

## MONETARY POLICY REGIMES AND PRICE STABILITY IN THE WEST AFRICAN MONETARY ZONE

*Ajayi Olufemi Isaac, (CA)*

*Nile University of Nigeria, Abuja*  
*zenith4real13@hotmail.com*

&

*Seth Akutson,*

*Nile University of Nigeria, Abuja*  
*seth.akutson@nileuniversity.edu.ng*

### ABSTRACT

*The study examined monetary policy regimes and price stability in the West African Monetary zone. This was undertaken given that countries in the zone are implementing different monetary policy regimes to achieve price stability for macroeconomic stability and economic growth, yet these have been elusive. So, the objective of the study was to examine the effect of monetary policy regimes on price stability in the West African monetary zone. The study adopted an ex-post facto research design and obtained secondary data from documents of the Central Banks of the WAMZ countries, the World Bank Development Indicator (WDI), the International Monetary Fund (IMF), and the International Financial Statistics (IFS) database for the period from 2001 to 2021. The method of data analysis involved the use of descriptive and analytical statistical tools. The estimation technique employed was the Panel Autoregressive Distribution Lag model, complemented by the Juodis, Karavias, and Sarafidis (2021) granger-causality test. The findings of the study indicate that the various monetary policy regimes being implemented in the West African Monetary Zone yielded conflicting effects on price stability. On the whole, the results show that the monetary policy rate against the money supply is more effective to achieve price stability in the West African monetary zone. Hence, the study makes the following recommendations; policymakers must ensure that an effective monetary policy is put in place to curb the persistent inflation in the zone that undermines socioeconomic development. Countries should review monetary policy rates appropriately to stimulate output growth, and, there should be cooperation between the monetary and fiscal authorities in the West African Monetary Zone to ensure smooth coordination and consistency in monetary and fiscal pursuits.*

**Key Words:** *Monetary Policy, Price Stability, Consumer Price Index, Monetary Policy Rate, Money Supply.*

**DOI:** 10.31039/jgeb.v4i12.119

## **1. Introduction**

There is a consensus in the literature that the appropriate monetary policy framework is determined by the structure of the economy. For instance, Ujunwa, Onah, Ujunwa, Okoyeuzu & Kalu, (2022) and Poole (1970) believe that economic structure determines the stability of money demand, while the stability of money demand determines the appropriate monetary policy framework. In his view, monetary targeting is appropriate for countries with stable money demand, while interest rate targeting is suitable for countries with unstable money demand. Folarin & Asongu (2019) further argued that since ensuring price stability is the mandate of most central banks across the globe, monetary targeting regime in an economy with stable money demand will lead to certainty in price determination, reduce macroeconomic fluctuations, and promote price stability. Similarly, inflation targeting regime becomes appropriate where the credit channel has collapsed and money demand is unstable. Continuing on the argument, Asongu, Folarin & Biekpe (2019) study cast doubt on the appropriateness of interest rate targeting in most developing economies. These arguments may account for the implementation of different monetary policy regimes for macroeconomic stability in the West African Monetary Zone (WAMZ).

The appropriate monetary policy regimes in developing economies have attracted research interest in literature (Ujunwa et al., 2022; Folarin & Asongu, 2019). This is traced to the importance of monetary policy in promoting macroeconomic stability. Across the globe, the monetary policy regimes adopted by the monetary authorities are inflation targeting, monetary targeting, output targeting, exchange rate targeting, direct controls, exchange rate fixing, unstructured discretion, no national framework, loosely structured framework, mixed targets (eclectic), and well-structured discretion (Cobham, 2018). In the WAMZ, the existing monetary policy regimes are exchange rate targeting in Liberia, monetary targeting in Nigeria, Sierra Leone, Guinea, and the Gambia, and inflation targeting in Ghana (Tule et al., 2019). Monetary policy regimes in the WAMZ countries over time have also been an issue of regional interest, with ever-increasing proposals and ratification of convergence of policy frameworks and trajectories among member countries beginning as far back as 1975 at the start of the regional treaty. This is stated in article 2 of the 1975 treaty which addresses the need for monetary policy harmonization among member states to engender rapid and collective economic viability (Harvey & Cushing, 2015).

However, the possibility of uniform monetary policy has been hampered by differences in the system structure of member states, lack of macroeconomic performance convergence, and the staggering effect of the political struggle of various degrees (Onye and Umoh, 2021). Premise on this background, this study set out to examine monetary policy regimes and price stability in the WAMZ countries. The identified gaps in the literature pose several notable problems such as inadequate suitable tools and a lack of appropriate design of monetary policy for sustainable growth and development in the WAMZ. In addition, it has been a huge task for both WAEMU and other sub-regional groupings such as WAMI to eventually merge and form a single currency to facilitate trade and promote economic growth within the ECOWAS. Despite the innovations and fine-tunes in countries' monetary policy implementation, there is a setback in achieving price stability.

Given the inconclusive evidence on the appropriate monetary policy regimes in developing economies, this study contributes to the existing literature by examining the effect of different monetary policy regimes in the WAMZ to achieve macroeconomic stability. This is because, despite the similarities in their economic structure, the countries adopted different monetary policy regimes, yet price stability and the subsequent economic growth and development elude them. So, the paper asks the following question; what is the effect of monetary policy regimes in the West African Monetary Zone? This is especially significant given the aspiration of unifying the monetary policy regimes in the Economic Community of West African States (ECOWAS) in 2027. Following section one, the introduction is section two which covers the literature review section three is on the methodology, while section four is on data analysis, and five deals with the summary of findings, conclusion, and recommendations.

