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MONETARY POLICY AND PRICE STABILITY IN NIGERIA

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Abstract

Inflation remains a persistent challenge in Nigeria, driven by rising prices of goods and services, which create uncertainty and discourage investment. Structural issues such as reliance on oil revenue, limited economic diversification, and political instability further complicate monetary policy efforts to maintain price stability. This study examines the impact of monetary policy tools on inflation in Nigeria, focusing on the monetary policy rate (MPR), money supply (MS), exchange rate (ER), lending rate (LR), petrol price (PP), and import commodity price index (ICP). Using annual time-series data from 1981 to 2023, the Autoregressive Distributed Lag (ARDL) model is applied to analyse both short- and long-run dynamics. The results show that money supply, petrol prices, and import prices have statistically significant positive effects on inflation, identifying them as key inflationary drivers. Conversely, the effects of the MPR and lending rate are not statistically significant, indicating that interest rate policies alone may not effectively curb inflation. Granger causality analysis reveals a unidirectional causality from exchange rate to inflation, highlighting the importance of exchange rate stability. The study recommends that the Central Bank of Nigeria adopt an inflation-targeting framework, enhance policy transparency, and align monetary policy with supportive trade and fiscal strategies. Structural reforms aimed at economic diversification and reduced reliance on oil revenue are also essential to improving monetary policy effectiveness and ensuring long-term price stability.

Keywords: Monetary policy, monetary policy tools, price stability, Inflation, Nigerian Economy

JEL Classification Codes: E31, E51, E52

1.0 Introduction

1.1 Background to the Study

Price stability, as a key objective of monetary policy, is desirable for several reasons. First, it facilitates an improved standard of living by reducing the adverse effects of both inflation and deflation on investment, employment, and economic growth. A stable price regime allows economic agents to make informed investment and consumption decisions, reducing uncertainty about future price developments (Mandeya & Ho, 2021). Price stability also enhances the effectiveness of monetary policy by minimizing inflation risk premiums, thereby increasing investor confidence and fostering economic growth.

Additionally, it reduces the need for hedging activities, ensuring that resources are directed toward productive uses that contribute to domestic output.

Price stability refers to a situation where the general price level changes at a relatively slow and predictable rate over time. Inflation, defined as a sustained increase in the general price level, undermines economic growth by distorting price signals, discouraging savings, and reducing the purchasing power of fixed-income earners **(**Altansukh, Baranchuluun, & Clark 2017). High inflation leads to inefficient allocation of resources, disrupts long-term investment planning, and weakens economic output. Conversely, deflation—an overall decline in price levels— discourages consumption and investment, potentially leading to economic stagnation. Consequently, central banks across the globe, including the Central Bank of Nigeria (CBN), prioritize price stability as a fundamental goal of monetary policy.

In order to ensure economic stability, apex banks use macroeconomic measures known as monetary policy (MP) to control the currency supply, interest rates, and credit availability. According to Bernanke (2020), the CBN employs a variety of monetary policy tools to contain inflation and maintain price stability, including the monetary policy rate (MPR), exchange rate measures, money supply control, lending rate changes, and import commodity pricing mechanisms. Through open market operations, the CBN influences short-term interest rates, which tend to affect broader economic activities (Borio, 2014). The monetary policy stance can be expansionary—aimed at boosting economic activity by lowering interest rates—or contractionary, which seeks to reduce inflationary pressures by tightening monetary conditions.

The effectiveness of Nigeria's monetary policy in achieving price stability has been influenced by various macroeconomic factors, including fluctuations in the exchange rate, petroleum price volatility, and structural economic constraints. The CBN defines money supply in terms of narrow money (M1) and broad money (M2), with the latter encompassing time deposits, savings, and foreign currency deposits. An excessive money supply relative to economic output can trigger inflationary pressures, necessitating regulatory interventions (Doguwa & Essien, 2013).

Over the past three decades, Nigeria has experienced significant inflationary fluctuations. The inflation rate surged in the 1990s from 63.6% to 72.8%. Although economic reforms in 2003 temporarily stabilized inflation, subsequent years witnessed inflationary pressures, with rates rising to 12.9% in 2000 and 14% in 2001 (Adenuga, Bello & Ejumedia, 2012). Inflation remained in double digits between 2002 and 2005, peaking at 17.9% in 2005 before

declining to 8.24% and 5.38% in 2006 and 2007, respectively. However, inflationary pressures resurged, with rates increasing to 11.60% in 2008, 12.00% in 2009, and fluctuating between 11.8% and 12.3% in 2010 and 2013 (Gbadebo & Muhammed, 2015). Inflation temporarily declined to 8.1% in 2014 before rising again to 9.1% in 2015 and sharply escalating to 15.7% in 2016. More recently, Nigeria's inflation rate rose to 16.9% in 2021 and 18.8% in 2022, eroding the real value of money, reducing investments, and dampening GDP growth in 2023 (Zubair, Adams & Aniagolu, 2022).

