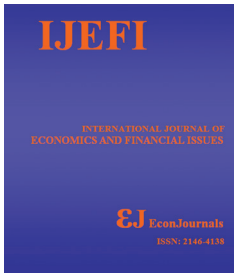

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Building Resilience for Transformational Recovery: An Analysis of Monetary Policy and Economic Growth in West Africa before and Following the COVID-19 Periods

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ABSTRACT

This study investigates the effectiveness of monetary policy in the pre and post COVID-19 periods in West Africa. The panel fully modified ordinary least squares (FMOLS) was used. Before the estimation, the correlation analysis and summary statistics were done. Unit root test was carried out to ascertain whether the data series are stationary or not and the panel cointegration test was used to determine the existence of long run relationship among the variables. The findings indicate that monetary policy has 12.3% negative and significant effects on economic growth in the periods before COVID-19, while it has insignificant effect after the pandemic. Furthermore, monetary policy has 21.01% negative and significance effects on inflation in the pre COVID-19 era, while it has 52.5% negative and significant effect on inflation after the pandemic. This indicates that the effectiveness of the central bank's efforts to affect and control inflation has declined after COVID-19. Causes for this could include the pandemic's effect on supply chains, demand, and the weaker economic environment. On this basis, the monetary authority should create an economic environment that will play a crucial role in determining the effectiveness of monetary policy in the post-COVID-19 periods to foster economic recovery.

Keywords: Monetary Policy, Lending Rate, Inflation Rate, After Pandemic, Economic Growth
JEL Classifications: E52, E58, 042.

1. INTRODUCTION

Africa's real GDP growth slowed to 3.5% in 2015 and 2.15% in 2016 before the pandemic, in part because of the dramatic drop in oil prices and other regional shocks like the drought in East and Southern Africa. After this, growth rates rose to 3.6% in 2017, 3.5% in 2018, and 3.4% in 2019, before dropping to 2.1% in 2020 due to the COVID-19 pandemic. Targeted and less restricted lockdowns helped many West African countries, notably Benin (2.3%) and Niger (1.2%), maintain solid growth in 2020. Others, such as Nigeria (−3%), experienced recession by the year 2020. In 2021, In the 2020-2021 period, Nigeria saw a contraction of 3.6% in its economy as a result of the COVID-19 pandemic's influence on both world oil prices and domestic economic activity, as stated by Sami and Taiwo (2023) and Olujobi et al. (2022). The nation had a decline in its gross domestic product (GDP) of 6.1% during the second quarter and 3.62% during the third quarter of 2020, followed by a modest recovery of 0.1% in the fourth quarter of the same year. The pandemic exerted a significant impact on the gross domestic product, resulting in a reduction in 2020. Nevertheless, the Nigerian economy saw a growth rate of 3.62% in 2021, primarily driven by rising oil prices and improvements in the services and manufacturing sectors. This development contributed to West Africa's total growth of 4.3% in 2021 (AEO, 2019–2022), with a further increase expected in 2023.

To support economic growth and sustainable development, many African nations increased policy interest rates in 2022 to combat

inflation and exchange rate pressure, but fiscal space remained constrained (Olaoye et al, 2024). Various central bank policies eased monetary conditions. These include liquidity injection (Nigeria), reducing reserve requirements (Gambia), revising provisioning and classification rules for specific loan categories (Ghana), loan deferrals (Serra Leone), and limited forbearance on lending policies in hard-hit sectors of the economy (IMF, 2021). The monetary policy committees (MPCs) believed that lowering policy rates would reduce liquidity pressures and improve output growth by increasing credit creation (Central Bank of Nigeria, 2022). This condition worsens inflation in some countries with attendant effects on growth. Due to the COVID-19 pandemic and frequent macroeconomic fluctuations in West Africa, inflation and currency prices have risen, affecting growth. According to Lepetit and Fuentes-Albero (2022), pandemics may make monetary policy less effective when households factor disease risk into their decisions. To throw light on this issue, this study investigates specifically the effects of monetary policy on economic growth and inflation in the selected West African countries before and after the COVID-19 periods.

2. LITERATURE REVIEW

2.1. Stylized Facts about Monetary Policy and Economic Growth in Anglophone Countries of West African Sub-region

According to Ufoeze et al. (2018), monetary policy is a tool that central banks and other monetary authorities use to control the money supply and promote economic growth. The procedure entails adjusting monetary policy instruments to better control the money supply in the economy. Maintaining price and exchange rate stability is critical for a nation's economic growth and international competitiveness, and monetary policy is a key tool for doing so (Adegbite and Alabi, 2013). When it comes to promoting economic growth, keeping prices stable, establishing balance of payments equilibrium, and other macroeconomic goals, it is up to the monetary authorities to use monetary policy. These goals can be attained by the use of either inflationary or deflationary monetary policy, depending on the state of the domestic economy. Reducing the money supply is one goal of contractionary policy, while expansionary policy is used to stimulate the economy and reduce unemployment during downturns (Chuttoo, 2020; Essien et al, 2016). Countries have increasingly turned to monetary policy as a means of achieving long-term economic growth and development by effectively managing the economy to accomplish intermediate and operating goals (Mehar, 2023). Liberia's current monetary policy regime is exchange rate targeting, while Nigeria's, Sierra Leone's, Guinea's, and the Gambia's are monetary targeting, and Ghana's is inflation targeting (Ajayi and Akutson, 2023).

The Bank of Ghana uses interest rate control as its primary tool of monetary policy operation. In this way, the Bank sets its policy rate, known as the Monetary Policy Rate (MPR), and makes sure that the overnight interbank rate is well aligned with the MPR as stated by the Bank of Ghana (2023). The Central Bank of Nigeria (CBN) uses a variety of monetary policy tools, including open market operations (OMO), discount window operations, moral persuasion, currency sales, and the standing facility, which it introduced in 2006. According to Bangura et al. (2021), Sierra Leone uses multiple policy tools to affect the quantity-based nominal anchor, or monetary aggregates. Reserve requirements, the Cash Reserve Ratio (CRR), the Liquidity Ratio (LR), and the purchase and sale of foreign currency are all examples of such tools. Depending on the intermediate and operating goals, monetary policy can be implemented through a variety of tools. These goals are consistent with what is expected from inflation and growth in the economy.