## **2. Literature Review**

### **Conceptual clarifications; monetary policy and price stability**

Ufoeze, Odimgbe, Ezeabalisi, and Alajekwu (2018), Adabor & Buabeng, 2020 and Olakanmi & Olagunju, 2020; among others, have a related definition for monetary policy, this study defined it as the various money control regimes utilizing the tools of interest rate and money supply by the members of the WAMZ to achieve macroeconomic objectives of price stability, favourable balance of payment, and output growth in the economy. As earlier stated,

the member countries of the WAMZ practice different monetary policy regimes to achieve macroeconomic stability.

Macroeconomic performance can be referred to as the extent to which desired levels of aggregate economic variables are achieved. Key macroeconomic objectives are price stability, sustainable growth, employment increase/unemployment decrease, equitable distribution of income and wealth, higher living standard, and balance of payment equilibrium (Ufoeze, Odimgbe, Ezeabalisi & Alajekwu, 2018). In line with this, Macroeconomic performance is defined in this study as the outcome of the various monetary policy regimes that are implemented in the WAMZ as reflected in price stability for macroeconomic stability and economic growth in the WAMZ.

### **Theoretical Review**

The modern quantity theory of money is based on the reformation of the cash balance approach to the quantity theory of money. The theory proposed that national income depends on the stock of money, and also that in the long run, the effect of money supply is on the general price level with consequences on macroeconomic stability and sustainable economic growth and development.

### **Empirical Review**

The empirical review related to this study was mostly on Nigeria and is more on the effect of monetary policy on bank lending Modugu and Dempere (2022), Bala, Godiya, Hadith, and Maijama'a (2022), Adetutu et al., (2021), Olofinlade and Azeez (2021) Yunusa, Williams, and Adegbenle (2020), Lartey (2018), Abere, Obarafo, and Adewole (2020) Mukolu and Adeleke (2020), Olofinlade, Oloyede, and Oke (2020) and Mordi, *et al.* (2019). Also, on the effect on bank credit especially to the private sector Awoniyi and Ogundipe (2021), Iddrisu and Alagidede (2020), Bianco (2021) Benetton and Fantino (2021) Ahmed, (2020), Uruakpa (2019) Ogolo and Tamunotonye (2018) Ndubuaku, Ifeanyi, Nze, and Onyemere (2017) Agbonkhese and Asekome (2016). Others were on output or economic performance Asaley et al. (2018) Oyeyemi (2019). There were just a few on cross-section, such as Modugu and Dempere (2022), Onyi and Umoh (2022), Takyi and Fosu (2019), Gambacorta (2017) and Balogun (2007). It is the study done by Balogun (2007) that is close to this study. But, this study improved on the study in terms of being contemporary, as it used data from the inception

of the WAMZ up to 2021, while the former used data from 1991-2004, it also examined economic performance, unlike this study that examined price stability. This study also used a more robust estimation technique than the Ordinary least squares technique used. Obeng and Sakyi (2017), Nana (2020), and Lartey (2015) did their study based on the economy of Ghana, while Matemilola et al (2015) explored that of South Africa.

### **3. Methodology**

This study made use of a longitudinal research design that captures observations from both time series and cross-sections of data units. Specifically, the time series observation was annual for the period of the study, while the cross-section unit comprised data from the six member-states of the West Africa Monetary Zone (WAMZ). Hence this study is panel-based. The secondary data were obtained from the documents of the Central Banks of the WAMZ countries, the World Bank Development Indicator (WDI) Database, the International Monetary Fund (IMF) database, the International Financial Statistics (IFS) database, as well as the International Monetary Fund for the period from 2001 to 2021 (the entire period of the operation of the WAMZ).

#### **Method of Data Analysis**

The study made use of both descriptive and inferential statistical analysis. The Descriptive analysis conducted in the study includes mean analysis, standard deviation analysis, minimum and maximum analysis, and trend analysis, followed by cross dependence test, panel unit root test, and co-integration test. Panel Autoregressive Distributed Lag (ARDL). The Juodis, Karavias, and Sarafidis (2021) granger-causality was conducted as a robustness check.

#### **Model Specification**

The technique used to estimate this dynamic panel is the Panel Autoregressive Distributed Lag ( $p, q$ ) model in the error correction form. Following Ufoeze, Odingbe, Ezeabalisi, and Alajekwu (2018) specified macroeconomic performance measures in terms of price stability (taking the consumer price index (cpi) measure as the dependent variable. While monetary policy variables such as monetary policy rate (mpr), broad money supply (m2), and interest rate (rir) of the various countries in the WAMZ are the explanatory variables.

Alongside, these variables and real effective exchange rate (rexr) are taken as a control variable. Hence, the model is estimated in the following format:

$$lncpi_{it} = \mu_i + \sum_{j=1}^p \lambda_{ij} lncpi_{it-j} + \sum_{j=0}^q \delta'_{ij} X_{it-j} + \varepsilon_{it} \text{ ----- Eqn..1}$$

where  $i = 1, 2, \dots, N$  represents cross-sectional unit  $t = 1, 2, 3, \dots, T$  represents time (annual),  $j$  is the number of time lag.  $X'_{it}$  is the vector of explanatory variables, and finally  $\mu_i$  is the fixed effect. By re-parameterization, the above equation can be written as:

$$\Delta lncpi_{it} = \mu_i + \varphi_i lncpi_{it-1} + \beta'_i X_{it} + \sum_{j=1}^{p-1} \lambda_{ij} lncpi_{it-j} + \sum_{j=0}^{q-1} \delta'_{ij*} X_{it-j} + \varepsilon_{it} \text{-----}$$

Eqn. 2

Where;

$$\varphi_i = -1 \left( 1 - \sum_{j=1}^p \lambda_{ij} \right), \beta_i = \sum_{j=0}^p \delta_{ij},$$

$$\lambda_{ij*} = - \sum_{m=j+1}^p \lambda_{im}, j = 1, 2, \dots, p - 1, \text{ and}$$

$$\delta_{ij*} = - \sum_{m=j+1}^q \delta_{im}, j = 1, 2, \dots, q - 1.$$

Now by grouping the variables in levels further, equation (3.2) is rewritten as an error correction equation:

$$\Delta lncpi_{it} = \mu_i + \varphi_i (lncpi_{it-1} + \theta'_i X_{it}) + \sum_{j=1}^{p-1} \lambda_{ij} lncpi_{it-j} + \sum_{j=0}^{q-1} \delta'_{ij*} X_{it-j} + \varepsilon_{it} -$$