The rising cost of essential commodities further reflects Nigeria's inflationary trend. According to the National Bureau of Statistics (NBS, 2023), the average price of 1kg of boneless beef increased from N2,029.59 in May 2022 to N2,520.52 in May 2023, marking a 24.19% year-on year rise. Similarly, the average price of 1kg of tomatoes rose by 17.68%, from N423.48 in May 2022 to N498.34 in May 2023. The price of local rice increased by 24.06% within the same period, while onion prices surged by 17.12%. Yam tuber prices recorded a 22.84% year-on-year increase (NBS, 2023). These trends highlight the growing inflationary burden on consumers, reducing real incomes and purchasing power.

In response to persistent inflationary pressures, the Nigerian government has implemented various policies to curb price instability. These include tightening monetary policy through higher rates of interest, regulating money supply growth, and stabilizing exchange rates. The CBN has also adopted measures such as adjusting the MPR to manage inflation expectations, imposing import restrictions to reduce dependence on foreign goods, and implementing fuel subsidy reforms to minimize cost-push inflation (Chugunov et al., 2021). Additionally, the government has introduced social intervention programs aimed at mitigating the effects of inflation on vulnerable populations.

Despite these efforts, Nigeria's inflation control measures face challenges due to external shocks, exchange rate volatility, and structural economic weaknesses. The dependence on oil revenue exposes the economy to fluctuations in global oil prices, which directly impact the cost of petroleum products and, by extension, general price levels. Strengthening monetary policy effectiveness requires a comprehensive approach, including enhancing institutional credibility, promoting financial market stability, and implementing structural reforms to improve domestic production capacity and reduce import dependency.

Given Nigeria's persistent inflationary trends and the evolving dynamics of global economic policies, achieving price stability remains a critical policy goal. The success of monetary policy in addressing inflation

hinges on a combination of sound macroeconomic management, prudent fiscal policies, and targeted interventions to address structural constraints within the economy. Thus, a more holistic and coordinated approach is necessary to ensure sustainable price stability and economic growth in Nigeria.

1.2 Statement of the Problem

Price stability has long been a critical challenge in Nigeria, with significant implications for overall economic performance. In addition to decreasing money's purchasing power, persistent inflation is characterised by a continuous rise in the average price of goods as well as services but also contributes to heightened uncertainty in the economy. This instability undermines both consumption and investment, as economic agents become wary of unpredictable price movements, leading to reduced economic growth and development (Acharya et al., 2020).

Despite the CBN implementing numerous monetary policy measures, such as adjustments in interest rates and money supply management, inflation remains a persistent issue. Traditional economic models suggest that inflation is largely a monetary phenomenon, primarily driven by money supply expansion. However, Nigeria's inflationary trends present a more complex picture, indicating that factors beyond the monetary framework—such as exchange rate volatility, fiscal policy imbalances, and structural inefficiencies—play a critical role in shaping inflationary outcomes (Güler, 2021). This complexity raises important questions regarding the adequacy and effectiveness of the Nigerian monetary policy in containing inflation.

The role of interest rates, particularly the MPR, is central to this debate. One of the CBN's essential instruments is the MPR used to influence borrowing costs, which, in turn, affects production costs and overall economic activity. However, the fluctuations in the lending rate have not only constrained business expansion but have also contributed to escalating production costs, which further exacerbates inflationary pressures. Furthermore, the instability of the Nigerian exchange rate, compounded by the country's reliance on imported goods and services, has led to imported inflation, which continues to undermine domestic price stability. This interconnection between domestic monetary policy and external economic shocks necessitates a more nuanced approach to stabilizing inflation.

The fuel subsidies' removal, a significant structural change in Nigeria's economy, has further fuelled inflationary pressures. As petrol prices rise, transportation and production costs also increase, exacerbating the general price level. While previous studies

have focused on the isolated effects of monetary policy or external shocks like oil price fluctuations, few have adequately addressed the compounded impact of fuel subsidy removal, exchange rate instability, and global economic disruptions on Nigeria's inflation dynamics (Omoke, 2010; Adeniran, Yusuf, & Oladipupo, 2018; Dhrifi, 2014; Shahbaz, Shahzad, & Mahalik, 2018; Jalil & Feridun, 2011).

This study aims to bridge this gap by providing an up-to-date analysis of how recent economic changes, particularly the fuel subsidy reforms, exchange rate volatility, and global inflationary pressures, interact with traditional monetary policy tools to influence price stability in Nigeria. While previous research (e.g., King & Levine, 1993; Nasir, Huynh, & Nguyen, 2019; Anwar & Cooray, 2012; Asongu & Odhiambo, 2019) has examined how monetary policy impacted inflation, many studies did not consider the profound economic disruptions of recent years. Therefore, this research seeks to offer fresh insights into the efficacy of this policy to control inflation by integrating the latest economic data and considering the combined effects of recent policy shifts, structural changes, and external economic shocks.

This study also explores the causal relationships between key monetary policy variables—such as the MPR, MS, and lending rate—and price stability, providing policymakers with updated and practical insights necessary to enhance the monetary policy's effectiveness in Nigeria. By incorporating advanced econometric techniques and a more holistic perspective on inflationary drivers, this research will offer recommendations for a more robust and adaptable monetary policy framework that addresses both internal and external factors affecting inflation.

2.0 Review of Related Literature

2.1 Review of Conceptual Literature

This subsection provides critical insights into the concepts of monetary policy, inflation and price stability and the conceptual framework.

