



Assessing the effects of Monetary Policy on Price stability in Nigeria

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Abstract

This study examined the empirical relationship between monetary policy and consumer price index in Nigeria during 1981-2021. The specific objectives were to determine how money supply, lending rate, monetary policy rate and exchange rate affected the consumer price index, proxy for inflation. Time series data were obtained from the Central Bank of Nigeria Statistical Bulletin, National bureau of Statistics and World Development Indicators and analysed using descriptive statistics as well as the econometrics method of unit root, bounds cointegration test and ARDL estimation. The findings from the unit root test showed that the variables were mixed integrated. While consumer price index, lending rate and monetary policy rate were stationary at levels, the other variables were stationary at first difference. The bounds cointegration test results showed that there was evidence of long run relationship between dependent and the explanatory variables. The ARDL results showed that money supply had a positive and not statistically significant effect on the consumer price index, indicating that one percent increase in the money supply increases the consumer price index in Nigeria by 162.09 percent in the long run; the lending rate showed a negative and not statistically significant effect on the consumer price index, indicating that one percent increase in the lending rate decreases the consumer price index by 111.21 percent in the long run; the result further showed a positive and statistically significant effect of monetary policy on consumer price index, indicating that one percent increase in the monetary policy rate increases the consumer price index by 311.20 percent in the long run; and the exchange rate showed a negative and statistically significant effect on the consumer price index in Nigeria, indicating that one percent increase in the exchange rate decreases the consumer price index by 12.73 percent in the long run. Based on the findings, the study recommended among others, that the government should implement policies aimed at stabilizing the exchange rate, such as enhancing foreign exchange reserves through diversified exports and attracting more foreign direct investments. Additionally, policies that reduce the demand for imports, such as promoting local production, can help stabilize the exchange rate and, by extension, control inflation.

Key Words: Monetary Policy Rate, Money Supply, Exchange Rate and Consumer Price Index,

Introduction

Macroeconomic goals such as full employment, price stability, high growth, and external balance are crucial for all economies, irrespective of their level of development. These objectives are not automatically achieved but require deliberate policy interventions (Olawunmi & Ayinla, 2017). Among the tools at the disposal of governments and central banks to guide economic policy towards these goals is monetary policy.



Monetary policy is essential for economic stabilization and involves regulating the volume, cost, availability, and direction of money and credit in an economy to achieve macroeconomic policy objectives (Olawunmi & Ayinla, 2017). It is primarily concerned with the management of interest rates and the total supply of money in circulation and is generally carried out by Central Banks to control inflation, stabilize currency, and achieve sustainable economic growth.

One of the primary goals of monetary policy is to maintain price stability. Price stability means keeping the price levels in an economy relatively constant by allowing money to retain its value and reducing uncertainty in price forecasts (European Central Bank, 2020). This stability is crucial as it enhances the transparency of the price mechanism, contributing to increased economic activity and employment. The Central Bank of Nigeria (CBN), for instance, has actively used monetary policy to stabilize prices and foster economic growth by managing the money supply (Central Bank of Nigeria, 2012).

The effectiveness of monetary policy in achieving price stability can significantly impact an economy. In Nigeria, various studies have shown that monetary policy tools like the cash reserve ratio significantly affect price stability (Bank-Ola, Jemiluyi, & Johnson, 2020). Furthermore, factors such as the exchange rate and money supply have been found to influence price stability both in the short and long term (Ahmed & Ibitoye, 2016).

Monetary policy plays a pivotal role in achieving macroeconomic stability by influencing economic variables such as inflation rates, economic growth, and employment levels. As such, it is vital for policymakers, especially in developing countries like Nigeria, to understand and effectively implement monetary policy to achieve these desired macroeconomic outcomes.

The primary objective of monetary policy in Nigeria, as in many countries, is to achieve price stability. Price stability is crucial because fluctuations can lead to capital flight or deter potential investors, thereby affecting employment and Gross National Product (GNP). Over the years, the Central Bank of Nigeria (CBN) has alternated between tight and loose monetary policies to stabilize prices. Despite these efforts, Nigeria continues to experience high rates of price instability, indicating that these policies may not be as effective as intended (Central Bank of Nigeria, 2021).



This persistent price instability has significant implications for Nigeria's economic growth. Despite the country's vast economic potential, it has struggled to harness this for rapid economic development. Macroeconomic indicators such as the balance of payments, import obligations, inflation rate, exchange rate, and national savings have shown disappointing trends in recent years (National Bureau of Statistics, 2021). The ongoing rise in general price levels has underscored the need to evaluate whether the monetary policies implemented by the CBN are truly capable of addressing price instability and controlling inflation.

