THE EFFICIENCY OF MONETARY POLICIES IN CONTROLLING INFLATION IN NIGERIA

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BENIN CITY

EDO STATE, NIGERIA

NOVEMBER, 2025

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AN UNDERGRADUATE DISSERTATION SUBMITTED TO THE DEPARTMENT OF ECONOMICS, FACULTY OF SOCIAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA; IN PATIAL FULFILLMENT OF THE REQUIREMENTS FOR AWARD OF BACHELOR OF SCIENCE (B.Sc) DEGREE IN ECONOMICS

NOVEMBER, 2025

DECLARATION

I, OTUYA ANITA ADAOBI do hereby declare that this project is entirely my work and composition. The work embodied in this project has not been submitted by another candidate for any degree and is not currently being submitted for any other degree. All references made to the works of other persons have been duly acknowledged.

OTUYA ANITA ADAOBI **DATE**

CERTIFICATION

This is to certify that this research work titled "THE EFFICIENCY OF MONETARY POLICIES IN CONTROLLING INFLATION IN NIGERIA" was carried out and submitted by **OTUYA ANITA ADAOBI** with matriculation Number SSC2105614 for the award of Bachelor of Science (B.Sc) degree in Economics, University of Benin, Edo State.

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DEDICATION

I dedicate this project to God Almighty my creator, my strong pillar, my source of inspiration, wisdom, knowledge and understanding.

I would also like to express my gratitude to my family, who has been my constant source of love, support and inspiration throughout my academic journey. Your unwavering encouragement and belief in my abilities have been invaluable, and I am grateful for the sacrifices you have made to help me pursue my dream.

ACKNOWLEDGEMENT

I would like to begin by expressing my heartfelt gratitude to my supervisor, Dr. Uju Nnadozie, for her patience, insightful guidance and unwavering support throughout the course of this research. Your thoughtful direction gave this work structure and depth and I'm truly grateful for the time and energy you invested in me.

I also want to sincerely appreciate my Head of Department, prof Clement Ighodaro, whose leadership has shaped the department into a place of learning and growth. To all the lecturers of the department of Economics, thank you for pouring your knowledge into me and for constantly challenging me to think critically and grow beyond the classroom. Every lecture and every conversation has left a mark on my academic journey.

To my incredible parents, Mr and Mrs Lucky.C. Otuya, words will never be enough to thank you for your sacrifices, love and encouragement. Thank you for believing in me even on days I doubted myself, you both are amazing and I'm really grateful for everything you've done for me. To my siblings and family members, thank you for your endless prayers, check-ins, and silent support.

I would also like to specially appreciate Mr Odunze Kennedy Ogu for his consistent financial support throughout the course of my academic journey, this is me saying thank you and God bless you sir. And to my dear friends Joy, Aishat, Sarah, Confidence, Gift and Miracle, the ones who stuck around, made me laugh when things got overwhelming, constantly reminded me to keep going and made Uni feel like home, thank you for making my journey lighter, I really appreciate you all.

Finally to everyone who contributed in one way or the other, whether through kind words, resources or simple encouragement, thank you. This milestone may have my name on it but it carries the fingerprints of so many people who stood by me along the way. I am truly grateful.

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ABSTRACT

This study investigates the efficiency of monetary policies in controlling inflation in Nigeria using annual data from 2000 to 2023 and applying the Autoregressive Distributed Lag (ARDL) approach. The analysis incorporates inflation as the dependent variable and Monetary Policy Rate (MPR), broad money supply (M2), exchange rate (EXR), gross domestic product (GDP), and foreign direct investment (FDI) as explanatory variables. The results reveal a stable long-run relationship among the variables, supported by a significantly negative error correction term that indicates rapid adjustment toward equilibrium after short-run shocks.

The findings show that exchange rate movements exert a strong positive and significant influence on inflation in both the short and long run, confirming that currency depreciation remains a major driver of price increases. Conversely, the monetary policy rate exhibits no significant impact on inflation, suggesting weaknesses in Nigeria's monetary transmission mechanism. Broad money supply demonstrates a negative and significant relationship with inflation, implying that liquidity growth does not immediately fuel inflation and may be absorbed productively in the economy. GDP and FDI display mixed and lagged effects, with long-run impacts that highlight the importance of economic activity and investment in shaping long-term inflation dynamics.