Eqn.3

Where  $\theta_i = -\left(\frac{\beta_i}{\varphi_i}\right)$  defines the long-run or equilibrium relationship among  $lncpi_{it}$  and  $X_{it}$ . In contrast  $\lambda_{ij*}$  and  $\delta_{ij*}$  are short-run coefficients relating cpi to its past values and other determinants like  $X_{it}$ . Finally, the error-correction coefficient  $\varphi_i$  measures the speed of adjustment of  $lncpi_{it}$  toward its long-run equilibrium following a change in  $X_{it}$ . The condition  $\varphi_i < 0$  ensures that a long-run relationship exists. Therefore, a significant and negative value

of  $\varphi_j$  is treated as evidence of cointegration between  $lncpi_{2it}$  and  $X_{it}$ . Thus, finally, the estimates are measured by:

$$\hat{\theta}_{PMG} = \frac{\sum_{i=1}^N \hat{\theta}_i}{N}, \hat{\beta}_{PMG} = \frac{\sum_{i=1}^N \hat{\beta}_i}{N}; \hat{\lambda}_{jPMG} = \frac{\sum_{i=1}^N \hat{\lambda}_i}{N}, \text{ and } \hat{\gamma}_{jPMG} = \frac{\sum_{i=1}^N \hat{\gamma}_i}{N}$$

Where  $j = 0, \dots, q - 1, \hat{\theta}_{PMG} = \hat{\theta}$

Therefore, based on the above methodology presented in equation (3.4), the following three models have been developed. Thus, the model to be estimated is:

$$\begin{aligned} \Delta \ln cpi_{i,t} = & -\mu_i + \varphi_i (lncpi_{i,t-1} - \lambda_2 mpr_{i,t-1} - \lambda_3 m2_{t-1} - \lambda_4 dcr_{i,t-1} - \\ & \lambda_5 rexr_{i,t-1}) + \sum_{j=1}^{p-1} \gamma_j^i \Delta(lncpi_{i,t-j}) + \sum_{j=0}^{q-1} \delta_{2j}^i \Delta mpr_{i,t-j} + \sum_{j=0}^{q-1} \delta_{3j}^i \Delta m2_{i,t-j} + \\ & \sum_{j=0}^{q-1} \delta_{4j}^i \Delta dcr_{i,t-j} + \sum_{j=0}^{q-1} \delta_{5j}^i \Delta rexr_{i,t-j} + \delta_{i,t}. \end{aligned} \quad \text{----- Eqn. 4}$$

In the equation,  $\lambda_1$  represents parameters to be estimated and  $\Delta$  indicates differenced operator.

Where:

cpi	=	Consumer price index for price stability
mpr	=	Monetary policy rate / real interest rate
m2	=	Broad money supply
dcr	=	Domestic credit to the private sector (% of GDP)
rexr	=	Real effective exchange rate

Note: In the case of Guinea, Liberia's Official exchange rate (LCU per US\$, period average) was used against the absence of a real effective exchange rate. Also, there was no data for monetary policy rate in some of the selected countries, thus, the study resorted to the use of real interest rate that was available in all the countries.

### Justification of Methodology

The study used the linear Panel ARDL within the framework of dynamic heterogeneous panel methods. The panel ARDL approach applies to cases in which the number of periods is relatively greater than the number of cross-sectional observations ( $T > N$ ). Thus since the

number of time series for this research is relatively larger than the number of cross sections ( $T > N$ ), that is, for large  $T$ , Pesaran and Smith (1995) show that the traditional panel techniques [fixed estimator (FE), instrumental variables (IV), GMM estimators] can produce inconsistent and potentially misleading estimates of the average values of the parameters in a dynamic panel data model unless the slope coefficients are identical, hence, the employment of the PMG and the MG estimators for the analysis to obtain the short and the long-run effects and the speed of adjustment to the long-run.

#### 4. Data Analysis

##### Preliminary Analysis

##### Cross-Section Dependence Test

This test is conducted to ensure that the estimates obtained are efficient. That is the estimation regression can be relied upon and the test statistic is valid. The balanced panel was chosen for the test because the number of time series ( $T$ ) is greater than the number of cross sections ( $N$ ). Also, the Pesaran CD estimates are most relevant to this study because the number of time series is small. The results of the CD tests for the model are presented below in Table 1.

**Table 1: Residual Cross-Section Dependence Test**

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	15.21077	15	0.3150
Pesaran scaled LM	0.424805		0.4600
Pesaran CD	0.640946		0.5300

Source: extract from E-view, 10

Table 1 present the results of CD tests using Breusch-Pagan LM, Pesaran scaled LM, and Pesaran CD. Evidence from the result is that the null hypothesis of no cross-sectional independence was not rejected for the model. This is indicated by the insignificant probability values in the Pesaran CD values that are above the 5% level of significance. This implies the non-existence of cross-section dependence in the model, so the estimates are free of residuals that may be caused by the interdependency of economic activities in the WAMZ.