Economic growth is commonly perceived as a favourable phenomenon due to its capacity to generate employment opportunities, increase wages, and improve individuals' quality of life. (Croes et al. 2018; Chand et al., 2017). However, it is important to note that growth in the economy can also lead to negative consequences such as inflation and other unforeseen outcomes (Ekinci et al., 2020). Inflation occurs when there is a gradual increase in the average price of goods and services over a period of time. When there is excess demand for goods and services over supply, rising prices can reduce the purchasing power of money. This phenomenon has the potential to negatively impact consumer confidence and investment, thereby exacerbating the hindrance to economic growth. Before the 2020 COVID-19 outbreak, some countries had been experiencing a rising inflation rate, which had been heightened due to the significant adverse effects of the pandemic. The aforementioned outcome can be attributed to various factors, such as a decrease in international trade, disruptions in the supply chain, a loss in tourist activity, and a contraction in domestic consumption in countries like Nigeria, Ghana, Sierra Leone, Gambia, and Liberia. Nigeria is an illustration of a nation going through a recession; its GDP growth rate dropped from 2.27% in Q4 2019 to −6.10% in Q2 2020. In the interim, the escalation of food prices and the devaluation of currency contributed to a surge in inflation, which rose from 11.98% in December 2019 to 14.23% in October 2020, as reported by the Central Bank of Nigeria (2020). According to SSG (2021), there was an increase in inflation from 7.9% in December 2019 to 10.4% in December 2020. Simultaneously, Ghana had a decline in its GDP growth rate from 6.5% to 0.9%.

The COVID-19 outbreak resulted in significant declines in both economic growth and inflation rates in Sierra Leone and Liberia. Given the pre-existing economic and social challenges faced by these nations, the impact of the COVID-19 pandemic on economic growth and inflation was particularly burdensome. Nigeria's economy is currently facing several challenges, including a significant level of debt, an expanding trade deficit, and the limited availability of foreign investment. The Ghanaian economy, already grappling with the aftermath of a prolonged civil war, experienced a notable impact from the substantial levels of public debt. In response to the economic challenges presented by the COVID-19 pandemic, the governments and central banks of these countries implemented a range of monetary policy measures (Adam et al., 2022). The plan encompassed a series of measures, including the reduction of interest rates, the augmentation of funding opportunities for enterprises, and the implementation of quantitative easing. Nevertheless, the efficacy of these strategies in achieving economic stabilisation and controlling inflation was

impeded by factors such as limited fiscal resources, inadequate foreign investment, and weak institutional capabilities. Amidst a period of worldwide turmoil, the COVID-19 pandemic has brought attention to the significant challenges faced by governments in maintaining economic stability and promoting growth. In order to address these challenges, policymakers must adopt a holistic strategy that integrates robust monetary policy measures. This approach is crucial for developing resilience for transformative recovery and sustained economic growth.

2.2. Theoretical Framework

The conventional interest rate channel of monetary policy transmission serves as the basic theoretical framework of our investigation. Changes in monetary policy, such as interest rate changes, are transmitted across the economy and have an effect on macroeconomic indicators including GDP, unemployment, and inflation. This process is known as "monetary policy transmission." One of the most important ways in which monetary policy is transmitted is through the interest rate channel. Ajayi (2007) asserts that the interest rate channels are important to the basic Keynesian IS-LM model and have been for several decades. Because the IS-LM paradigm helps explain how changes in monetary policy might affect output and employment via the interest rate channel, it is widely used to analyse the effects of interest rates on the economy.

The CBN (2023) explains how the interest rate channel functions and points out that variations in the central bank's interest rate have an impact on the rates at which commercial banks and other financial institutions charge for loans and pay on deposits. Reducing interest rates makes borrowing money cheaper, which in turn leads to more expenditure by consumers and businesses. This in turn increases production and output by stimulating the demand for products and services. In addition to boosting economic activity, lower interest rates encourage investment in physical capital and housing. Lowering interest rates through monetary policy stimulates economic activity, which can increase aggregate demand and inflation. This is because lower interest rates reduce the cost of borrowing, making it easier for households and firms to finance spending and investment. As a result, demand for goods and services increases, leading to upward pressure on prices. However, a rise in interest rates can have the opposite effect by making borrowing more expensive, which in turn can restrict consumer expenditure on goods and services, which in turn can have a negative impact on inflation and output.

Monetary policy works by influencing interest rates, which in turn affect borrowing and spending by households and businesses. When interest rates are low, borrowing and spending tend to increase, which can boost economic growth. However, if inflation is high, lenders may demand higher interest rates to compensate for the decreased purchasing power of the money they will be repaid with in the future. This can limit the effectiveness of monetary policy in stimulating economic growth, as higher interest rates can make borrowing and spending more expensive, thus limiting growth. Additionally, high inflation can lead to uncertainty and volatility in financial markets, which can negatively affect economic growth. Businesses may become hesitant to invest or expand in such an environment, which can limit job creation and economic growth. Therefore, controlling inflation is an important aspect of achieving sustained economic growth, and policymakers may need to take steps to control inflation before monetary policy can be effective in promoting growth. Awopegba et al. (2022) note that the interest rate channel is a crucial instrument for central banks in attaining their macroeconomic goals as it has a considerable impact on the economy as a whole.

2.3. Empirical Review of the Relationship between Monetary Policy and Economic Growth

In the existing literature, the effects of monetary policy on economic growth have been shown to be different. This is because of differences in how monetary policy is evaluated and the presence of moderating factors that affect the relationship between monetary policy and economic growth. Several studies have examined the impact of monetary policy on economic growth, finding contrasting results depending on the specific variables used. Specifically, the use of interest rates as a tool of monetary policy has been associated with a negative influence on economic growth in certain studies. Conversely, the use of the money supply as an indicator of monetary policy has been found to have a beneficial effect on economic growth in other studies. In their empirical study, Ovat et al. (2022) conducted an evaluation of the impact of the monetary policy rate (MPR) on the economic growth of Nigeria. The study utilised annual data from the period of 2006-2020 and employed the two-stage least squares (2SLS) method. The results of the study indicate that there is a statistically significant negative relationship between the monetary policy rate and economic growth.