Price stability is fundamental not only to economic growth but also to employment generation, production, and investment decisions. This underscores the importance of investigating the effectiveness of monetary policy in achieving desired economic outcomes in Nigeria. Although numerous studies have been conducted on monetary policy and price stability, they have produced mixed results and are largely outdated, with none extending up to 2021. It is against this backdrop that this study asked the following questions; to what extent does money supply affect price stability in Nigeria? How does lending rate affect price stability in Nigeria? What is the relationship between monetary policy rate and price stability in Nigeria? To what extent does exchange rate affect price stability in Nigeria? The aim of the study was to empirically examine the extent to which monetary policy has been effective in enhancing price stability in Nigeria. Specifically, the study examined the effects of money supply, lending rates, monetary policy rates and exchange rates on price stability in Nigeria.

Literature Review

Classical Theory

The widely accepted approach to monetary economics was known as the quantity theory of money, which was part of a broader approach to micro and macro issues referred to as classical economics. This theory was based on the works of Irving Fisher, who laid the foundation of the quantity theory of money through his equation of exchange. The classical school evolved through the concerted efforts and contributions of economists like Jean-Baptiste Say, Adam Smith, David Ricardo, and Pigou, among others, who shared the same beliefs.

The classical economists agreed that the quantity theory of money was the determinant of the general price level. The private market, such as banks, provided the best framework for achieving socially and economically desired outcomes. According to the theory, the role of government was



to provide a system of laws and security to protect private property, as well as to provide a stable financial and monetary framework.

Monetarism/Neo-Classical Theory

Milton Friedman's 1956 monetarist theory, often referred to as the Monetarist Theory of Money, marked a significant shift in the understanding of the role of money supply in economic activity. This theory was a critical response to the then-dominant Keynesian economics, which emphasized government intervention and fiscal policy as primary tools for managing economic fluctuations.

Friedman argued that the supply of money has a direct, predictable effect on price levels and economic output. Central to his theory is the assertion that inflation is always and everywhere a monetary phenomenon. According to Friedman, stable economic growth could be most effectively maintained by controlling the growth rate of the money supply.

Friedman's monetarist theory posited that the velocity of money (the rate at which money changes hands) and the real output are relatively stable in the short run. Therefore, any change in the money supply has a direct and proportional effect on the price level. He advocated for a fixed annual increase in the money supply, aligning with the natural growth rate of the economy, typically around 2-3% per year. This approach, he argued, would prevent the boom and bust cycles associated with discretionary monetary policy and lead to greater economic stability.

His ideas profoundly influenced monetary policy, particularly in the late 20th century, leading to the adoption of targets for money supply growth by many central banks around the world. Although the strict monetarist approach has been modified over time, Friedman's emphasis on the importance of controlling money supply continues to influence monetary policy decisions today.

Empirical Literature

Eggon and Ajidani (2021) examined the impact of monetary policy management on inflation in Nigeria during the 1985- 2019. Autoregressive distributed lag analysis was employed on time series data covering the period. It was found that while monetary policy rate and foreign exchange rate impacted negatively on inflation; broad money supply impact positively on it. Therefore, the study recommended that monetary authorities should fix the exchange rate at where the value of naira will rise. Besides, government should direct more investment on productive activities in order



to increase output of goods and services in the country. This will lead to a fall in inflation rate and hence economic growth in the country.

Bank-Ola, Jemiluyi and Johnson (2020) examined the impact of monetary policy on price stability in Nigeria from 1986 to 2018. The cash reserve ratio, liquidity ratio, exchange rate, money supply and import of goods and services were the monetary policy variables used while inflation consumer prices was the variable used to measure price stability. For this study, secondary time series data which was obtained from the CBN Statistical Bulletin 2018 and WDI were adopted and the Auto-Regressive Distributed Lag (ARDL) model was employed after conducting a diagnosis test. The results of the analysis showed that of all the monetary policy instruments used; only cash reserve ratio had a positive and significant effect in ensuring price stability. Liquidity ratio, exchange rate, and money supply negatively and insignificantly impacted on price instability, while import of goods and services was positive though insignificant for the period examined. Based on the results, it was therefore recommended that indirect monetary policy should continue to be used to bring consumer prices to a reasonable low level so as to strengthen the purchasing power of the Naira, which will eventually reduce; unemployment rate, interest rate, inflation rate, arbitrary redistribution of wealth and income, and consequently lead to economic growth and external viability.