## Panel Unit Root Test

**Table 2: Stationarity Test Results for the Panel Data**

Variables	Levin-Lin-Chu unit-root test		Decision	Im-Pesaran-Shin unit-root test		Decision	Hadri LM		Decision
	Adjusted t-statistics	Prob. Value		w-t-bar statistics	Prob.		z statistics	Prob.	
cpi	0.1213	0.5483		2.4142	0.9921		29.3892	0.0000	-
D(cpi)	-8.9897	0.0000***	I (1)	-8.5061	0.0000***	I (1)	0.2689	0.3940***	I (1)
mpr	-6.9293	0.0000***	I (0)	-5.4241	0.0000***	I (0)	4.2806	0.0000	-
D(mpr)	-	-	-	-	-	-	-1.7247	0.9577***	I (1)
m2	-2.2285	0.0129**	I (0)	-2.3364	0.0097***	I (0)	-1.9272	0.9730***	I (0)
D(m2)	-	-	-	-	-	-	-	-	-
dcr	-4.7358	0.0000***	I (0)	0.5123	0.6958	-	22.4386	0.0000	-
D(dcr)	-	-	-	-4.5831	0.0000***	I (1)	-1.0467	0.8524***	I (1)
rexr	0.0093	0.5037	-	0.3871	0.6507		31.1931	0.0000	
D(rexr)	-3.9913	0.0000***	I (1)	-3.9154	0.0000***	I (1)	-1.8879	0.9705***	I (1)

**Source:** Culled from STATA 15 Output.

Note: The asterisk (\*\*\*) \*\*, and \*) denotes rejection of the null hypothesis that the series has a unit root at 1%, 5%, and 10% level of significance.

The results of panel unit root tests are presented in Table 2, it shows the panel unit root test results using Levin, Lin, and Chu (2002) unit-root test and Im, Pesaran, and Hadri LM unit-root test. It indicates that most of the panels do not contain unit roots at levels; money supply (m2) from the Levin-Lin-Chu unit-root test, Im, Pesaran, and Hadri LM unit-root test, domestic credit rate (dcr) from Levin-Lin-Chu unit-root test, monetary policy rate from Levin-Lin-Chu unit-root test and Im, Pesaran unit-root test. However, all the variables consumer price index (cpi), monetary policy rate (mpr), domestic credit rate (dcr), and the real effective exchange rate (rexr), from Levin, Lin, and Chu (2002) unit-root test and Im, Pesaran, and Hadri LM unit-root test were integrated at first difference.

## Panel Co-integration Test

**Table 3: Panel Co-integration Test Results**

Monetary Policy and Price Stability		
Kao Test (Dickey-Fuller t)	4.6508	0.0000
Pedroni (Philips-Perron t)	3.9482	0.0000
Westerlund	5.6631	0.0000

Source: Authors extract from E-views10

The result of the Dickey-Fuller t, Philip-Perron t, and Westerlund, at 5%, 10% level of significance for the model under the Panel Kao, Pedroni test and Westerlund Statistic shows a long run relationship among the variables indicating that the null hypothesis was accepted at the 5% level of significance. The Kao residual co-integration test rejects the null hypothesis since it is not up to a 5% level of significance. This means that we have a long-run relationship among all the variables in the model.

**Multicollinearity Test**

**Table 4: Pearson Correlation Coefficient Matrix**

	cpi	mpr	m2	dcr	rexr
cpi	1				
rir	0.1564	1			
m2	-0.2207	-0.0331	1		
dcr	0.405	0.0222	-0.0446	1	
rexr	0.2313	0.7384	0.0075	-0.1247	1

Source: Authors extract from E-views 10

From the results obtained from the Pearson Product Moment correlation matrix in Table 4 above, there is a low positive correlation between cpi and all the other explanatory variables. Except for m2 where the correlation is negative, all the others were positive. So, on the whole, the study confirmed that there is no pair-wise correlation coefficient in the model that is over 0.80 (Gujarati and Porter, 2006). Hence, the variables cannot be said to be collinear. Therefore, it can be concluded that there is no multicollinearity among the regressors in the model.

**Empirical Results and Analysis**

This study uses econometric techniques within a dynamic framework in determining the effect of monetary policy regimes on price stability in the WAMZ, the estimation techniques are the Panel Auto-Regressive Distribution Lag (ARDL), complemented by the Juodis, Karavias, and Sarafidis (2021) Granger non-causality test for robustness check. Table 3 below shows the Granger non-causality test result for the causal relationship between the cpi and the other explanatory variables of the study. The estimates are assessed based on a 5% level of significance.

The study used the Dynamic Panel Data Model and since the number of time series for the study is relatively larger than the cross-sections ( $T > N$ ), dynamic non-stationary heterogeneous panel models or dynamic panel Autoregressive Distributed Lag (panel ARDL)

is preferred where Pooled Mean Group (PMG) estimator and Mean Group (MG) estimator are considered. The PMG estimator constrains the long-run coefficients to be the same across countries and allows only the short-run coefficients to vary while the MG estimator estimates separate regressions for each country and computes the averages of the country-specific coefficients, which provides consistent estimates of the long-run coefficients. The Hausman test was therefore used to decide whether PMG or MG estimator is appropriate for estimating each of the objectives of the study. The decision rule is: to reject the null hypothesis if the probability value is less than 0.05. The null hypothesis is that MG and PMG estimates are not significantly different or PMG is more efficient. Therefore, the outcome of the Hausman (1978) test determines which estimator is most preferred. The Hausman test was estimated for the model with the result presented in Table 5 below;

**Table 5: Hausman Test Results for price stability model**

<b>PMG vs MG</b>				
<b>Variables</b>	<b>(b)</b>	<b>(B)</b>	<b>(b-B)</b>	<b>Sqrt(diag(V_b-V_B))</b>
	<b>MG</b>	<b>PMG</b>	<b>Difference</b>	<b>S.E</b>
<b>mpr</b>	-0.76469	-0.95681	0.19212	0.40801
<b>m2</b>	-0.86211	-1.00113	0.13901	0.12397
<b>dcr</b>	8.81453	8.05404	0.76049	1.36744
<b>rexr</b>	0.02918	0.01382	0.01535	0.00539
<b>Chi-square (4) =18.57, Prob. = 0.001</b>				

**Source:** Authors' Computed from STATA 15 Output

The result in Table 5 shows the chi-square value of 18.57 with a probability value of 0.001. Since the probability value is less than 0.05 (at a 5% level of significance), the study fails to accept the null hypothesis and concludes that the MG estimator is preferred over the PMG estimator for the price stability model. This means long-run heterogeneous estimates and short-run individual country-specific effects are displayed. It was based on this that the study estimated the effect of monetary policy regimes on price stability in the WAMZ. The results obtained are presented in Table 6 (short-run) and Table 7 (long-run) respectively.