Amarasekara (2019) conducted an analysis utilising the recursive VAR and semi-structural VAR methods on a dataset consisting of monthly observations. The objective of the study was to evaluate the impact of monetary policy on both economic growth and inflation within the context of Sri Lanka. The findings from the recursive and semi-structural vector autoregression (VAR) models indicate a statistically significant negative effect of interest rates on economic growth. In their study, Obeid and Awad (2017) employed many variables, including money supply, to examine their research question. The measurement of monetary policy in Jordan involves the consideration of the required reserve ratio, rediscount rate, and overnight interbank lending rate. The findings of the Vector Error Correction Model analysis indicate that the rediscount rate exhibits a negative impact on economic growth, as assessed through the examination of quarterly data spanning the period from 2005 to 2015. Gul et al. (2017) have substantiated the notion that the monetary policy rate exerts a negative and statistically significant influence on output. Additionally, their analysis reveals a robust positive impact of the money supply on output when examining the effects of monetary authorities' actions on macroeconomic variables such as GDP. Njie and Badjie (2021) employ the Vector Error Correction Model (VECM) to investigate the impact of monetary policy on economic growth in Gambia, with the interest rate serving as the chosen metric for measuring monetary policy. Based on empirical evidence, it is seen that there is no immediate correlation between the expansion of the Gambian economy and interest rates in the short term. However, a long-term relationship

is identified, indicating a causal link between real interest rates and economic growth.

Various methodologies have been employed to examine the effects of monetary policy on global economic growth. Moursi and El Mossallamy (2019) employed Bayesian methodology to estimate a dynamic stochastic general equilibrium (DSGE) model in order to examine the impact of monetary policy on inflation and economic growth in Egypt. The researchers discovered that the effect of a negative shock on monetary policy has a considerably greater influence on output compared to its impact on inflation. This suggests that the implementation of expansionary monetary policy has the potential to foster economic growth while mitigating excessive inflationary pressures. In their study, Victor et al. (2022) utilised the autoregressive distributed lag (ARDL) approach to investigate the effects of monetary policy on economic growth in Nigeria, both in the short run and the long run. The findings of the study indicate that there is a lack of substantial correlation between economic growth and the variable under investigation, which has a negative effect. However, it is seen that the money supply variable has a statistically significant and beneficial impact on long-term economic growth.

In Sierra Leone, Tarawalie and Kargbo (2020) conducted an empirical study that investigated the comparative efficacy of fiscal and monetary policies in stimulating economic growth. The authors employed the autoregressive distributed lag (ARDL) approach to analyse the relationship between these policies and economic growth. The results of the study indicate that there is a positive and statistically significant relationship between money supply and economic growth in the long term, as well as the influence of other variables.

In their study, Ufoeze et al. (2018) employed the ordinary least squares (OLS) technique to examine the impact of monetary policy on economic growth in Nigeria. The researchers considered several monetary policy variables, including the monetary policy rate, money supply, exchange rate, lending rate, and investment. The findings of the analysis indicate the presence of a long-term relationship between the variables under consideration. Specifically, the study reveals that the monetary policy rate, interest rate, and investment exhibit an insignificant positive impact on economic growth in Nigeria. On the other hand, the study highlights that money supply and exchange rates have a large and positive influence on economic growth. Similarly, Havi and Enu (2017) conducted a study in Ghana to assess the comparative significance of monetary policy and fiscal policy on the country's economic growth from 1980 to 2015. Employing the ordinary least squares (OLS) method, the findings indicated that the money supply, as an indicator of monetary policy, had a statistically significant positive effect on the Ghanaian economy.

In their study, Abille and Mpuure (2020) found statistically significant negative short-term effects and positive long-term effects of the money supply on economic growth. The researchers utilised yearly data spanning from 1983 to 2017. In their study, Ubi-Abai and Ekere (2018) employed the dynamic panel general method of moment to examine the impact of fiscal and monetary policies on economic growth in a panel of 47 sub-Saharan African economies. The time frame for their analysis spanned from 1996 to 2016. The results indicated a positive relationship between monetary policy, as measured by money supply, and economic growth within the sub-region. However, Ugwuanyi et al. (2018) conducted a study in the same year to investigate the effects of monetary policy on economic growth. The researchers employed the error correction model (ECM) to analyse time-series data spanning from 1990 to 2017. The researchers revealed that the money supply in Nigeria exhibits a beneficial and statistically significant insignificant impact on the country's economic growth. Furthermore, Mugume (2018) conducted an analysis of the monetary transmission mechanisms in Uganda by employing a five-variable non-recursive vector autoregression (VAR) model. The variables used as proxies for monetary policy were wide money and the 3-month T-bill rate, which represents the lending rate. The study utilised quarterly data from the period spanning from 1999 Q1 to 2014 Q1. The findings of the study indicate that variations in the money supply did not yield any statistically significant impact on output. This observation highlights the diverse effects of monetary policy instruments on economic output within the sub-Saharan African region.

Furthermore, Faux (2022) examines the impact of alterations in monetary policy on real GDP growth in Sierra Leone. The study investigates the transmission channels of monetary policy, including interest rates, the real effective exchange rate, credit to the private sector, and lending rates. To mitigate issues related to endogeneity and serial correlation, the study employs the fully modified ordinary least square (FMOLS) method. The findings of the study demonstrate the efficacy of monetary policy interventions in fostering economic growth in Sierra Leone, as evidenced by their impact on real effective exchange rates and credit allocation to the private sector within the monetary sector.

The influence of monetary policy on economic growth has been suggested to be contingent upon various factors, including bank lending and financial development. In their recent study, Sena et al. (2021) conducted an investigation into the relationship between financial development, monetary policy efficacy, and economic growth in Ghana. The researchers employed the autoregressive distributed lag (ARDL) approach to analyse the joint impact of these factors on Ghana's economic growth. Similarly, Sena (2018) demonstrated that the influence of monetary policy on economic growth, mediated by financial development, is both positive and statistically significant. This finding implies that the presence of financial development enhances the effectiveness of monetary policy in driving economic growth within the context of Ghana. According to Abuka et al. (2019), the relationship between monetary policy and actual economic activity is contingent upon the prevailing conditions of the banking sector. The study highlights that there is a substantial real impact on the bank lending channel, specifically in developing nations. The reason behind this phenomenon is that as interest rates rise, it leads to a decrease in the availability of bank credit, both in terms of quantity and quality. Additionally, there is a notable impact on the rates at which retail loans are offered to consumers.