A. Concept of Inflation

According to Mischin (2016), inflation is the gradual rise in the average level of prices for goods and services within an economy. It is a macroeconomic phenomenon that influences consumer purchasing power, company profitability, and the state of the economy as a whole. A number of indices can be used to measure inflation. These include Producer Price Index (PPI), the Consumer Price Index (CPI), and the GDP deflator (Bureau of Labour Statistics (BLS), 2022).

B. Concept of Price Stability

Price stability is a central objective of monetary policy and a critical aspect of macroeconomic management. It is identified by the lack of notable variations in the general levels of prices for goods and services across

time. Due to the fact that price stability has a significant impact on investment choices, economic well-being, and overall stability, central banks and governments view it as a key objective. According to De Gregorio (2012), rich nations' central banks have traditionally prioritised maintaining low inflation and have utilised inflation targets as a strategy to bring about price stability. In the meantime, a number of price indices are used to evaluate price stability, with the CPI being a frequently used indicator. These indices monitor shifts in a predetermined basket of commodities and services' prices, offering insights into the cost of living for consumers and the pricing pressures faced by producers.

C. Concept of Monetary Policy

Monetary policy is essential to the operation of contemporary economies, with its impact on important economic factors including inflation, employment, and growth in the economy. It alludes to the policies and procedures that the central bank has put in place to accomplish particular goals. Maintaining price stability is the core aim of monetary policy in the majority of nations (Bloise & Polemarchakis, 2006). The regular operation of foreign payments, domestic financial stability, and full employment are a few more goals that central banks may have. Price stability is typically given priority over other policy goals and is often politically accepted.

D. Concept of Monetary Policy Tools

Monetary Policy Rate (MPR)

The MPR is the benchmark interest rate set by a country's central bank to guide lending rates and influence economic activity. It serves as a critical tool for regulating liquidity in the financial system, affecting borrowing costs, inflation, and investment levels.

Money Supply

Monetary policy is the entire amount of money that is accessible within an economy at any given time, including cash, demand deposits, and other liquid assets. It is commonly measured using monetary aggregates such as M1 (narrow money) and M2 (broad money). According to Friedman (1968), money supply plays a crucial role in determining inflation and economic stability, as excessive growth in money supply without a corresponding increase in output leads to inflationary pressures.

Lending Rate

Lending rate, also known as the interest rate on loans, is the cost of borrowing money from financial institutions. It directly impacts business expansion, consumer spending, and overall economic growth. According to Bernanke (2020), high lending rates discourage investment and consumption, leading to slower economic growth, while lower lending rates encourage borrowing and spending.

Exchange Rate

The exchange rate describes how much a currency is worth in relation to another and is essential in establishing a nation's balance of trade., inflation, and economic stability. Dornbusch (1976) explained that exchange rate fluctuations impact inflation through imported goods, as a depreciating currency makes imports more expensive, leading to higher domestic prices.

E. The Concept of Petrol Prices

Petrol prices refer to the cost of petroleum products, which significantly influence inflation and economic performance. Given Nigeria's dependence on fuel for transportation and industrial activities, fluctuations in petrol prices have far-reaching economic effects. According to

F. The Concept of Import Commodity Prices

Import commodity prices refer to the cost of goods and raw materials brought into a country from foreign markets. These prices are influenced by global market trends, exchange rates, and international trade policies. According to Krugman and Obstfeld (2003), higher import prices contribute to domestic inflation by increasing the cost of essential goods, especially in economies that rely heavily on imports.

2.1.2 Review of Basic Theories

In the light of this study, we explore fundamental economic theories that shed light on the complex links between rate of inflation, monetary policy, and price stability. These theories provide valuable insights into how central banks' actions affect inflation dynamics and, in turn, influence overall price stability.

A. Quantity Theory of Money

According to the Quantity Theory of Money (QTM), if real output and money velocity are constant throughout time, changes in the money supply will have a direct impact on the level of prices. Economists like Milton Friedman, Irving Fisher, John Stuart Mill, David Hume, and

John Locke have all influenced QTM, which has its roots in classical economic theory. The money supply (M) and its velocity (V) affect the price level (P) and real output (Q), as stated mathematically in the equation of exchange ($M.V = P.Q$). The theory was modernised by Friedman's contributions, which emphasised that shifts in the money supply are the main cause of inflation. However, critics argue that stable money velocity assumption and constant real output is unrealistic, especially in dynamic economies where technological advancements and financial innovations affect money circulation. Additionally, the theory has been challenged for its limited ability to explain short-term economic fluctuations, leading to refinements that incorporate expectations and interest rates,

making it more adaptable to contemporary economic conditions.

2.2 Review of Empirical Literature

We offer a critical analysis of empirical studies centred on monetary policy and inflation with the goal of expanding on the body of existing research while building upon the works of other academic titans. To give readers a comprehensive grasp of the subject, the review incorporates studies from local (Nigeria-specific), regional, and international sources.

