration Test for Pedroni's Residual and Westerlund.

Pedroni's Residual Co-integration Test: H0:38, Ha:19. Lags 1.

	Statistics	**P-value**
Modifies Phillips Perron, L	-8.770	0.000
Phillips-Perron L	-8.876	0.000
Augmented Dickey-Fuller L	-11.556	0.000
Westerlund Co-integration Test: H0:38, Ha:20		
	Statistic	**P-value**
Augmented Dickey-Fuller L	-4.185	0.000

Source: ***Author's computation using STATA version 15***

Pedroni and the Westerlund are the two main variants of panel co-integration test used in the study, and it was presented in table 5. In all the two cointegration test conducted, the null hypothesis is that there is no cointegrating relationship, because the P-values of all the three test was below the 5% (0.05) critical value, this implies that they were all found to be significant, suggesting rejection of the null hypothesis of no cointegrating relationship between gross domestic product and the independent variables such as M2, LINTR, EXCR, DINTR, and MPR employed in the model. It further depicts that monetary policy rate, broad money supply, exchange rate, lending interest rate, and deposit interest rate have significant effect on gross domestic product in West African countries. Based on this result, this study proceeded to establish the ARDL MG, and DFE long run and short run coefficients.

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Table 6: Mean Group Model Result

GDP	Coefficient	Std. Err	Z-stat	P>(Z)
Long-run Coeff				
Money supply (M2)	0.197	0.659	0.029	0.051
Lending interest rate (LINTR)	0.102	0.748	0.136	0.892
Exchange rate (EXCR)	0.014	0.043	0.326	0.000
Deposit interest rate (DINTR)	-2.194	0.854	-0.036	0.732
Monetary policy rate (MPR)	-0.052	0.067	0.034	0.761
Error Correction Coefficient (EC)	-1.131	0.051	22.175	0.000
Short-run Coefficient				
Money supply (M2)	-0.148	0.609	-0.243	0.065
Lending interest rate (LINTR)	-0.063	0.044	-0.143	0.054
Exchange rate (EXCR)	-1.215	0.362	-3.366	0.000
Deposit interest rate (DINTR)	2.185	0.999	2.187	0.063
Monetary policy rate (MPR)	0.164	0.145	1.131	0.051
Intercept	-17.351	1.830	-9.481	0.001

Source: ***Author's computation using STATA version 15***

Table 6 reveals the results for Mean Group (MG). In the long run, broad money (M2) supply has positive relationship across the model, it was discovered that M2 has a positive and significant effect on GDP. The lending interest rate (LINTR) reveals positive but insignificant impact on economic growth in PG. This shows that LINTR has a positive relationship with GDP but does not significantly influence economic growth in the region. Based on the apriori expectation stated in this study, it is expected that an increase in M2 will lead to an increase in economic growth while a decrease in lending interest rate will lead to significant increase in economic growth. This is because, decrease in lending interest rate will encourage borrowing which in the long run will stimulate economic activities. The results of M2 and LINTR has reveal that these variables do not conform to the stated apriori expectation in MG. Exchange rate (EXCR) reveals that it has a positive and significant impact on economic growth in MG. EXCR has a strong significant influence on economic growth in the long run. This implies that exchange rate is a viable monetary policy instrument that influences GDP in

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West African countries. This could also imply that exchange rate in West African countries greatly influence economic activities in the region. It further implies that an increase in the exchange rate will lead to a 14% decrease in GDP vice versa.

The study also reveals that deposit interest rates have negative and insignificant effect on economic growth in MG. This implies that decrease in deposit interest rate will discourage savings and lead to 2% decrease in GDP across West African countries vice-versa. It also implies that DINTR has less influence on economic growth compared to EXCR. This finding is similar to LINTR and this conforms to the apriori expectation of this study. Surprisingly, monetary policy rate that is one of the major instruments of apex banks in West African countries reveals a negative and insignificant impact on economic growth in the region while in DFE it was discovered that it exhibits positive but insignificant impact on economic growth in the long run. The long run result in MG shows that a decrease in MPR will lead to 5% increase on GDP in absolute terms. The long run results reveal that EXCR, and M2 are the major instruments of monetary policy that influence economic growth in the region. The error correction terms are significant in all models, confirming adjustment to long-run equilibrium.