Ajayi and Akutson (2023) demonstrate that the utilisation of the monetary policy rate in relation to the money supply yields a higher degree of efficacy in attaining price stability within the West African monetary zone. In this study, Ayodeji and Oluwole (2018) examine the impact of government monetary policy on economic growth. They employ a multi-variable regression analysis to analyse the relationship between monetary policy instruments, including money supply, exchange rate (ER), interest rate, and liquidity ratio, and economic growth. The application of an error correction model revealed that the relationship between money supply and economic growth is positive, albeit statistically insignificant. In general, the review has demonstrated a varied impact of monetary policy on economic development throughout different time periods and through the use of diverse estimation methods. Furthermore, this study demonstrates the divergent patterns of monetary policy implementation observed in various countries. Furthermore, it has been acknowledged that other factors, such as bank lending and financial development, play a significant role in moderating the relationship between monetary policy and economic growth. To address this issue further, this study examines additional variables like loan rates and consumer spending as moderators to be able to gauge how much economic production and inflation will change as a result of monetary policy adjustments.

3. METHODOLOGY

The aim of this study is to investigate the effectiveness of monetary policy on economic growth and inflation in these West Africa economies (Nigeria, Gambia, Ghana, Sierra Leone and Liberia). The scope of the study will measure the period before COVID-19 i.e., from 2015-2018 and after COVID-19 i.e., 2019-2022 using quarterly data that were be obtain from IFS database via these variables: monetary policy rate, inflation rate and exchange rates. To investigate the effects of monetary policy on inflation and economic growth, in selected African economies, the following models were specified based on the theoretical framework underpinning the economic intuition of this study. Using the economic growth as measured by GDP per capita (Peterson, 2017) as dependent variable, the model before COVID-19 is expressed as;

$$LGDPC_{itBC} = f(MPR_{it}, LR_{it}, LCPI_{it}, LCEX_{it}, \varepsilon_{it}) \quad (1)$$

$$LGDPC_{itBC} = \lambda_0 + \lambda_2 MPR_{it} + \lambda_3 LR_{it} + \lambda_5 LCPI_{it} + \lambda_6 LCEX_{it} + \varepsilon_{it} \quad (2)$$

The model after Covid-19 is expressed as;

$$LGDPC_{itAC} = f(MPR_{it}, BLR_{it}, LCPI_{it}, LCEX_{it}, \varepsilon_{it}) \quad (3)$$

$$LGDPC_{itAC} = \lambda_0 + \lambda_1 MPR_{it} + \lambda_2 LR_{it} + \lambda_3 LCPI_{it} + \lambda_4 LCEX_{it} + \varepsilon_{it} \quad (4)$$

The effect of monetary policy on inflation

Using log of consumer price index (LCPI) as dependent variable, the model before COVID-19 is expressed as;

$$LCPI_{itBC} = f(MPR_{it}, LR_{it}, LGDPC_{it}, LCEX_{it}, \varepsilon_{it}) \quad (5)$$

$$LCPIC_{itBC} = \lambda_0 + \lambda_1 MPR_{it} + \lambda_2 LR_{it} + \lambda_3 LGDPC_{it} + \lambda_4 LCEX_{it} + \varepsilon_{it} \quad (6)$$

The model after COVID-19 is expressed as;

$$LCPI_{itAC} = f(MPR_{it}, LR_{it}, LGDPC_{it}, LCEX_{it}, \varepsilon_{it}) \quad (7)$$

$$LCPI_{itAC} = \lambda_0 + \lambda_1 MPR_{it} + \lambda_2 LR_{it} + \lambda_3 LGDPC_{it} + \lambda_4 LCEX_{it} + \varepsilon_{it} \quad (8)$$

Where

LR=Bank lending rates

LGDPC=GDP per capita

MPR=Monetary Policy rate

LCPI=Log of Consumer Price Index capture inflation rate

LCEX=Log of consumer Expenditure of household

4. RESULTS

4.1. Summary Stat for Monetary Policy and Economic Growth (Before and After COVID-19)

Table 1 present the summary statistics of the variables employed in the before COVID-19 model. These variables include GDP per capital (GDPC), monetary policy rate (MPR), lending rate (LR), inflation rate as measured by consumer price index (CPI) and consumer expenditure (CEX). The average GDPC is $2600.532 with minimum of $484.4465 and maximum of $9788.984, while the standard deviation is $3164.178. This means that there is wide variation in the GDPC of countries in West Africa. This is supported by the positive value of the skewness and the non-normal distribution of the data series as indicated by the Jarque Bera statistics. The average MPR is 16.67% with minimum of 9.5% and maximum of 26%, while the standard deviation is 4.73%. This means that the positive value of the skewness and the normal distribution of the data series as indicated by the Jarque Bera statistics indicate that there is moderate variation in the monetary policy rate of countries in West Africa. The average LR is 20% with a minimum of 13.2% and maximum of 42% while the standard deviation is 7.14%. This means that the positive value of the skewness and the normal distribution of the data series as indicated by the Jarque Bera statistics indicate that there is moderate variation in the Lending rate of countries in West Africa. The average CPI is 170.5299 with a minimum of 126.3524 and maximum of 259.8864 while the standard deviation is 38.18494. This means that the positive value of the skewness and the normal distribution of the data series as indicated by the Jarque Bera statistics indicate that there is moderate variation in the Consumer price index rate in countries in West Africa. The average CEX is $76.93375 billion with a minimum of $1.125000 billion and maximum of 387.4000 while the standard deviation is $131.7683 billion. This means that there is a wide variation in the CEX of countries in West Africa. This is supported by the positive value of the skewness and non- normal distribution of the data series as indicated by the Jarque Bera statistics.