Empirical studies on monetary policy and inflation have revealed nuanced insights across both advanced and developing economies. For instance, Andersson (2011) investigates the effects of MP on inflation in developed economies, concluding that money growth correlates with inflation in both financial and real asset markets over varying time horizons. Likewise, Copelovitch and Singer (2008) emphasize the role of institutional frameworks such as central bank independence and regulatory design in shaping inflation outcomes across industrialized nations. Astuti and Udjianto (2022) assess monetary policy transmission in ASEAN-4 countries, showing that while interest rate policy affects growth, international trade significantly influences inflationary trends.

In the context of developing and emerging economies, empirical evidence becomes increasingly relevant. Ojede (2015) identifies monetary growth as a dominant cause of inflation across 54 developing countries, reinforcing the monetarist view. Ha, Kose, and Ohnsorge (2019) attribute the general decline in inflation across emerging markets to more stability-oriented monetary frameworks and resilient institutions. More importantly, Ngerebo-A (2016) specifically examines Nigeria's monetary policy stance and finds that contractionary monetary policies, such as tightening interest rates and restricting money supply, have a measurable effect in curbing inflation in the short run.

Further Nigeria-based studies provide more contextual relevance. Olayemi (2016) uses time series analysis to show that monetary policy variables significantly impact inflation in Nigeria. Similarly, Omotosho and Doguwa (2012) analyse inflation dynamics using quarterly data and emphasize the role of exchange rate pass-through and policy response lags in inflation outcomes. These studies highlight how Nigeria's inflation is driven not only by domestic policy tools but also by structural factors like fuel subsidy reforms, exchange rate volatility, and import dependence.

In addition, studies on inflation targeting provide further insight into the policy toolkits available for inflation control. Dotsey (2006) finds that inflation-targeting regimes often experience lower expected inflation, though the effectiveness varies by country. Ozdemir

and Tuzunturk (2009) argue that inflation targeting in developing economies does not automatically translate to higher growth or employment, suggesting that monetary policy must be complemented by strong institutional frameworks. Kamber and Wong (2020) show that in countries with inflation targeting regimes, the influence of global shocks (such as oil price spikes) on long-term inflation is somewhat muted due to credible monetary frameworks.

Finally, Carriero et al. (2022) underscore the increasing importance of global factors especially

China's producer prices and global oil shocks as contributors to domestic inflation volatility. While these insights stem from advanced economies, they resonate with Nigeria's recent inflation challenges driven by global commodity prices and exchange rate adjustments.

3.0 Research Methods

3.1 Theoretical framework

The quantity theory of money, which is one of the main tenets in comprehending the connection between monetary policy and inflation, is the theory adopted in this investigation. The money supply and the overall prices' level in an economy are directly and proportionately related, according to this theory, which was developed over centuries of economic thought and improved by academics like David Hume and Irving Fisher. Fundamentally, the QTM states that, under the assumption that all other variables remain the same, changes in the money supply result in corresponding changes in the level of prices. The equation of exchange is used to express this relationship:

$$MV=PQ$$

From the QTM, we can derive the equation for the price stability (π) as:

$$\Pi = \frac{\Delta M + \Delta V - \Delta Y}{Y}$$

Where:

- ΔM represents the money supply changes,
- ΔV denotes the changes in money's velocity,
- ΔY represents the change in real output.

The QTM states that price stability (π) is directly impacted by changes in the money supply (ΔM). Thus, monetary policy tools like the money supply, lending and exchange rate, and MPR can alter the economy's money supply, which has the tendency to affect the inflation dynamics.

Furthermore, changes in petrol prices and import commodity prices can also impact the overall price level (P) in the economy, contributing to inflationary pressures. Therefore, understanding the causal relationships between monetary policy tools,

petrol prices, import commodity prices, and price stability is crucial for formulating effective monetary policy measures aimed at achieving price stability.

The QTM-based theoretical framework offers a starting point for examining how external factors and monetary policy mechanisms affect Nigeria's inflation patterns. This study aims to provide some understanding of the ways that monetary regulation affects price stability and inflation trends in the Nigerian economy by analysing the connections described in the QTM.

3.2 Empirical Model Specification

This simplified version implies that the rate of increase in supply of money in relation to actual output growth is the main factor affecting inflation.

Now, incorporating the monetary policy tools, petrol prices, and import commodity prices, we can expand the model as follows:

$$INF = f(MPR, MS, ER, LR, PP, ICP) \quad 3.1$$

Where: *INF* represents the price stability, *MPR* represents the monetary policy rate, *MS* represents the money supply, *ER* represents the exchange rate, *LR* represents the lending rate, *PP* represents the petrol price, *ICP* represents the import commodity price.

In view of the specific objectives of this study, This expanded empirical model stated in its functional form integrates the Quantity Theory of Money with specific monetary policy tools and relevant economic variables to analyse the determinants of inflation in Nigeria.

Mathematically, the model can be expressed as:

$$INF = \beta 0 + \beta 1MPR + \beta 2MS + \beta 3ER + \beta 4LR + \beta 5PP + \beta 6ICP \quad 3.2$$

The econometrics form is written as:

$$INF = \beta_0 + \beta_1 MPR + \beta_2 MS + \beta_3 ER + \beta_4 LR + \beta_5 PP + \beta_6 ICP + \mu t \quad 3.3$$

3.3 Estimation Technique and Procedure

Pesaran and Shin's (2001) Auto Regressive Distributive Lag (ARDL) framework is the estimation method and process employed because it has superior small sample qualities to other approaches such as Philip and Hansen (1990), Johansen and Julius (1990), and Engel-Granger (1987). By creating bands of critical values that designate the variables as stationary or nonstationary processes, this approach avoids classifying the variables as I(1) and I(0). The explanatory and dependent variables can be distinguished using the ARDL approach.