Ekong and Effiong (2020) examined the effectiveness of a monetary-fiscal coordination in inflation targeting in Nigeria for the period 1985 to 2019. The study got its inspiration from the monetarist assertion that inflation is strictly a monetary phenomenon. Data were obtained from the Central Bank of Nigeria statistical bulletin and the World Bank database on World Development Indicators. The study employed the Augmented Dickey-Fuller unit root test, ARDL bounds test for cointegration, and the Error Correction Mechanism (ECM). The unit root test revealed that the variables were stationary at mixed order of level $I(0)$ and first difference $I(1)$. This mixed order made us to employ the ARDL Bounds test for cointegration and the result indicated that there is a long run relationship. The Error Correction Mechanism revealed that 55.4% of the short run disequilibrium is corrected annually. Meanwhile, the study revealed that both monetary policy channels and fiscal policy significantly influence inflation both in the long run and in the short run. The study concluded by stating that there is a need for a sound monetary-fiscal coordination in the



Nigerian economy if the fight against inflation is to be won hence, inflation should not only be viewed as a monetary phenomenon.

Chukwuemeka (2018) investigated the impact of monetary policy on price stability in Nigeria. Annual data covering 1981 – 2015 were utilized. Unit root test was conducted using Augmented Dickey-Fuller test method and the result showed that the variables were stationary though at different levels. Co-integration test was also conducted using Johansen co-integration technique and the result revealed that the variables in the model are co-integrated implying that the variables have a long run relationship. The model was estimated using ordinary least square method and the result revealed that money supply and liquidity ratio have a significant impact with price stability. The result revealed that 96.27 percent of the total variation in the model is caused by changes in the explanatory variables. Based on these findings, the study recommended that the central bank should adopt appropriate monetary policy by reducing money supply, increasing the liquidity ratio as these will lead to reduction in consumer's price index.

Ahmed and Ibitoye (2016) examined the impact of monetary policy on price stability in Nigeria from 1970 to 2014. The data obtained for the purpose of the study through Central Bank of Nigeria Statistical Bulletin were analysed using ordinary least square regression (OLS) model, unit root test and Johansen co-integration test. Consumer Price Index (CPI) is used as a proxy for general price level, which is the explained variable. Exchange rate and money supply were used as explanatory variables. The research also addressed various problems associated with monetary policies such as budget deficits, change in policy formulation, lack of enabling environment in the financial market and political instability. The result of the findings revealed that exchange rate and money supply actually influenced price stability in Nigeria both in the short-run and long-run. This is evidenced by 90% coefficient of determination and F-Statistics of 168.30 which is higher than the tabulated F-Statistics.

Ahmed and Murtala (2014) examined the extent of the impact of changes in interest rate (INTR), money supply (MS) and liquidity ratio (LQDR) on inflation rate (INFR) in Nigeria from 1990-2013. Secondary data were sourced from different publications of CBN and the National Bureau of Statistics for this study. The paper uses Ordinary Least Square (OLS) method in conducting this study. The findings of the study revealed that there is a relationship between the explained variable (inflation rate) and the explanatory variables (i.e. money supply, interest rate and liquidity ratio).



Durbin Watson (D.W.) statistics is used to examine the degree of autocorrelation among the explanatory variables used in the research. The study finally recommended for sustainability in the implementation of monetary policy in Nigeria. And that as a precaution against wrong choice of instrument of monetary control, immediate and remote causes of macroeconomic instability should be identified first before selecting the appropriate tool to be used in order to address the problem effectively.

Onayemi (2013) also investigated the price stability effect of monetary policy and output growth in Nigeria from 1970 to 2011 following the adoption of the Keynesian inflationary gap model that emanates from the quantity theory of money. The empirical evidence shows that previous price gap tends to be a significant determinant of inflationary pressure. The result also reveals that changes in monetary aggregate and output gap enhance inflationary pressure in Nigeria as a result of inefficiency of monetary and macroeconomic policies in stabilizing the price level.

Adesoye (2012) examined the Cointegration and causality between price, monetary policy aggregate and real output in Nigeria from the period of 1970 to 2009 using the inflationary gap model that results from the quantity theory of money. The empirical results revealed that inflation is a monetary phenomenon and previous price and output are strong indicators of controlling monetary aggregate in Nigeria.

Methodology

The ex-post facto research design adopted in this study. The secondary data for the study were sourced from world development indicators, Central Bank of Nigeria statistical bulletin and National Bureau of Statistics publications.