Table 1: Summary statistics: Monetary policy and economic growth (before and after COVID-19)

Summary statistics	GDPC	MPR	LR	CPI	CEX_B
Before COVID 19					
Mean	2600.532	16.67463	20.57140	170.5299	76.93375
Median	799.9449	15.02500	17.22861	156.0069	3.871500
Maximum	9788.984	26.00000	42.84000	259.8864	387.4000
Minimum	484.4465	9.500000	13.25019	126.3524	1.125000
SD	3164.178	4.735509	7.147815	38.18494	131.7683
Skewness	1.400021	0.454582	1.507519	0.921275	1.494500
Kurtosis	3.197836	2.154833	5.255075	2.724919	3.394247
Jarque-Bera	26.26458	5.136284	47.25273	11.56886	30.29852
Probability	0.000002	0.076678	0.095000	0.083075	0.000000
Observations	80	80	80	80	80
After COVID-19					
Mean	2327.055	13.92888	19.07476	289.0599	71.73355
Median	1058.780	13.60000	19.10458	254.4315	4.065000
Maximum	8015.076	27.00000	28.00000	628.6700	334.3000
Minimum	480.0392	10.00000	11.48313	148.1263	1.406000
SD	2578.243	2.704545	4.779948	142.8092	117.2675
Skewness	1.366910	1.636922	0.378585	1.295354	1.448509
Kurtosis	3.167427	8.975867	2.431535	3.567892	3.288462
Jarque-Bera	25.00602	154.7635	2.988194	23.44757	28.25306
Probability	0.000004	0.500000	0.224451	0.080008	0.000001
Observations	80	80	80	80	80

Source: Author's computation based on data from the World Bank (2023). GDPC: GDP per capital, MPR: Monetary policy rate, LR: Liquidity ratio, CPI: Consumer price index, CEX_B: Consumer expenditure_B, COVID-19, SD: Standard deviation

Also, from the summary statistics of the variables used in the after COVID-19 model is presented in Table 1. The average GDPC is $2327.055 billion with a minimum of $480.0392 billion and maximum of $8015.076 billion while the standard deviation is $2578.243. This simply means that there is also wide variation in the GDPC of countries in West Africa. This is supported by the positive value of the skewness and non- normal distribution. The average MPR is 13.6% with a minimum of 10% and maximum of 27%, while the standard deviation is 2.7%. This means that the positive value of the skewness and the normal distribution of the data series as indicated by the Jarque Bera statistics indicate that there is moderate variation in the monetary policy rate of countries in West Africa. The average LR is 19.07% with minimum of 11.48% and maximum of 28% while the standard deviation is 4.78%. This means that the positive value of the skewness and the normal distribution of the data series as indicated by the Jarque Bera statistics indicate that there is moderate variation in the Lending rate of countries in West Africa. The average CPI is 280.0599 with a minimum of 148.1263 and maximum of 628.67 while the standard deviation is 142.1263. This means that the positive value of the skewness and the normal distribution of the data series as indicated by the Jarque Bera statistics indicate that there is moderate variation in the Consumer price index rate in countries in West Africa. The average CEX is $71.73355 billion with a minimum of $1.406 billion and maximum of 334.3000 billion, while the standard deviation is $117.2675 billion. This means that there is a wide variation in the CEX of countries in West Africa. This is supported by the positive value of the skewness and non- normal distribution of the data series as indicated by the Jarque Bera statistics.

4.2. Correlation Analysis: Monetary Policy and Economic Growth (Before and After COVID-19)

Exploring the potential of a relationship between independent variables is one of correlation analysis' primary attractions. A significant connection between independent variables suggests a problem with multicollinearity. Although collinearity may not be a problem if the correlation is low or moderate, multicollinearity is typically present if the correlation coefficient exceeds 0.8 (Asthana, 2020). According to Table 2, the correlation coefficient between the monetary policy and the GDP per capita is 0.4707 for the period before COVID-19. This is significantly <0.8, showing that there is no cause for concern regarding model collinearity. While for the period after COVID-19, the correlation coefficient between the monetary policy and the GDP per capita is 0.2622 as captured in Table 2. This is significantly <0.8, showing that there is no cause for concern regarding model collinearity.

4.3. Homogeneity Test for Monetary Policy on Economic Growth (before and after COVID-19)

According to Ameziane and Benyacoub (2022), conducting a panel study with slope heterogeneity would yield unbiased and consistent results. In doing so, the Pesaran and Yamagata (2008) test, which examine the weighted difference between the cross-sectional unit-specific estimate and a weighted pooled estimate, was undertaken to confirm slope heterogeneity. The test results are reported in Table 3. Pesaran and Yamagata test P-values are statistically significant at the 1% significance level. Hence, the null hypothesis was rejected, and the heterogeneity of the data-generating process was confirmed, showing that slope heterogeneity exists in both models.

4.4. Cross-Sectional Dependency Test for Monetary Policy and Economic Growth (Before and After COVID-19)

Apart from the slope homogeneity test, another important assumption of panel data analysis is the assumption of cross-sectional dependence. This is because panel data can be subject to pervasive cross-sectional dependence, whereby all units in the

same cross-section are correlated or there is interaction between them. This is usually attributed to the effect of some unobserved common factors that are common to all units and affect each of them, although possibly in different ways (Henningsen and Henningsen, 2019). The test developed by Pesaran (2004) was conducted to test for the existence of cross-sectional dependency, and the CD test is still valid for homogeneous or heterogeneous dynamic models and nonstationary models. The test is based on the null hypothesis of no cross-sectional dependence and is rejected when the P < 5%. This test is to enable the researcher to determine whether to conduct the first or second generational unit root tests as well as cointegration tests that are consistent with cross-sectional independence. Table 4 shows that the null hypothesis of no correlation across panel groups is not rejected. This indicates that there is no cross-sectional dependence in the model for both before and after COVID-19 models. The implication of no cross-sectional dependence is that panel conventional unit root tests such as Breitung unit root (2000) and Levin Lin and Chu (2002) tests can be used for the analysis. The variables except for LR and CPI are characterized by cross-sectional dependency the model for before Covid-19, while MPR and CPI in the after COVID-19 are characterized by cross-sectional dependency.