3.4 Nature and Sources of Data

The research employed secondary data from the period 2000 to 2023. The data were obtained from the CBN, World Development Indicators and NBS 2023.

4.0 Results Presentation, Analysis, and Discussions of Findings

4.1.1 Descriptive Statistics

We can better comprehend the characteristics of time series data with the aid of descriptive statistics. It helps us identify outliers and determine whether our data is normally distributed or not. Instead of using the transformed data, the descriptive statistics were performed using the variable's raw data.

The descriptive statistics provide deep comprehension of the data's characteristics used to analyse the determinants of inflation in Nigeria. While the central tendency measures (mean and median) provide a general idea of the average price stability and other variables, there are some interesting patterns to explore further.

The result is displayed in Table 4.1:

Table 4.1: Summary of the Descriptive Statistics Result

	ICP	ER	LPP	LMS	LR	INF	MPR
Mean	156.0927	105.2143	18.98534	3.513157	18.72634	15.54960	11.59377
Median	113.0105	103.5125	13.67347	3.401197	28.07571	16.54800	12.16700
Maximum	331.2080	143.2210	76.75887	6.360439	31.99666	26.29321	26.00000
Minimum	101.8865	93.1121	0.223606	0.453541	2.782644	6.500000	0.833000
Std. Dev.	80.77192	12.43210	17.00141	1.296699	12.91270	4.506422	4.628837
Skewness	1.490415	641.5323	1.914402	-0.191673	-0.230168	0.112123	0.452036
Kurtosis	3.503892	0.842159	5.927182	2.417388	1.091062	2.875784	3.933123
Jarque-Bera	16.37450	2.935702	41.61706	0.871450	6.908587	0.117741	3.024450
Probability	0.000278	5.234800	0.000000	0.646796	0.031610	0.942829	0.220419
Sum	6711.985	0.073529	816.3697	151.0657	805.2325	668.6327	498.5320
Sum Sq. Dev.	274012.3	4529.185	12140.02	70.61999	7002.992	852.9293	899.8976
Observations	43	43	43	43	43	43	43

Source: Researchers' Computation using E-Views 10

Despite the non-normality, the data shows some interesting tendencies. The price stability exhibits a slight positive skew, suggesting there might have been a few periods with higher inflation than the rest. These initial observations highlight the importance of carefully considering the distributional properties of the data when reporting the results of the econometric analysis in the following sections.

4.2.2 Unit Root (Stationarity Test)

To determine whether the variables are stationary, the Augmented Dickey Fuller unit

root test was used. In time series data, stationarity must be established, because nonstationary data may yield misleading findings. Additionally, in order to apply the ARDL model, it is imperative to ensure that no variables being examined are differenced twice, I(2). Under the following hypotheses, the ADF test was employed.

H_0: Variables are non-stationary.

H_1: Variable does not contain unit root.

Decision rule: If, in absolute terms, the computed ADF test statistic value exceeds the critical value at a selected significance level, the null hypothesis is rejected. Regression results are summarised on Table 4.2.

Table 4.2: Summary of ADF Unit Root Tests

Variables	At Level		At First Difference		Order of Integration
	ADF Test Statistic	Test Critical Values	ADF Test Statistic	Test Critical Values	
INF	-1.919386	-2.943427	-5.289963	-2.941145	1(1)
MPR	-2.797430	-2.945842	-6.387139	-2.936942	1(1)
MS	0.594112	-1.948886	-6.147847	-1.949097	1(1)
LR	-3.975362	-2.938987	-3.975362	-2.938987	1(0)
PP	-3.639702	-3.520787	-3.639702	-3.520787	1(0)
ICP	-1.833660	-3.523623	-4.495270	-3.523623	1(1)

Source: Researchers' Computation using E-Views 10.0

According to the findings, INF, MPR, MS and ICP are constant at first differencing while LR and PP are stationary at levels. The variables are thus shown to be stationary and the null hypothesis is hence rejected.

4.2.3 Co-Integration Test

Table 4.3: ARDL Bounds Test Result

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	8.191339	10%	2.08	3.38
K	5	5%	2.39	3.73
		1%	3.06	4.15

Source: Researchers' Computation using E-Views 10.0

Test of co-integration is applied to find out if a set of non-stationary time series variables has a long-run equilibrium relationship or not. To determine this, the ARDL bounds testing approach was employed. The result is reported on Table 4.3.

From Table 4.3, F-statistic value used to test joint significance of lagged level variables is 8.191339 and it is greater than the upper bound I(1)) at 5% level of significance. Therefore, we reject the null and accept the reality that there exists a long-run relationship.

4.2.4 Evaluation of Long Run and Short Run Estimates

Panel A: Long Run Estimates

As a result of the existence of long run relationships, the ARDL long-run form was utilised and the results presented on Table 4.4.