The functional form of the model was expressed as:

$$\text{CPI} = f(\text{M2}, \text{LR}, \text{MPR}, \text{EXR}) \quad (1)$$

CPI = consumer price index

M2 = money supply

LR = lending rate

MPR = monetary policy rate

EXR = exchange rate



Econometric Model:

Equation (1) is transformed into an econometric model as follows:

$$CPI_t = \alpha_0 + \sum_{i=1}^K \alpha_{1i} \Delta CPI_{t-1} + \sum_{i=1}^K \alpha_{2i} \Delta M2_{t-1} + \sum_{i=1}^K \alpha_{3i} \Delta LR_{t-1} + \sum_{i=1}^K \alpha_{4i} \Delta MPR_{t-1} + \sum_{i=1}^K \alpha_{5i} \Delta EXR_{t-1} + \beta_1 i CPI_{t-1} + \beta_2 M2_{t-1} + \beta_3 LR_{t-1} + \beta_4 MPR_{t-1} + \beta_5 EXR_{t-1} + U_t \quad (2)$$

Where: α_0 = intercept

$\alpha_1 - \alpha_4$ = short run dynamic coefficients of the explanatory variables

$\beta_1 - \beta_4$ = long run multipliers

e_t = White noise error process

Δ = First difference operator

K = maximum lag order automatically selected based on AIC

i and t denote country of study and timeframe respectively

Data Analysis Techniques

The study employed the ARDL model to estimate the model.

Results and Discussion

ADF unit root test results

The result of the ADF unit root test is presented in Table 1.

Table 1: ADF unit root test results

Variable	Results @levels		Results @1 st difference		Order of integration
	ADF stat.	Critical value	ADF stat.	Critical value	
CPI	-3.009	-2.94	-	-2.94	I(0)
M2	-0.8065	-2.94	-5.7685	-2.94	I(1)
LR	-3.3997	-2.94	-	-2.94	I(0)
MPR	-3.3345	-2.94	-	-2.94	I(0)
EXR	2.9248	-2.94	-3.7963	-2.94	I(1)

Source: Researcher’s computation using E-views software



As observed from the results, consumer price index, lending rate and monetary policy rate are stationary at levels given that the computed ADF statistics (-3.009, -3.3997 and -3.3345) for each of the variables are greater than the corresponding critical value (-2.94) in absolute terms. This implies that the null hypothesis of unit root is rejected at 5 percent significance level. Further, it was observed from the results that money supply and exchange rate are stationary at first difference.

Bounds co-integration test results

The result of the Bounds co-integration test is presented in Table 2 below

Table 2: Bounds co-integration test results

Series: CPI M2 LR MPR EXR		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	5.5015	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Researcher’s computation using E-views software

As observed from the bounds cointegration table, the computed F-statistic (5.5015) is greater than the lower and upper critical value of 4.01 at 5 percent significance level. This finding is a pointer that the variables are cointegrated.



ARDL results of the short and long run

The result of the ARDL of the short and long run are presented in Table 3

Table 3: ARDL results of the short and long run

Dependent Variable: CPI				
Short run results				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CPI(-1))	0.5322	0.1651	3.2222	0.0031
D(M2)	1.2007	0.7195	1.6687	0.1056
D(LR)	-0.8238	0.6004	-1.3718	0.1803
D(MPR)	-0.0110	0.6743	-0.0163	0.9871
D(MPR(-1))	-2.3639	0.6693	-3.5315	0.0014
D(EXR)	-0.0943	0.0339	-2.7782	0.0093
CointEq(-1)	-0.7407	0.1497	-4.9460	0.0000
Long Run results				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
M2	1.6209	1.0732	1.5103	0.1414
LR	-1.1121	0.8259	-1.3464	0.1883
MPR	3.1120	1.1250	2.7660	0.0096
EXR	-0.1273	0.0498	-2.5532	0.0160
C	-12.4492	20.4297	-0.6093	0.5469
Adjusted R-squared	0.5555		Prob.(F-stat.)	0.0000

Source: Researcher’s computation using E-views software



The ARDL results show that the consumer price index lagged for one period is positive and significantly associated with the current level of the consumer price index in the short run. The results showed that money supply has a positive and not statistically significant effect on the consumer price index. This is evidenced by the positive coefficient value (1.2007) of money supply and its p-value (0.1056), which is greater than 0.05, indicating that one percent increase in the money supply increases the consumer price index in Nigeria by 120.07 percent in the short run. Similarly, the long-run results show a positive and not statistically significant effect on the consumer price index. This is evidenced by the positive coefficient value (1.6209) of money supply and its p-value (0.1414), which is greater than 0.05, indicating that one percent increase in the money supply increases the consumer price index in Nigeria by 162.09 percent in the long run.