Table 2: Correlation matrix for monetary policy and economic growth (before COVID-19) Model

Variable	LGDPC	LMPR	LLR	LCPI	LCEX
Before COVID-19					
LGDPC	1.0000				
LMPR	0.4707	1.0000			
LLR	0.1624	−0.1223	1.0000		
LCPI	−0.2423	0.0447	0.1832	1.0000	
LCEX	0.0032	−0.1832	−0.4743	−0.7867	1.0000
After COVID-19					
LGDPC	1				
LMPR	0.2622	1			
LLR	0.5775	0.466	1		
LCPI	0.4551	0.3686	0.4513	1	
LCEX	−0.0702	−0.4259	−0.1297	−0.6749	1

Source: Author's computation based on data from the World Bank (2023). LGDPC: Log of GDP per capita, LCPI: Log of consumer price index, LCEX: Log of consumer expenditure

Table 3: Pesaran and Yamagata slope heterogeneity test for monetary policy and economic growth (before and after COVID-19)

Pesaran and Yamagata test	Before COVID-19		After COVID-19	
	Statistics	P	Statistics	P
Delta	6.787	0.000	7.838	0.000
Delta adj	8.585	0.000	9.914	0.000

Source: Author's computation based on data from the World Bank (2023)

4.5. Unit Root for Monetary Policy and Economic Growth (Before and After COVID-19)

The section presents the unit root test to determine if the variables are stationary at level or first differences. From Table 5, the null hypothesis of unit root is rejected for all the variables at 5% level of significance as indicated by the P-values of Pesaran unit root test results for before COVID-19 model. This shows that all the variables are stationary at first differences. Also, the after COVID-19 model's unit root shows that at level, the statistics are greater than the critical values in parenthesis at 5% level of significance for all the variables. This indicates that all the variables are stationary at first difference.

4.6. Cointegration Test

The Kao and Pedroni cointegration test were conducted to examine the existence of long run relationships among the variables. The cointegration tests were presented in Table 6. The Pedroni test results show that the null hypothesis of no cointegration in a panel ADF and PP can be rejected at 1% level of significance, while the panel rho cannot be rejected for both before COVID-19 and after COVID-19 models. This indicates the rejection of null hypothesis of no cointegration. Thus, it is concluded the variables have long run relationship. The Kao test reveals there is co-integration and long-run relationship between the variables in two models.

4.7. The Effect of Monetary Policy on Economic Growth (Before and After Covid-19)

To examine the effects of monetary policy on economic growth in West Africa, this study applied fully modified ordinary least squares (FM-OLS). The result of the FMOLS as presented in Table 7 for both the before and after COVID-19 models. The model for before COVID-19 shows that the R2, which is the co-efficient of determination, indicates that about 89.74% of the variations in GDP per capita (LGDPC) is explained by monetary policy rate (MPR) and other explanatory variables. The adjusted R-square of 84.71% shows that even if all the other explanatory variables are included in the model, 84.71% of the variations will still be explained by the selected explanatory variables. The result of the fully modified least square shows that increasing MPR by a percentage basis point, decrease LGDPC by 12.3 percent, showing that, at a 5% level of significance, monetary policy rate has a negative and significance effect on economic growth in the long run. Also, a percentage increase in the log of consumer price index (LCPI) decreases LGDPC by 0.215%, which implies at

Table 4: Pesaran CD cross-sectional dependency test for monetary policy and economic growth (before and after COVID-19)

Variable	Before COVID-19				After COVID-19			
	CD-test	P	Correction	Abs (correction)	CD-test	P	Correction	Abs (correction)
GDPC	−0.23	0.820	−0.018	0.576	1.47	0.141	0.117	0.537
MPR	−1.20	0.229	−0.095	0.545	2.58	0.01	0.204	0.421
LR	−2.48	0.013	−0.196	0.399	−1.5	0.134	−0.118	0.46
CPI	11.98	0.000	0.947	0.947	3.5	0.00	0.276	0.533
CEX	0.43	0.666	0.034	0.729	−0.77	0.444	−0.061	0.532

Source: Author's computation based on data from the World Bank (2023). CEX: Consumer expenditure, CPI: Consumer price index, GDPC: GDP per capital, MPR: Monetary policy rate, LR: Liquidity ratio

Table 5: Pesaran unit root tests

Variable	Pesaran unit root (before COVID-19)				Pesaran unit root (After COVID-19)			
	Level		First difference		Level		First difference	
	Statistics	P	Statistics	P	Statistics	P	Statistics	P
MPR	3.1503	0.999	−2.1031	0.0177	−0.6277	0.265	6.0454	1.000
LCEX	−0.6277	0.265	−3.3914	−0.000	−0.7306	0.233	−3.1204	0.001
LGDPC	−0.7306	0.233	−3.2940	0.000	2.3639	0.991	−3.1572	0.001
LR	−0.1007	0.459	−3.2430	0.000	−0.1152	0.454	−3.3368	0.000
LCPI	2.1712	0.985	−3.7470	0.000	0.4158	0.661	−3.5570	0.000

P values in parenthesis for ADF, while KPSS stat are in parenthesis. Source: Author's computation based on data from the World Bank (2023). LCEX: Log of consumer expenditure, LCPI: Log of consumer price index, LGDPC: Log of GDP per capita, MPR: Monetary policy rate, LR: Liquidity ratio

Table 6: Pedroni and Kao Co-integration test

Cointegration test	Before COVID-19		After COVID-19	
	Statistic	P	Statistic	P
Panel v-statistic	−2.359662	0.9909	−4.052949	1.0000
Panel rho-statistic	0.217942	0.5863	2.042588	0.9795
Panel PP-statistic	−2.579941	0.0049	−4.709409	0.0000
Panel ADF-statistic	−2.588517	0.0048	−4.433102	0.0000
Group rho-statistic	1.487612	0.9316	3.109549	0.9991
Group PP-statistic	−2.182106	0.0146	−2.187728	0.0143
Group ADF-statistic	−1.884298	0.0298	−2.862386	0.0144
KAO cointegration test				
ADF statistics	−1.846343	0.0324	−1.797369	0.0361

*Indicates significant at 5% level of significance. Source: Author's computation based on data from the World Bank (2023)

1% level of significance, inflation has a negative and significant effect on economic growth in the long run. However, a percentage increase in the log of consumer expenditure (LCEX) will increase LGDPC by 0.53% indicating that consumption expenditure of the household has a positive and significant effect on economic growth in the long run. Overall, monetary policy and inflation have negative and significant effects on economic growth, while consumption expenditure has positive and significant effects on economic growth in the long run.