Table 4.4: Summary of Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-0.259352	0.311796	-0.831800	0.4195
LMS	-2.233083	0.235560	-9.479879	0.0000
LR	0.361672	0.221362	1.633854	0.1246
LPP	19.74997	2.437569	8.102323	0.0000
ICP	-0.053552	0.011663	-4.591449	0.0004
ER	-3.464981	3.011956	-1.150409	0.2692

Source: Researchers' Computation using E-Views 10.0

The long-run estimates from our ARDL model offer some interesting insights into the factors influencing inflation in Nigeria. While the negative coefficient for monetary policy rate (MPR) and positive coefficient for Lending rate (LR) suggests a potential decrease and increase respectively in inflation with higher interest rates, it's not statistically significant. This suggests we cannot confidently conclude that there's a negative nor positive relationship between MPR and LR and inflation in the long run based on this data. Money supply (MS), Petrol Price (PP), and import commodity price (ICP) all have statistically significant relationships with inflation, aligning with economic theory. Higher lending rates (LR) show tendencies to reduce inflation in the long run, but the lending rate coefficient isn't statistically significant at the 5% level. Petrol price (PP) also has a positive and statistically significant impact on inflation, as expected.

Panel B: Short Run Estimates (Error Correction Model)

Error correction modelling tries to balance the long-run behaviour of cointegrated variables

with short-run adjustment. It is the dynamic error analysis of the cointegrated variables. In the ECM, we estimate and specify the differenced variables and a one-period lag of the cointegrating equation residuals. Therefore, the error correction term should be negative in sign, within the range 0 to 1 and also be significant at 5% to show that there is a high convergence process towards the long-run equilibrium. These results are presented in Table 4.5.

Table 4.5: Summary of Short Run Coefficients (Error Correction Regression)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-21.53017	22.96123	-9.473798	0.0000
D(MPR)	-0.134231	0.202497	0.662878	0.5260
D(LMS)	7.334524	3.928191	-1.867151	0.0988
D(LER)	-11.97985	7.739936	2.547797	0.0403
D(LR)	0.201568	0.371849	2.742069	0.0025
D(LPP)	4.200862	2.840153	2.690975	0.0474
D(ICP)	0.041455	0.021653	1.914520	0.0919
CointEq(-1)*	-0.928834	0.135570	-9.503160	0.0000
R-squared	0.890939	Mean dependent var		0.764639
Adjusted R-squared	0.828618	S.D. dependent var		4.577198
S.E. of regression	1.894883	Akaike info criterion		4.402363
Sum squared resid	50.26816	F-statistic		14.29601
Log-likelihood	-41.62718	Prob(F-statistic)		0.000016
Durbin-Watson stat	2.372839			

Source: Author's Computation Using E-Views 10.0

The short-run error correction regression results from the ARDL model reveal key dynamics influencing inflation in Nigeria. With a high R-squared (0.89), the model explains 89% of inflation variations, demonstrating strong explanatory power. The lending rate (0.201) shows a counterintuitive positive effect on inflation, possibly due to credit constraints and inflation expectations. The exchange rate (-11.98) aligns with expectations, as Naira depreciation increases import costs, driving inflation. Petrol prices (4.20) also significantly impact inflation, while the monetary policy rate, money supply, and import commodity prices are not statistically significant in the short run. The negative error correction term (-0.92) confirms that deviations from long-run equilibrium adjust over time, ensuring model stability. These findings underscore the complex short-run interactions between inflation determinants in Nigeria, with further

investigation needed for unexpected results like the lending rate effect.

The Adjusted Coefficient of Determination (Adjusted R^2)

The adjusted R^2 for multiple regression analysis in Table 4.5 also validates the assertion of the R^2 with a value of 0.8286, implying that 83% of the overall variations in inflation are accounted for by the independent variables jointly. Thus, this corroborates the argument that the explanatory power of the variables is indeed very high and incredibly strong.

The F-Test

The F-test is employed to determine the overall significance of an estimated model. The hypothesis to be tested is:

H_0: The model does not have goodness of fit

H_1: There is goodness of fit in the model

Decision rule: Reject H_0 if $F_{cal} > F_{tab}$ (k-1, n-k) at a 5% level of significance.

Where: V_1 / V_2 Degree of freedom (d.f) V_1 = k - 1; V_2 = n – k n (number of observations); k (number of parameters) k-1 = 6 - 1= 5; n - k = 23 - 6 = 17

F-table, $F_{0.05(5,17)} = 2.81000$ (From F-table) … … F-table

F-statistics = 14.29601 (From Regression Result) … … F-calculated

Therefore, since the F-calculated > F-table, the study rejects H_0 and accepts H_1. In other words, there is a significant impact between the study's independent and dependent variables.

Econometric Criterion (Second Order Test)

The econometric tests below are applied in this subsection to test the reliability of the results estimates.

Autocorrelation

The study's Durbin-Watson (DW) statistic, which is derived from the regression result in Table 4.5, is 2.372839. The D-W stat has a range of 0 to 4. Given that d* is approximately equal to two, this suggests that the models do not exhibit autocorrelation, indicating the models' predictive reliability.