The study concludes that while monetary policy is essential for managing inflation, its effectiveness in Nigeria is constrained by exchange rate instability, structural rigidities,

and weak policy transmission. Strengthening monetary fiscal coordination, improving exchange rate management, enhancing financial sector depth, and promoting productive investment are crucial for achieving sustainable price stability.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Monetary policy is a key tool for managing the economy, especially for controlling inflation and keeping prices stable. According to Mishkin (2022) and Blanchard (2021), monetary policy means using policy tools by a central bank to manage the money supply and credit in the economy. This aims to achieve goals like price stability, economic growth, and job creation. In many economies, controlling inflation is a major goal because ongoing increases in the general price level diminish purchasing power, distort investment choices, worsen income inequality, and shake economic confidence.

In Nigeria, inflation has been a constant challenge even with many years of active monetary policy efforts. The Central Bank of Nigeria (CBN), as established by the CBN Act of 2007, is responsible for creating and carrying out monetary policy to maintain monetary and price stability (CBN, 2023). The main monetary policy tools include the Monetary Policy Rate (MPR), which is the key interest rate that guides borrowing and lending rates in the economy; Open Market Operations (OMO), which involve buying and selling government securities to manage liquidity; the Cash Reserve Ratio (CRR), which sets the amount of customer deposits that commercial banks must keep with the CBN; and managing the money supply (M2), which reflects the total money circulating in the economy and can be adjusted using different policy measures. These tools are supposed to influence inflation by changing aggregate demand, credit availability,

interest rates, and inflation expectations (Adebayo & Yusuf, 2023; Akpan & Nwosa, 2022). However, a crucial question remains debated widely, if changes in these monetary policy tools actually lead to noticeable reductions in inflation in Nigeria?.

Historical evidence presents a mixed view. From 2000 to 2015, inflation averaged about 12.4%, with ups and downs tied to both local and global shocks (NBS, 2023). In 2016, inflation jumped to over 18% after global oil prices fell and exchange rates were adjusted. More recently, from 2019 to 2024, there was a strong effort to tighten monetary policy, with the CBN raising the MPR from 11.5% to 26.25% to tackle inflation. Despite these actions, inflation hit 33.95% in May 2024, the highest rate in nearly thirty years (CBN, 2024; NBS, 2024). This contradiction raises an important question: are inflation pressures in Nigeria really responsive to shifts in monetary policy tools?

Studies have shown differing results on this topic. Adetokunbo and Adefeso (2020) found that contractionary monetary policy especially raising interest rates had a significant but limited impact on cutting inflation. On the other hand, Olayemi (2024) and Akpan and Nwosa (2022) found weak or not statistically significant impacts of MPR and money supply on inflation, implying that other economic factors might play a stronger role in the inflation process. These varying findings highlight the need for a fresh and well-structured investigation using recent data that reflects Nigeria’s current economic situation.

Although the CBN's monetary policy mainly operates through domestic financial channels, its effects on inflation can also be passed on indirectly through the foreign exchange market. For example, OMO operations and changes in interest rates can affect capital flows and the availability of foreign currency, which can, in turn, impact import prices and inflation levels (IMF, 2023). While the exchange rate itself isn't a main monetary policy tool, it serves as an important channel in Nigeria due to the country's heavy reliance on imports and sensitivity to global commodity price changes.

Worldwide evidence suggests that effective monetary policy can stabilize inflation. The U.S. Federal Reserve, the European Central Bank, and the Bank of England successfully used interest rate increases and forward guidance to lower post-pandemic inflation towards target levels between 2022 and 2023 (Federal Reserve, 2023; Bank of England, 2023). However, the effectiveness of monetary policy in developing countries is often reduced due to structural issues, weak financial markets, and doubts about policy credibility (IMF, 2023).

Considering these mixed results and Nigeria's ongoing inflation issues, this study directly examines whether monetary policy measured through the MPR, money supply (M2), and related CBN liquidity management activities significantly affects inflation in Nigeria. By focusing on this key relationship, the research aims to provide fresh empirical evidence to guide policy decisions, resolve conflicting findings in the literature, and help design stronger monetary policy strategies.