The result of the FMOLS as presented in Table 7 for after COVID-19 model shows that the R2, which is the co-efficient of determination, indicates that about 89.57% of the variations in GDP per capita (LGDPC) is explained by monetary policy rate (MPR) and other explanatory variables. The adjusted R-square of 84.51% shows that even if all the other explanatory variables are included in the model, 84.51% of the variations will still be explained by the selected explanatory variables. The result of the fully modified least square shows that increasing lending rate (LR) by a percentage point, increases LGDPC by 16.9%, showing that, at a 5% level of significance, lending rate has a positive and significance effect on economic growth in the long run. Also, a percentage increase in the log of consumer expenditure (LCEX) will increase LGDPC by 0.930% indicating that consumption expenditure has a positive and significant effect on economic growth in the long run. Although MPR and LCPI are statistically insignificant, they are rightly signed, meaning that they have negative effects on economic growth. Overall, lending rate and consumption expenditure have significant and positive effects on economic growth in the long run. In summary, monetary policy has negative effect on economic growth in the periods before and after COVID-19, but the effect is statistically insignificant in the periods after-COVID-19, this could be the resultant increase in the inflation rate in these West African countries.

4.8. The Effect of Monetary Policy on Inflation (Before and After COVID-19)

Also, this study delved into the effects of monetary policy on inflation in West Africa before and after the COVID-19 pandemic, employing the Fully Modified Ordinary Least Squares (FM-OLS) methodology. In Table 8, the results for both periods reveal insightful relationships. In the pre-pandemic era, the model indicates that approximately 75.16% of the variations in the log of Consumer Price Index (LCPI) are accounted for by monetary policy rate (MPR) and other explanatory variables. A higher MPR is associated with a decrease of 21.013% in LCPI, signifying a negative and significant impact on inflation in the long run. Similarly, an increase in the log of GDP per capita (LGDPC) is linked to a 0.41979% reduction in LCPI, highlighting the negative effect of economic growth on inflation. Conversely, consumer expenditure (LCEX) exhibits a positive and significant relationship, with a 0.653788% increase in LCPI for each percentage rise in LCEX. These findings suggest a complex interplay between monetary policy, economic growth, and consumer expenditure, shaping inflation dynamics.

In the post-COVID-19 period, the results portray an even higher explanatory power of the model, with about 89.57% of the LCPI variations elucidated by MPR and other variables. Here, the influence of MPR on inflation remains negative and substantial, with a coefficient of −0.525723, indicating a 52.6% decrease in LCPI for every percentage increase in MPR. Similarly, the effect of economic growth persists in influencing inflation negatively, with a coefficient of −0.271882, revealing a 0.272% reduction in LCPI with a one-percentage-point rise in LGDPC. Notably, consumer expenditure's impact remains positive, but less pronounced, with a coefficient of 0.343003 representing a 0.343% inflation increase per percentage gain in LCEX. This comprehensive examination of monetary policy's intricate relationship with inflation offers valuable insights into how policy actions and economic variables shape the inflationary landscape in Nigeria, serving as a significant reference for policymakers and researchers alike.

Overall, monetary policy and economic growth have negative and significant effects on inflation, while consumer expenditure has positive and significant effects on economic growth in the periods after the pandemic. In summary, monetary policy has negative effect on inflation in the periods before and after COVID-19, but the effect is higher in the periods after-COVID-19 than in the

Table 7: Effect of monetary policy on economic growth (before and after COVID-19)

LGDPC	Before COVID-19			After COVID-19		
	Coefficient	t-statistic	P	Coefficient	t-statistic	P
MPR	−0.12338	−2.43616	0.0176	−0.09432	−1.263803	0.2107
LR	−0.05194	−0.63694	0.5264	0.168625	2.235899	0.0287
LCPI	−0.21499	−4.34084	0.000	−0.015079	−0.189448	0.8503
LCEX	0.530424	5.596934	0.000	0.113372	1.929738	0.0579
R^2	0.897444			0.895656		
Adjusted R^2	0.847134			0.845129		
Long-run variance	0.001416			0.001799		

* , ** and *** represent 1%, 5% and 10% levels of significance. Source: Author's computation based on data from the World Bank (2023). LCPI: Log of consumer price index, LGDPC: Log of GDP per capita, MPR: Monetary policy rate, LR: Liquidity ratio, LCEX: Log of consumer expenditure

Table 8: Effect of monetary policy on inflation (before and after COVID-19)

LCPI	Before COVID-19			After COVID-19		
	Coefficient	t-statistic	P	Coefficient	t-statistic	P
MPR	−0.21013	−2.77844	0.0077	−0.525723	−5.88911	0.000
LR	−0.01718	−0.17757	0.8598	−0.084586	−0.855477	0.3964
LGDPC	−0.41979	−4.28055	0.0001	−0.271882	−2.855738	0.0062
LCEX	0.653788	14.93122	0.0000	0.343003	3.58252	0.0008
R2	0.751561			0.895656		
Adjusted R2	0.706842			0.855129		
Long-run variance	0.027148			0.001799		

*** , ** and * represent 1%, 5% and 10% levels of significance. Source: Author's computation based on data from the World Bank (2023). LCPI: Log of consumer price index, LGDPC: Log of GDP per capita, MPR: Monetary policy rate, LR: Liquidity ratio, LCEX: Log of consumer expenditure

periods before COVID-19, this could be the resultant increase in the inflation rate in these West African countries due to increase in the money supply in these periods.

5. DISCUSSION OF FINDINGS

The empirical inquiry into the interplay between monetary policy and economic growth in West Africa, both prior to and following the COVID-19 pandemic, commences with an examination of summary statistics. The findings reveal that before the onset of COVID-19, the average Gross Domestic Product per capita (GDPC) in West Africa amounted to $2600.532 billion, displaying substantial diversity among countries, evident from the high standard deviation of $3164.178 billion. The average monetary policy rate (MPR) stood at 16.67%, reflecting a moderate degree of variability, as indicated by positive skewness and a normal distribution. Similarly, the average lending rate (LR) was recorded at 20%, signaling moderate variation within lending rates across West African nations. Analogously, the average consumer price index (CPI) registered a value of 170.5299, indicative of moderate fluctuation in the consumer price index rate across the region. Meanwhile, the average consumer expenditure (CEX) amounted to $76.93375 billion, characterized by a wide standard deviation, denoting substantial heterogeneity in consumer expenditure among West African economies.