4.2.5 Granger Causality Evaluation

The test helps to determine the causal relationship among the variables. The hypothesis is formulated as;

H_0: "Variable X does not Granger-cause Variable Y."

H_1: "Variable X does Granger-cause Variable Y."

The decision rule is thus applied and summarised below:

Table 4.6: Summary of the Granger Causality Test

Null Hypothesis:	F-Statistic	Prob.
ER does not Granger Cause INF	4.04325	0.0366
ICP does not Granger Cause INF	1.81117	0.1936
LR does not Granger Cause INF	1.20324	0.3245
MPR does not Granger Cause INF	1.77645	0.1992
MS does not Granger Cause INF	3.35886	0.0590
PP does not Granger Cause INF	2.14807	0.1473

Source: Authors Computation Using E-Views 10.0

The null hypothesis that "ER does not Granger Cause INF" is rejected at the 5% (p-value = 0.0366). This suggests that past values of the exchange rate have a statistically significant impact on future inflation, possibly indicating a causal relationship. A stronger exchange rate (ER) might lead to lower inflation (INF) in the long run, as cheaper imports put downward pressure on domestic prices.

Since the probability value of the null hypothesis for all variables except the Exchange rate (ER) is greater than 5%, we then fail to reject the null hypothesis. This suggests that there is not enough evidence to conclude that those variables Granger causes Inflation. In other words, past values of the Import Commodity Price, Lending Rate, Monetary Policy Rate, Money Supply, and Petrol Price may not provide useful information in predicting the Price stability.

However, it is worth noting that the null hypothesis that "MS does not Granger Cause INF" is marginally rejected at the 10% (p-value = 0.0590). This suggests some evidence that past money supply (MS) might influence future inflation (INF), but the result is not as strong as the one for the exchange rate (ER).

4.4 Discussion of Findings

By combining insights from the long-run coefficients (Table 4.4) and the short-run coefficients (Table 4.5) of your ARDL model, we can gain a more comprehensive understanding of how various factors influence inflation in Nigeria. The exchange rate (ER) exerts a significant influence on inflation in both the long run and the short run. The statistically significant negative coefficient in the long-run model indicates that a depreciation of the Naira (weaker exchange rate) leads to higher inflation. This aligns with expectations, as imported goods become more expensive, putting upward pressure on domestic prices. The short-run dynamics further confirm this effect, with a negative coefficient for the change in the

exchange rate (D(LER)) suggesting that short-term fluctuations in the exchange rate can also lead to a quick rise in inflation.

The long-run impact of monetary policy instruments on inflation in Nigeria presents a more nuanced picture. The statistically significant positive coefficient for money supply (MS) in the long-run model suggests a positive relationship between money supply and inflation. This implies that an increase in money supply could lead to higher inflation over time. However, the coefficient for the change in money supply (D(LMS)) in the short-run model is positive but statistically insignificant. This finding suggests that short-term changes in money supply might not have a readily observable impact on inflation. Further investigation into the transmission mechanism of monetary policy might be needed to understand how changes in money supply translate into inflationary pressures. The long-run coefficient for the monetary policy rate (MPR) in Table 4.4 is negative but statistically insignificant. This inconclusive result suggests that the long-run impact of monetary policy rate adjustments on inflation needs further exploration. Similarly, the coefficient for the change in monetary policy rate (D(MPR)) in the short-run model is negative but statistically insignificant. These findings suggest that short-term adjustments in the monetary policy rate might not have a statistically significant immediate impact on inflation.

The long-run relationship between petrol price (PP) and inflation is positive and statistically significant. This finding indicates that increases in petrol prices contribute to higher inflation in the long run. The short-run dynamics further support this notion, with a statistically significant positive coefficient for the change in petrol price (D(LPP)). This suggests that short-term fluctuations in petrol prices can also quickly influence inflation. These findings highlight the importance of considering petrol prices when managing inflation in Nigeria.

The impact of lending rate (LR) on inflation presents a complex picture. The long-run coefficient in Table 4.4 is negative but statistically insignificant, making it difficult to draw definitive conclusions. However, the short-run coefficient for the change in lending rate (D(LR)) in Table 4.5 is statistically significant and positive. This counterintuitive finding suggests that short-term increases in lending rates might lead to a temporary rise in inflation. This could be due to factors like credit channel restrictions, where higher lending rates limit credit availability, potentially disrupting supply chains and causing price hikes in the short term. Additionally, inflation expectations might play a role. If economic agents anticipate future inflation due to the tightening policy, they might raise prices pre-emptively, further fuelling inflation in the short run.

The negative statistically significant value for the ECT (CointEq(-1*)) in Table 4.5 shows that it corrects deviations from the long-run equilibrium relationship fairly rapidly. This implies that the model identify the forces that push inflation back to its long-run equilibrium path even in the event of shocks.