Furthermore, the lending rate shows a negative and not statistically significant effect on the consumer price index in Nigeria. This is evidenced by the negative coefficient value (-1.8238) of lending rate and its p-value (0.1803), which is greater than 0.05, indicating that a one percent increase in the lending rate decreases the consumer price index by 82.38 percent in the short run. Similarly, in the long run, the lending rate shows a negative and not statistically significant effect on the consumer price index. This is evidenced by the negative coefficient value (-1.1121) of lending rate and its p-value (0.1883), which is greater than 0.05, indicating that a one percent increase in the lending rate decreases the consumer price index by 111.21 percent in the long run.

Furthermore, the results show that the monetary policy rate at the current year and lag1 exhibits a negative relationship and is statistically significant only at lag1 in Nigeria. This is evidenced by the negative coefficient value (-0.0110) and (-2.3639) of monetary policy rates and its p-value (0.9871) and (0.0014), for the current year and lag 1 respectively, which is greater than 0.05 for the current year and less than 0.05 for the lag 1, indicating that a one percent increase in the monetary policy rate at the current year and lag1 decreases the consumer price index by 1.10 percent and 236.39 percent, respectively, in the short run. On the other hand, the long-run result shows a positive and statistically significant effect, which is evidenced by the positive coefficient value (3.1120) of monetary policy rate and its p-value (0.0096), which is less than 0.05, indicating that a one percent increase in the monetary policy rate increases the consumer price index by 311.20 percent in the long run.



In addition, exchange rate shows a negative and statistically significant effect on the consumer price index in the short run. This is evidenced by the negative coefficient value (-0.0943) of exchange rate and its p-value (0.0093), which is less than 0.05, implying that a one percent increase in the exchange rate decreases the consumer price index by 9.43 percent in the short run. Similarly, in the long run exchange rate shows a negative and statistically significant effect on the consumer price index in Nigeria, which is evidenced by the negative coefficient value (-0.1273) of exchange rate and its p-value (0.0160), which is less than 0.05, implying that a one percent increase in the exchange rate decreases the consumer price index by 12.73 percent in the long run.

The error correction coefficient value of -0.7407 is negative and statistically significant, indicating that the model adjusts to the long-run equilibrium position at a speed of 74 percent.

Table 4: Post-estimation test results

Test type	Test statistic	Probability value
Breusch-Godfrey serial correlation LM test	Chi-square (5.4129)	0.0668
Breusch-Pagan-Godfrey heteroskedasticity test	Chi-square (4.4804)	0.8114

Source: Researcher’s computation using E-views software

The post-estimation test results showed that there is no evidence of serial correlation and heteroscedasticity in the model at 5 percent significance level given that the associated probability values of the Chi-square statistics for the Breusch-Godfrey serial correlation LM test and Breusch-Pagan-Godfrey heteroscedasticity test results are greater than 0.05. Overall, the post-estimation test results provided the empirical evidence for the reliability of the estimated model.

Conclusion

In this study, the effect of monetary policy on price stability in Nigeria was examined over the period 1981-2021. The findings shows that money supply and monetary policy rate contributes positively to consumer price index in the long-run, while lending rate and exchange rate did not enhance consumer price index in Nigeria. However, monetary policy rate and exchange rate were found to have a significant impact on consumer price index in the long-run.

Recommendations



The recommendations based on the findings are provided as follows:

1. The monetary authorities should move towards controlling the volume of money in the economy through restrictive monetary policy to ensure stability in the price level.
2. The government should implement policies aimed at stabilizing the exchange rate, such as enhancing foreign exchange reserves through diversified exports and attracting more foreign direct investments. Additionally, policies that reduce the demand for imports, such as promoting local production, can help stabilize the exchange rate and, by extension, control inflation.
3. The government, through the CBN, should ensure that lending rates are conducive to fostering economic growth without exacerbating inflationary pressures. This might involve maintaining a balance between encouraging borrowing and spending, and preventing excessive liquidity that could lead to inflation.
4. The CBN should consider the timing and potential long-term effects of changes in the monetary policy rate. Implementing a forward-looking monetary policy that considers both immediate and future impacts on inflation and economic growth could be beneficial.

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