**Table 6: Short-run effect of monetary policy on price stability in the WAMZ**

	Ec	D1.lcpi	D1.mpr	D1.m2	D1.dcr	D1.rexr	_cons
The Gambia	-0.03433 (0.04675)	0.54649 (0.51712)	-0.03119 (0.08029)	-0.05544 (0.07770)	-0.47605 (0.74162)	-0.02799 (0.08229)	-4.87098 (10.50909)
	0.463	0.291	0.698	0.475	0.521	0.734	0.643
Ghana	-0.18228 (0.05833)	0.27200 (0.33909)	0.63652 (0.48632)	0.09612 (0.14250)	0.12740 (0.60235)	0.23148 (0.22388)	-25.69395 (44.50635)
	0.008***	0.422	0.191	0.500	0.832	0.301	0.564
Guinea	-0.39713 (0.38754)	0.42300 (0.48030)	0.03970 (0.77866)	-0.01311 (0.06205)	1.50769 (1.51958)	-0.00124 (0.00368)	93.31107 (107.01670)
	0.305	0.378	0.959	0.833	0.321	0.735	0.383
Liberia	-0.35390 (0.45637)	-0.74071 (0.44192)	0.01092 (0.32606)	0.11084 (0.13038)	-5.37997 (3.12513)	0.35974 (0.34979)	-0.11221 (8.04583)
	0.438	0.094*	0.973	0.395	0.085*	0.304	0.989
Nigeria	-0.21106 (0.07749)	-0.07633 (0.46389)	0.01688 (0.20662)	-0.07641 (0.08238)	-0.55748 (0.74207)	-0.20604 (0.15776)	12.81017 (10.20676)
	0.006***	0.869	0.935	0.354	0.452	0.192	0.209
Sierra-Leone	-0.10462 (0.05199)	0.50501 (0.27766)	0.06881 (0.08711)	0.03366 (0.08330)	0.32473 (0.91349)	-0.18963 (0.07060)	12.65785 (10.38764)
	0.044**	0.069*	0.430	0.686	0.722	0.007***	0.223

**Source:** Authors' Computed from STATA 15 Output.

Note: The first figure in each cell is the estimated coefficient while the second and the third are their respective standard errors and probability values. The figures in parentheses () are the standard errors of the estimates. This study used a 5% level of significance upon which the statistical significance of the estimated variables was examined. The asterisk (\*\*\*) \*\* and \*) denote rejection of the null hypothesis which implies that the estimate of the variable is highly significant at 1%, 5%, and 10% levels of observed significance respectively.

Table 6 indicates that most of the countries (Ghana, Guinea, Liberia, Nigeria & Sierra Leone) monetary policy rates have a positive but statistically insignificant effect on price stability in the WAMZ in the short run. Only the Gambia's monetary policy rate revealed a negative effect on price stability and it was statistically insignificant. These outcomes of monetary policy rates across the sample countries within the corresponding period indicate that changes in the monetary policy rate did not explain changes in the general price level in the WAMZ in the short run. Most of the coefficients of the other variables of the study; money supply, domestic credit, and real exchange rate effect on price stability are also negative and statistically insignificant in the short run. This was the case for the Gambia, Ghana, Guinea, and Nigeria. This explains the situation of prolonged general price increases and adverse output growth in these countries. In Liberia and Sierra Leone, domestic credit to the private sector and real effective exchange rate respectively exerted a negative and statistically significant effect on the general price level.

From the result of the error correction terms from the model, the speed of adjustment coefficients for the WAMZ shows negative estimates only that of Ghana, Nigeria, and Sierra-Leone are statistically significant at a 1% and 5% level of significance respectively. This implies that in case of any initial distortion in these countries, the distortions would converge towards a long-run equilibrium at a 1% and 5% level of significance.

**Table 7: Long-run effect of monetary policy on price stability**

D.cpi	mpr	m2	dcr	rexx
The Gambia	-1.23247 (6.14375) 0.841	-3.43510 (6.30684) 0.586	-10.12493 (28.10113) 0.719	0.34717 (1.80707) 0.848
Ghana	-9.08286 (3.89182) 0.020**	-0.04530 (2.35524) 0.985	-7.71796 (7.18231) 0.283	-0.85970 (2.95191) 0.771
Guinea	9.69044 (2.66206) 0.000***	-0.10526 (0.51207) 0.837	1.32308 (2.56478) 0.606	-0.01087 (0.00876) 0.215
Liberia	0.54556 (1.78347) 0.760	0.24449 (0.68799) 0.722	11.23951 (6.32032) 0.075*	0.47986 (0.27771) 0.084*
Nigeria	1.48358 (1.65803) 0.371	-0.26629 (0.52370) 0.611	-0.79709 (2.64352) 0.763	0.95879 (0.47220) 0.042**
Sierra-Leone	1.50139 (1.92377) 0.435	1.67827 (1.08988) 0.124	3.86183 (4.92758) 0.433	0.82033 (0.50316) 0.103

**Source:** Authors' Computed from STATA 15 Output.

The first figure in each cell is the estimated coefficient while the second and the third are their respective standard errors and probability values. The figures in parentheses () are the standard errors of the estimates. This study used a 5% level of significance upon which the statistical significance of the estimated variables was examined. The asterisk (\*\*\*) \*\* and \*) denote rejection of the null hypothesis which implies that the estimate of the variable is highly significant at 1%, 5%, and 10% levels of observed significance respectively.