In the short run, there is negative and insignificant effects of broad money supply (M2) on economic The study also discovered that there is negative relationship of LINTR with GDP but it has significant effect on GDP. This implies that if monetary policy authority effectively utilize lending interest rate, it will significantly influence economic growth in West African countries. EXCR reveals that it has significant effect in the short run but negative relationship exist with GDP. This shows that exchange rate volatility has significant impacts on economic growth in both long run and short run. DINTR reveals a positive but insignificant effects on GDP in the short run, this could imply that deposit interest rate is a viable instrument that can be used to control inflationary rate and encourage savings in the region. The study further reveals that MPR has positive relationship with GDP, it also shows that MPR is statistically significant in the short run. This implies that MPR is a viable instrument in the short run that influences economic growth in West African countries.

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Table 7: Dynamic Fixed Effects (DFE) Model Result

GDP	Coefficient	Std. Err	Z-stat	P>(Z)
Long-run Coeff				
Money supply (M2)	0.051	0.224	0.228	0.051
Lending interest rate (LINTR)	0.238	0.437	0.545	0.508
Exchange rate (EXCR)	-0.089	0.033	-2.697	0.000
Deposit interest rate (DINTR)	-4.036	0.825	-4.892	0.003
Monetary policy rate (MPR)	0.034	0.662	0.051	0.132
Error Correction Coefficient (EC)	-0.503	0.026	19.346	0.000
Short-run Coefficient				
Money supply (M2)	0.017	0.448	0.038	0.248
Lending interest rate (LINTR)	-1.289	0.992	-1.299	0.970
Exchange rate (EXCR)	-3.024	0.682	-4.434	0.000
Deposit interest rate (DINTR)	-0.057	0.199	-0.286	0.912
Monetary policy rate (MPR)	2.252	0.541	4.163	0.000
Intercept	-18.985	1.983	-9.574	0.001
Hausman Test Result				
MG VS DFE Chi2(5)	Chi2=10.07	Prob>chi2	**0.138** Decision=DFE	

Source: ***Author's computation using STATA version 15***

Table 7 reveals the results for Dynamic Fixed Effects (DFE). In the long run, broad money (M2) supply has positive and significant effect on GDP across the model. This implies that M2 has positive and significant effect on GDP in MG and DFE. However, it was discovered that M2 has positive and insignificant effect on GDP in the short run. Lending interest rate (LINTR) reveals positive but insignificant impact on economic growth in the long run while negative and insignificant effect was found to exist with GDP in the short run. This clearly depicts that LINTR has the potential of being a viable monetary policy instrument, LINTR can be used in the long run stimulate economic activities, encourage borrowing and investment. Based on the apriori expectation

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stated in this study, it is expected that an increase in M2 will lead to increase in economic growth while a decrease in lending interest rate will lead to significant increase in economic growth. This is because, decrease in lending interest rate will encourage borrowing, cause an increase in aggregate demand which will eventually stimulate economic activities in the long run, unfortunately the above result does not conform to the stated apriori expectation. This implies that M2 and LINTR have not been effectively utilized by the central banks to stimulate economic growth in West African countries.

Exchange rate (EXCR) reveals that it has negative and significant impact on economic growth in both the long and short run. The result has revealed that EXCR has a strong and significant influence on economic growth. This implies that exchange rate is a viable monetary policy instrument that influences GDP in West African countries. This could also imply that exchange rate in West African countries greatly influence economic activities in the region. The study also revealed that deposit interest rate has negative but significant effect on economic growth in the long run while in the short run it has negative and insignificant effect on GDP. This implies that DINTR has the least influence on economic growth compared to other monetary policy instruments used in this study. This finding is similar to LINTR and this conforms to the apriori expectation of this study. Monetary policy rate was discovered to have positive and insignificant effect on GDP in the long run while in the short run, it has positive and significant influence on economic growth. The result has shown that MPR is one of the major instruments used by the apex banks in West African countries to stimulate economic activities. Though MPR was insignificant in MG, but it reveals that it has positive and significant effect on GDP in DFE.

The error correction coefficient is having a negative sign, but its p-value of (0.000) indicates that it is significant; it suggests that any deviations from the long run equilibrium is adjusted at the 50% adjustment speed from the period 2000 to 2022. The EC significant level implies a significant long run co-integration. It also indicates that we can deduce joint causality of the independent variables jointly influence the dependent variable. The Hausman test enables us to have a check to know whether we incorporated the right estimator in our model. Therefore, since the p-value (0.138) of the Hausman test is above the 5% critical value it implies that the mean group is not the appropriate estimator to adopt but rather the dynamic fixed effect (DFE). Therefore, the dynamic fixed effect model is the preferred model based on the Hausman test.