In the aftermath of the COVID-19 pandemic, the average GDPC exhibited a decrease to $2327.055 billion, reflecting considerable variance among the five countries under consideration. The average MPR also experienced a decline to 13.6% post-COVID-19, accompanied by a comparatively lower standard deviation, signifying a moderated degree of variation in the monetary policy rate across West African nations. Moreover, the average lending rate reached 19.07%, with a range spanning from 11.48% to 28%, implying moderate variation in lending rates. This is reinforced by Jarque Bera statistics indicating non-normal distribution of the data series. The average Consumer Price Index post-COVID-19 amounted to 280.0599, encompassing values ranging from 148.1263 to 628.67; the standard deviation of 142.1263 signifies moderate variability. Furthermore, the average current expenditure was documented at $71.73355 billion, with values ranging from $1.406 billion to $334.3000 billion. The standard deviation of $117.2675 billion underscores substantial variability. Jarque Bera statistics confirm the non-normal distribution of the data series, highlighting pronounced variation in current expenditure.

The findings of this study are aligned with the diverse effects of monetary policy on economic growth highlighted in the empirical review. The utilization of distinct measurements of monetary policy, such as monetary policy interest rate and money supply, has yielded varying outcomes in different contexts. The study's discovery of a negative and significant impact of the monetary policy rate (MPR) on economic growth before COVID-19 resonates with the findings of Ovat et al. (2022) in Nigeria, who also reported a negative effect of MPR on economic growth. Moreover, the positive and significant impact of money supply on economic growth, as found in studies like Gul et al. (2017), is mirrored in the positive effect of consumer expenditure (LCEX) on economic growth observed in this study.

The broader empirical literature has employed various methodologies to scrutinize the impact of monetary policy on economic growth. For example, Moursi and El Mossallamy (2019) employed a dynamic stochastic general equilibrium (DSGE) model to analyze the effect of monetary policy on inflation and growth in Egypt. The finding that expansionary monetary policy can foster growth without undue inflationary pressures aligns with

the observed insignificant positive effect of lending rate (LR) on economic growth after COVID-19. The divergence in the impact of interest rates and money supply is also consistent with Njie and Badjie's (2021) findings, where no short-term correlation was established between interest rates and growth, but a long-term association emerged between real interest rates and economic growth.

Furthermore, the varied behaviour of monetary policy across different countries, as evidenced by studies in Ghana, Sierra Leone, and Nigeria, underscores the importance of considering nation-specific conditions. The recognition of financial development's role in strengthening the effectiveness of monetary policy, as emphasized by Sena et al. (2021), aligns with the inclusion of lending rate and consumer expenditure as a moderator in this study. This introduces an additional layer of complexity in understanding the intricate relationships between monetary policy, inflation, and economic growth.

In conclusion, the findings of this study enrich the empirical landscape by reaffirming and expanding existing knowledge concerning the nuanced effects of monetary policy on economic growth. The alignment with previous research and the introduction of novel dynamics underscores the imperative for policymakers to consider diverse factors and contextual distinctions when devising and executing monetary policy strategies.

6. CONCLUSION AND RECOMMENDATIONS

In conclusion, the empirical investigation into the relationship between monetary policy and economic growth in West Africa, both before and after the COVID-19 pandemic, has shed light on several significant findings. It is evident that monetary policy exerts a negative influence on economic growth in both periods, albeit with varying degrees of significance. Notably, the effect was prominent before the pandemic but turned statistically insignificant afterward. This underscores the dynamic nature of the relationship, shaped by changing economic conditions encompassing factors like lending rates, and household consumption expenditure. The COVID-19 pandemic prompted central banks worldwide to implement unconventional monetary policy measures to stabilize financial markets, ensure credit availability, and facilitate economic recovery. Such measures included large-scale asset purchases, direct lending initiatives, and liquidity support. While these measures were crucial to mitigating the pandemic's economic impact, their influence on economic growth was mixed, as observed in this study's findings. Furthermore, the study highlights the consistent negative impact of monetary policy on inflation across both periods, with a more pronounced effect observed after the pandemic. This led to the implementation of accommodative monetary policy measures, encompassing interest rate reductions, quantitative easing (large-scale asset purchases), and liquidity provisions to financial markets. These measures aimed to stimulate economic activity, support lending, and counteract deflationary pressures.

Policy recommendations arising from the findings of the effect of monetary policy on economic growth in West Africa following the COVID-19 pandemic include the need to maintain lending rates at levels conducive to economic growth. Striking a balance between affordability and potential inflationary pressures is crucial. Encouraging consumer expenditure through income support programs and consumer-focused incentives is imperative, given its positive impact on long-term economic growth. While the analysis suggests that monetary policy and the local consumer price index (LCPI) negatively affect economic growth, the statistically insignificant effects in the post-COVID-19 period require continued vigilance in inflation monitoring. Clear and transparent communication with the public about policy decisions is essential to build trust and manage expectations. Additionally, central banks should tailor policies to address the unique challenges of the post-pandemic era and work in coordination with government agencies to implement complementary fiscal measures that support sustainable economic growth. This integrated approach, coupled with ongoing research and data analysis, will facilitate well-informed and effective policy decisions.

In light of the findings of the effect of monetary policy on inflation in West Africa following the COVID-19 pandemic, it is recommended that central banks and policymakers in West African countries carefully consider their monetary policy stance. The analysis underscores the importance of maintaining a prudent and tight monetary policy approach, given the strong negative correlation between MPR and inflation. It is imperative to monitor MPR closely and make adjustments as necessary to ensure its effectiveness in controlling inflation. Simultaneously, policymakers should focus on stimulating and sustaining economic growth through investment promotion, infrastructure development, and business-friendly policies. Striking the right balance between economic growth and inflation containment is a key challenge. Furthermore, consumer expenditure patterns should be vigilantly monitored, and policy responses should be crafted to mitigate any excessive consumer demand that may threaten to drive up inflation. Timely and accurate inflation data is essential for sound policy-making, especially in the post-COVID-19 period when the effect of monetary policy on inflation is heightened. The international economic context must also be considered, as global economic conditions, trade dynamics, and capital flows can significantly impact the money supply and inflation rates in West African countries. Collaboration with academia and research institutions is encouraged to delve deeper into these dynamics, and clear, transparent communication about monetary policy decisions is essential to manage inflation expectations and bolster confidence in the central bank's abilities.

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