From the results in Table 7, the monetary policy rate exerts a negative and statistically significant effect on price stability in Ghana and Guinea, this conforms to a priori and the finding of Ahiadorme (2022). On the other hand, the coefficients of monetary policy rate for Liberia, Nigeria, and Sierra Leone were positive but statistically insignificant, this was the result obtained by (de Haan, Mavromatis, and Tan, 2020). Finally, the monetary policy rate in the Gambia also exerts a negative and statistically insignificant effect on price stability. For the complementary variables, the money supply exhibits a positive effect on price stability for Liberia and Sierra Leone and it is a negative effect for the Gambia, Ghana, Guinea, and Nigeria,

and all the coefficients across the sample countries are statistically insignificant. Also, Domestic credit to the private sector indicates a positive effect on price stability for Guinea, Liberia, and Sierra Leone while Gambia, Ghana, and Nigeria had a negative effect. In any case, they were all statistically insignificant, except in Liberia where it was statistically significant. The coefficient of real exchange for the Gambia and Sierra Leone also demonstrates a positive and statistically insignificant effect on price stability, this was positive and statistically significant for Nigeria. Conversely, Ghana and Guinea exerted a negative, but still statistically insignificant effect on price stability.

The Juodis, Karavias, and Sarafidis (2021) Granger non-causality test was performed to ascertain the causal relationship between monetary policy regimes and price stability. The result obtained is presented in Table 8 below;

**Table 8: Granger non-causality test results**

<b>Null Hypotheses</b>	<b>HPJ Wald test</b>	<b>P-value (Z-bar)</b>
mpr does not Granger-cause cpi	8.7354	0.0031***
mpr does not Granger-cause cpi	16.4271	0.0001***
m2 does not Granger-cause cpi	0.6080	0.4355
cpi does not Granger-cause m2	76.7083	0.0000***
dcr does not Granger-cause cpi	5.7491	0.0165**
cpi does not Granger-cause dcr	13.7884	0.0002***
rexr does not Granger-cause cpi	5.1189	0.0237**
cpi does not Granger-cause rexr	27.4045	0.0000***

**Source:** *Authors' Computed from STATA 15 Output.*

Note: The asterisk (\*\*\*) \*\* and \*) denotes rejection of the null hypothesis at 1%, 5%, and 10% levels of significance.

The result in Table 8 revealed that there is a bi-directional relationship running from both monetary policy rates to consumer price index proxy for price stability and vice versa in at least one of the countries in WAMZ at a 5% level of significance. This implies that monetary policy rate granger causes price stability in the WAMZ, which is in line with the finding

obtained for Nigeria Ebikila, Agada, Lucky, and Matthew, 2018). The study also found that the consumer price index granger causes money supply in at least one of the countries in the WAMZ at a 5% level of significance without a feedback mechanism. The study also shows a bi-directional relationship running from the domestic credit rate to the consumer price index and vice versa implying that an increase in the level of domestic credit rate in the country resulted in an increase in the general price level in at least one of the countries in WAMZ. This conforms to the finding of Anwar and Nguyen (2018). The study further reveals a bi-directional relationship between the real effective exchange rate and consumer price index in WAMZ and vice versa. The implication is that changes in the real effective exchange rate can induce changes in the general price level, and changes in the general price level can also induce changes in the real effective exchange rate in the WAMZ.

## **5. Discussion of Findings**

The results show that in Ghana, Guinea, Liberia, Nigeria, and Sierra Leone, monetary policy rates have a positive but statistically insignificant effect on price stability in the WAMZ in the short run. Only the Gambia's monetary policy rate reveals a negative effect on price stability and it was also statistically insignificant. These outcomes of monetary policy rates across the sample countries within the corresponding period indicate that changes in the monetary policy rate do not explain the changes in the general price level in the WAMZ in the short run. The money supply effect on price stability is also negative and statistically insignificant in the short run. Economic theories indicate that this is the case when countries are financially repressed, such that interest rate is no longer effective in determining economic outcomes. For money supply, this happens when an economy harbors a large unbanked population with a large amount of cash outside the banking system that is not captured by the formal sector of the economies in the zone making monetary policy become ineffective.

But, in the long run, the monetary policy rate exerts a negative and statistically significant effect on price stability in Ghana and Guinea. Generally, the economic theory asserts that interest rates affect inflation conversely, when inflation is falling and economic growth is slowing, monetary authorities may lower interest rates. Lowering interest rates mean people can afford to borrow more money, so have more money to spend. This makes the economy grow, but it may induce inflation, which can again be controlled by interest rates. Higher interest rates make it more expensive for people to borrow money and they also

encourage people to save. The result is that, overall, people will tend to spend less. If people spend less on goods and services, then the price of those things tends to rise more slowly. On the other hand, the coefficients of monetary policy rate for Liberia, Nigeria, and Sierra Leone were positive but statistically insignificant, so they do not explain changes in the inflation rate due to reasons stated above in the short run. Finally, the monetary policy rate in the Gambia also exerts a negative and statistically insignificant effect on price stability. This was the same for the complementary variables; money supply exhibits a positive effect on price stability for Liberia and Sierra Leone and it is a negative effect for the Gambia, Ghana, Guinea, and Nigeria, and all the coefficients across the sample countries are statistically insignificant.

The result of the granger-causality reveals a bi-directional causation running from both monetary policy rate to consumer price index proxy for price stability and vice versa in at least one of the countries in WAMZ. This implies that the monetary policy rate granger causes price stability in the WAMZ in agreement with the long-run result obtained in the MG estimation. In the same vein, it shows the weak link between money supply and inflation, as the granger-causality result showed a unidirectional flow from the consumer price index to the money supply in at least one of the countries in the WAMZ without a feedback mechanism. All the other variables indicate bi-directional causation indicating that policy implementation may impact them quickly given the fast speed of adjustment in short-run distortion to long-run equilibrium at the shortest possible time for Ghana, Nigeria, and Sierra Leone respectively.