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4.1 Discussion of Findings

Specifically, the study used the DFE to estimate both long run and short-run effect of monetary policy on economic growth in West African countries. The study discovered that broad money supply (M2) has positive relationship with economic growth in both long and short run, the study found that M2 has significant effect on economic growth in the long. This simply implies that injection of money into an economy influences economic activities which eventually enhances economic growth in the long run. It can be deduced that M2 is one of the viable instruments that significantly impacts economic growth in West African countries. This finding is in consonance with work of Adeoye and Alenoghena (2019), they investigated the relationship between monetary policy reforms, financial inclusion and economic growth in Nigeria and the study discovered that money supply significantly influences economic growth.

Lending interest rate (LINTR) was discovered to have positive but insignificant effect on economic growth in the long run while in the short run it was found that it has negative and insignificant effect on economic growth. This implies that one of the reasons why most West African countries are experiencing stifling growth rate is because LINTR does not positively and significantly influence GDP. This could be as a result of the threshold set by financial institutions in the region that discourage borrowers. It is worthy of note that when financial institutions issue out loans to borrowers at an affordable interest rate, it will stimulate aggregate demand and investment which in the long run it will enhance economic growth. However, this study discovered that LINTR does not significantly affect economic in West African countries. This finding is in line with the work of Bakang (2022), the study examined the effect of monetary policy, financial deepening and economic growth in West Africa Economic and Monetary Union countries and discovered that liquidity ratio and lending interest rate does not significantly influence economic growth SSA countries.

Similarly, this study found that exchange rate (EXCR) has significant impact on economic growth in both long and short run. The study discovered that EXCR is the most viable instrument that influence economic activities in the region. it is expedient to buttress that most African countries depend largely on import goods especially capital goods, and any nation that imports more than she exports, such nation will be at the negative receiving end. Meaning, import dependent nations usually are bedeviled with the challenge of exchange rate volatility which usually affect international trade. Also, deposit interest rate was discovered to have negative but significant effect on economic growth in the long run while in the short run it had negative and insignificant effect on GDP. This implies that DINTR does not positively influence economic growth in West African countries. This result is in conformity with the study of Ikpefan and Enobong (2023), the study examined the

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relationship between monetary policy, electronic banking and economic growth in Malaysia and discovered deposit interest rate has less effect on economic growth while exchange rate was discovered to have great influence on growth.

Monetary policy rate was discovered to have positive and significant effect on economic growth in the short run while in the long run it also had positive but insignificant impact on GDP. However, the study found that MPR is one of the major instruments used by apex banks in West African countries to achieve macroeconomic goals. It can be deduced that MPR is one of the viable instruments that influence economic growth in the region. this finding can be backed up with the finding of Adofu and Wada (2021) who examined the effect of monetary policy on financial deepening and Aduda (2023) who investigated the relationship between monetary policy reforms, e-banking and economic growth in Kenya. They discovered that MPR influence financial deepening and economic growth.

5. Conclusion and Recommendations

This study provided critical insights into the dynamics of monetary policy and economic growth in West African countries covering the period of 2000-2023. The outcome of the cross-sectional dependency indicates the presence of cross-sectional dependence among the variables, and this resulted to the incorporation of the second-generation unit root test. The cointegration test of Pedroni and Westerlund, shows that long run relationship existed between the dependent variable and the independent variables, and this prompted this study to adopt the dynamic fixed effects estimator. Based on the regression result, it was revealed that broad money supply had positive and significant effect on economic growth in the long run while in the short run it was discovered that it had positive but insignificant effect on growth. Lending interest rate had insignificant effect on economic growth both in the long and short run. Consequently, it was discovered that exchange rate is the most viable instrument that influence economic activities in the region. it was revealed that exchange rate had positive and significant impact on growth in the short run while in the long run it had negative but significant effect on economic growth in West African countries. The outcome underscores the critical needs for effective implementation of monetary policy and other complementing policies so as to enhance economic growth in West Africa.

The study recommends that countries in West Africa through the central banks should maintain low interest rate and MPR during economic downturns to encourage borrowing and investments by businesses and individuals, this will stimulate economic activities in the region. Also, there should be proper coordination of deposit and

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lending interest rate to stimulate economic growth and encourage investment. Policy makers within the region of West African countries and financial institutions should manage and implement flexible exchange rates regimes. This will allow currencies to adjust to changes in economic conditions, promote exportation and promote economic stability.

The government and central bank governors within West African countries should increase the money supply especially in countries with high rate of unemployment, this will make funds readily available for lending and investment. Increased supply of money will also help in stimulating economic activities. Policy makers and financial institutions managers should carefully manage deposit interest rate and lending interest in such a way that it will attract borrowers.

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