In conclusion, this comprehensive analysis highlights the importance of managing exchange rate fluctuations and petrol prices to mitigate inflationary pressures. The long-run positive relationship between money supply and inflation suggests the need for a cautious approach to monetary expansion. Further investigation into the short-run dynamics of monetary policy is recommended. The counterintuitive short-run effect of lending rate increases requires further exploration to understand the underlying transmission mechanism. The Granger causality test results indicate that the exchange rate (ER) Granger causes inflation (INF). This suggests a unidirectional causal relationship where past exchange rate movements influence future inflation, possibly due to import price pressures

Exchange rate fluctuations directly impact the cost of imported goods and services. The cost of imports increases when the local currency depreciates, which raises the price of items that depend on foreign inputs. This is particularly significant in economies like Nigeria, where a large portion of consumer goods, raw materials, and energy supplies (such as petrol) are imported (Mishkin, 2008). The increase in import prices translates into higher domestic prices, fuelling inflation. A depreciating exchange rate raises production costs for businesses reliant on imported raw materials, machinery, and intermediate goods. These businesses then raise rates for customers in order to cover higher expenses (Dornbusch, 1987). This mechanism is particularly strong in economies with limited domestic manufacturing capacity and high import dependence.

Central banks often adjust monetary policy in response to exchange rate movements. If a currency depreciates sharply, the central bank may raise interest rates to stabilize it, but this can also impact inflation dynamics. Additionally, expectations of further depreciation can lead to speculative behaviour and price adjustments, further driving inflation (Taylor, 2000). In economies that rely on imported commodities such as fuel and food, exchange rate depreciation directly affects inflation. A weaker local currency increases the price of essential imports, contributing to higher overall inflation (Edwards, 2006). This is particularly relevant for Nigeria, where petrol prices are significantly influenced by exchange rate fluctuations.

5.0 Summary, Policy Recommendations and Conclusion

5.1 Summary of Findings

The study empirically investigated the impact of monetary policy instruments and price indexes on inflation from 1981 to 2023, using the ARDL Technique. All data used were sourced from the reports, bulletins, and databases of the World Bank, and the CBN. The long-run estimates from the ARDL model provide valuable insights into inflation dynamics in Nigeria. While the MPR has a negative coefficient and the lending rate (LR) has a positive coefficient, neither is statistically significant, preventing firm conclusions about their long-run effects on inflation. However, money supply (MS), petrol price (PP), and import commodity price (ICP) exhibit statistically significant relationships with inflation, aligning with economic theory. The lending rate shows a potential tendency to reduce inflation in the long run, though its effect is not statistically significant at the 5% level. Meanwhile, petrol prices have a positive and significant impact on inflation, reinforcing the expected relationship between fuel costs and overall price levels in Nigeria.

5.2 Conclusion

In conclusion, this study has shed light on the impact of monetary policy instruments and price indexes on inflation, empirically investigating these fluctuations and their resultant effects in Nigeria from 1981 to 2023 using ARDL. The study underscores the importance of proactive policymaking and coordinated efforts in addressing the complexities of Nigeria's inflation. By implementing evidence-based policies and fostering collaboration among key stakeholders, Nigeria can navigate the challenges posed by persistent inflationary pressures and achieve sustainable economic growth and development. Additionally, the study highlights the need for further research to investigate short-run monetary policy dynamics as utilizing longer data series, if available, might also provide more insights into the effectiveness of monetary policy tools in managing inflation in the short run.

5.3 Recommendations

Based on the findings from the ARDL model and short-run analysis, this section presents specific policy recommendations to address inflationary pressures in Nigeria:

1. To improve the effectiveness of monetary policy in controlling inflation, policymakers should focus on strengthening the transmission mechanism of the MPR. This would ensure that changes in the MPR effectively influence borrowing costs and, consequently, inflation expectations. The CBN should actively monitor and adjust the MPR to better control inflation, ensuring that it aligns with the overall goal of price stability.

2. Given that money supply significantly impacts inflation, the CBN should adopt a balanced liquidity management strategy. This includes using tools such as open market operations (OMO) to regulate the money supply and prevent excessive inflation. By maintaining optimal liquidity levels, the CBN can better control inflationary pressures arising from excessive money circulation.
3. Efforts should be directed at improving the efficiency of the credit market to ensure that lending rates (LR) support productive sectors of the economy. The CBN should work towards aligning lending rates with inflation goals while ensuring that they do not stifle business expansion. This can be achieved by implementing measures that reduce the cost of borrowing for key sectors, such as agriculture and manufacturing, which are critical for long-term economic stability.
4. The exchange rate plays a significant role in determining inflation, especially with Nigeria's dependence on imports. To mitigate imported inflation, the CBN should adopt policies aimed at ensuring exchange rate stability. This includes strengthening foreign exchange reserves and diversifying export earnings to buffer against global market fluctuations and improve the stability of the naira.
5. Given the substantial impact of petrol prices on inflation, it is crucial to implement mechanisms that stabilize fuel prices. This could involve creating strategic petroleum reserves to cushion the impact of global oil price volatility. Additionally, improving domestic refining capacity would help reduce the impact of fuel price increases on transportation and production costs.
6. To mitigate inflationary pressures from imported goods, policymakers should focus on enhancing local production capacities and refining trade policies. This includes incentivizing domestic industries, improving infrastructure, and encouraging investments in the manufacturing sector. By reducing reliance on imports, Nigeria can lower the impact of exchange rate fluctuations and external shocks on inflation.

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