## **6. Conclusion and Recommendations**

In conclusion, the results obtained indicate that the various monetary policy regimes being implemented in the West African Monetary Zone yielded conflicting effects on price stability. In the short run, the monetary policy tools of monetary policy rate and money supply were not significant, only domestic credit to the private sector in Liberia was negatively significant, just like the exchange rate in Sierra Leone. Perhaps, due to the fast speed of adjustment of the short-run distortion to adjust to long-run equilibrium in Ghana, Nigeria, and Sierra-Leone, the long-run estimates indicate that the monetary policy rate is negative and significant for price stability in Ghana and positive and significant in Guinea in the zone. On the whole, the result shows that a monetary policy regime targeting price stability should implement this policy using the monetary policy rate as against money supply which might be ineffective to achieve that goal.



It should be noted that the most active monetary variables of monetary policy rate and money supply show a mix of negative and positive significant effects on price stability with implications for macroeconomic stability and economic growth. So, there is a need to formulate policies to balance these consequences to stimulate the macroeconomic goals of the countries in the West African Monetary Zone.

### **Recommendations**

It is based on these findings of the study that it becomes imperative to make the following policy recommendations to enhance price stability in the West African Monetary Zone.

- i) The monetary policy variables of monetary policy rate and money supply do not have a significant effect on price stability in the WAMZ. So, policymakers must ensure that an effective monetary policy is put in place to curb the persistent inflation in the zone that undermines socio-economic development. To achieve this, the monetary authorities must be more proactive in determining the stance of fiscal policies, developing financial markets, and liberalizing the controlled interest rate practices with sound liquidity management practices.
- ii) The countries should review interest rate policies appropriately to stimulate output growth. That is, make the financial sector to be vibrant and strong enough with the capacity to provide credit at a low-interest rate which in turn will stimulate productivity and economic growth in the West African Monetary Zone.
- iii) There should be cooperation between the monetary and fiscal authorities in the West African Monetary Zone to ensure smooth coordination and consistency in monetary and fiscal pursuits. Put differently, the combination and coordination of both monetary and fiscal policies are highly recommended in the zone.

### **REFERENCES**

- Abere, M.A., Obarafo, S.A. and Adewole, A.O. (2020). "Impact of monetary policies on allocation of loan and advances to small and medium scale enterprises in Nigeria". *International Journal of Economics, Commerce and Management*, VIII (8), August 2020
- Adabor, O. & Buabeng, E. (2020). "Does monetary policy and foreign direct investment have an influence on the performance of stock market: further evidence from Ghana". *Economic Literature*, 2(2), 161-176

- Adetutu, M. O. (2014). "Energy efficiency and capital-energy substitutability: Evidence from four OPEC countries". *Applied Energy*, 119(1), 363–370
- Adetutu, A.O., Ditimi, A., Adelakun, J., Sinyanbola, A. and Jenyo, G. (2021). "Credit crunch, bank lending and monetary policy in Nigeria". *Journal of Tianjin University Science and Technology*, 54(11), 2021 DOI 10.17605/OSF.IO/RCZ2Q
- Agbonkhese, A.O. & Asekome, M.O. (2016). "The impact of monetary policy on bank credit creation in Nigeria: (1980 – 2010)". *International Journal of Business and Social Science*, 4(15), 160-165
- Ahmed, A.O. (2020). "Nexus between monetary policy and bank credit: New insight from Nigeria". *Global Journal of Management and Business Research: B Economics and Commerce*, 20(2), Version 1.0 Year 2020
- Ahiadorme.J. W. (2022). "Monetary policy in search of macroeconomic stability and inclusive growth" *Research in Economics* 76(2). DOI:10.1016/j.rie.2022.08.002
- Asaleye, A.J., Popoola, O., Lawal, A.I., Ogundipe, A. & Ezenwoke, O. (2018). "The credit channels of monetary policy transmission: implications on output and employment in Nigeria". *Banks and Bank Systems*, 13(4), 103-118.
- Awoniyi, C.O. and Ogundipe, A.T. (2021). "Influence of monetary policy on the credit supply to small and medium scale enterprises in Nigeria (1993 -2018)". *Research Square*, DOI: <https://doi.org/10.21203/rs.3.rs-885734/v1>
- Bala, U., Godiya, I., Hadith, N.B. and Maijama'a, R. (2022). "The Effect of monetary policy on the performance of deposit money banks in Nigeria". *Journal of Business Management and Economic Research*, 2022, 6 (1), 10-23 DOI: 10.29226/TR1001.2022.292
- Balogun, E.D. (2007). "Monetary policy and economic performance of West African monetary zone countries". *Munich Personal RePec Archive*. Retrieved from: <http://mpra.ub.uni-muenchen.de/4308>
- Benetton, M., & Fantino, D. (2021). "Targeted monetary policy and bank lending behavior". *Journal of Financial Economics*, 142(1), 404–429. doi:10.1016/j.jfineco.2021.05.002
- Bianco, T. (2021). "Monetary policy and credit flows". *Journal of Macroeconomics*, 70, 103362. doi:10.1016/j.jmacro.2021.103362
- Cobham, D. (2018). "A new classification of monetary policy frameworks". Available at <https://voxeu.org/article/new-classification-monetary-policy-frameworks>
- de Haan, J. Mavromatis, K. and Tan, G. (2020). "Individual inflation forecasts and monetary policy announcements". In: *Economics Letters*. Vol. 197
- Ebikila, S., Agada, F. A. Lucky, T. & Matthew, B. (2018). "Impact of money supply on some macroeconomic variables on the Nigerian economy". *International Journal of Scientific and Research Publications*, 8 (8) 18-32

- Folarin, O. E., & Asongu, S.A. (2019). “Financial liberalization and long-run stability of money demand in Nigeria”. *Journal of Policy Modeling* (forthcoming).
- Gambacorta, L. (2017). “Monetary policy and bank lending in a low interest rate environment: diminishing effectiveness?” *Journal of Macroeconomics*, 45, 32-48
- Gujarati, D. N and Porter, D. C. (2006). *Essentials of Econometrics*. McGraw-Hill, 3d ed., (2006)
- Harvey, S.K. & Cushing, M.J. (2015). “Is West Africa monetary zone a common currency area?” *Review of Development Finance*, 5, 53-63
- Hausman, J. (1978) “Specification tests in econometrics”. *Econometrica*, 46, 1251-1271.
- Iddrisu, A. and Alagidede, I.P. (2020). “Revisiting interest rate and lending channels of monetary policy transmission in the light of theoretical prescriptions”. *Central Bank Review*, 20 (2020) 183e192
- Juodis, A., Karavias, Y. and V. Sarafidis (2021). “A homogeneous approach to testing for granger non-causality in heterogeneous panels. *Empirical economics*, 60, 93–112.
- Lartey, L. (2018). “The Signalling effect of monetary policy rate on lending rates in Ghana”. *Munich Personal RePEc Archive*, Paper No. 92244
- Matemilola, B.T., Bany-Ariffin, A.N. & Muhtar, F.E. (2015). “The impact of monetary policy on bank lending rate in South Africa”. *Borsa –Istanbul Review*, 15(1), 53-59
- Modugu, K.P. and Dempere, J. (2022). “Monetary policies and bank lending in developing countries: evidence from Sub-Sahara Africa”. *Journal of Economics and Development*, DOI 10.1108/JED-09-2021-0144
- Mordi, C.N.O., Adebisi, M.A. & Omotosho, B.S. (2019). “Modelling interest rates pass-through in Nigeria: an error correction approach with asymmetric adjustments and structural breaks”. *Contemporary Issues in the Nigerian Economy: A Book of Readings*, Central Bank of Nigeria.
- Mukolu, M.O. and Adeleke, K.O. (2020). “Lending rates and the performance of money deposit banks in Nigeria”. *International Journal of Management Studies and Social Science Research*, 2(1), 124-131
- Nana K. A. (2020). *Monetary policy and macroeconomic stabilization: An application of new keynesian for forecasting and policy analysis in Ghana*. PhD Thesis. Department of Economics, Faculty of Social Sciences, University of Ghana
- Ndubuaku, V.C., Ifeanyi, O., Nze, C. and Onyemere, S. (2017). “Impact of monetary policy (interest rate) regimes on the performance of the banking sector in Nigeria”. *IOSR Journal of Economics and Finance (IOSR-JEF)* 8(4) Ver. I, 16-32
- Obeng, S.K., & Sakyi, D. (2017). “Macroeconomic determinants of interest rate spreads in Ghana”. *African Journal of Economic and Management Studies*, 8(1), 76-88.

- Ogolo, and Tamunotonye, M. (2018). “Monetary policy and commercial bank lending to the real sector in Nigeria: A Time Series Study”. *American Finance & Banking Review*, 2(1), 2018
- Olakanmi, O.A. & Olagunju, O. (2020). “Monetary policy and inclusive growth in Nigeria”. *International Journal of Development and Economic Sustainability*, 8(2), 1-9
- Olofinlade, S.O. and Azeez, B.A. (2021). “The composite effects of monetary policy on bank lending and Nigeria economic performance: further empirical evidence”. *Journal of Business School*, 2021, 4(2), 176-188
- Olofinlade, S.O., Oloyede, J.A. and Oke, M.O. (2020). “The effects of monetary policy on bank lending and economic performance in Nigeria”. *Acta Universitatis Danubius*, 16(2), 150-159.
- Onye, K. & Umoh, O. J. (2021). “Fiscal policy and monetary integration in the ECOWAS. AERC CREA”. *Policy brief*, 762
- Oyeyemi, D.O. (2019). “Effectiveness of monetary policy instruments in Nigeria (time series approach)”. *A Project Submitted to the Department of Economics, Faculty of Social Sciences, in Partial Fulfillment of the Requirements for the Award of Bachelor of Science (B.Sc) Degree in Economics, Lagos State University, Ojo.*
- Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). “Pooled mean group estimation of dynamic heterogeneous panels”. *Journal of the American statistical Association*, 94(446), 621–634.
- Poole, W. (1970). “Optimal choice of monetary policy instruments in a simple stochastic macro model”. *The Quarterly Journal of Economics*, 84(2), 192–216.
- Takyi, P.O. & Fosu, R. (2019). “Inflation targeting monetary policy and macroeconomic performance: the case of middle income countries”. *Applied Economics and Finance*, 6(5), 1-8
- Tule, M. K., Ajilore, T., & Ujunwa, A. (2019). Monetary policy contagion in the West African Monetary Zone”. *Foreign Trade Review*, 54(4), 375-398.
- Ufoeze, L.O., Odimgbe, S.O., Ezeabalisi, V.N. & Alajekwu, U.B. (2018). “Effect of monetary policy on economic growth in Nigeria: an empirical investigation”. *Annals of Spiru Haret University*
- Ujunwa, A., Onah, E., Ujunwa, A. I., Okoyeuzu, C. R., & Kalu, E. U. (2022). “Financial innovation and the stability of money demand in Nigeria”. *African Development Review*.
- Uruakpa, P.C. (2019). “Impact of monetary policy on deposit money banks’ performance: the case of Nigeria”. *Journal of Finance, Banking and Investment*, 5(1), 2019.
- Yunusa, L.A., Williams, T.O. and Adegbenle, O.J. (2020). “Monetary Policy and Bank Lending in Nigeria”. *Acta Universitatis Danubius*, 16(1), 112-127 2020