1.2 Statement of the Problem

From 2019 to 2024, Nigeria faced significant inflation increases, with headline inflation exceeding 30% by mid-2024. In response, the CBN raised the MPR from 11.5% to over 26.25% (CBN, 2024). Yet, these adjustments did not lead to the expected decrease in inflation rates. This suggests a gap between monetary policy tools and actual inflation results. This widening gap raises important questions about how monetary policy operates in Nigeria.

Several factors have weakened the effectiveness of monetary policy in the country. These include strong fiscal influence, frequent financing of fiscal deficits by the Central Bank (as noted by the Debt Management Office, 2023), unstable exchange rates, supply issues, widespread insecurity, and low financial inclusion. The large informal economy and weak credibility of monetary policy have made inflation largely unresponsive to standard interest rate increases and other restrictive measures. Furthermore, the lines between fiscal and monetary authorities have often blurred, leading to unclear policy signals and reduced investor confidence. With increasing fiscal pressures and rising public debt, the CBN's independence has come under scrutiny, limiting its ability to implement anti-inflation strategies effectively.

Although many studies have looked at the link between monetary policy and inflation in Nigeria, such as those by Adefeso and Mobolaji (2010), Omotosho and Doguwa (2012), Olayemi (2024), Akpan and Nwosa (2022), and Adebayo and Yusuf (2023), their

findings vary. Some studies show a significant relationship between monetary policy variables and inflation, while others find weak or insignificant effects, suggesting that non-monetary factors might drive inflation. This variation in results indicates a need for updated research that takes into account recent economic changes, including inflationary shocks from the COVID-19 pandemic, subsidy removals, and recent tightening measures by the CBN.

Despite the persistent efforts by the Central Bank to achieve price stability, there remains a critical gap in literature assessing whether these policies have truly achieved their intended inflation control objectives in a sustainable and efficient manner. Hence, this study seeks to bridge that empirical void by critically analyzing the effectiveness of monetary policy in controlling inflation in Nigeria.

By understanding the extent to which monetary policy has mitigated inflationary trends, especially in the context of Nigeria's unique macroeconomic terrain, this research provides deeper insights into the challenges confronting price stabilization efforts. It becomes essential to determine whether the traditional monetary toolkit still holds relevance or whether more integrated, hybrid frameworks are required.

Sequel to the foregoing discussion, this study seeks to answer the following key research questions:

- To what extent, do monetary policy rate significantly affect inflation in Nigeria?

- What is the impact of money supply on inflation in Nigeria?

1.3 Objectives of the Study

The broad objective of this study is to evaluate the efficiency of monetary policies in controlling inflation in Nigeria. Specifically, the study seeks to:

- Examine the extent to which the monetary policy rate (MPR) significantly affects inflation in Nigeria.
- Assess the impact of money supply (M2) on inflation in Nigeria.

1.4 Research Hypotheses

To guide the empirical analysis, the following null hypotheses are formulated:

1. H0: The monetary policy rate (MPR) does not have a significant effect on inflation in Nigeria.
2. H0: Money supply (M2) does not have a significant impact on inflation in Nigeria.

1.5 Significance of the Study

The persistent inflationary pressure in Nigeria over the years has raised critical concerns among policymakers, economists, and the general populace. This study is therefore significant in several dimensions, as it seeks to unravel the extent to which core monetary policy instruments, specifically the monetary policy rate (MPR), money supply (M2), and exchange rate effectively control inflation within the Nigerian economy.

First, the study will be beneficial to policymakers, particularly the Central Bank of Nigeria (CBN), by providing empirical evidence on the effectiveness of the monetary tools at their disposal. A clearer understanding of which instruments are most impactful in curbing inflation will aid in the formulation and recalibration of monetary policies that are more precise and outcome-oriented.

Secondly, the findings from this research will contribute to existing literature by offering updated insights, especially in the context of Nigeria's post-COVID-19 economic recovery, the impact of global shocks, currency depreciation, and recent reforms in the financial and exchange rate systems. The study's reliance on recent data and empirical rigor ensures that it fills existing gaps, especially where previous research may have neglected the interplay among MPR, M2, and exchange rate volatility in a high-inflation environment like Nigeria's.

Furthermore, the study will be of immense value to academic researchers and students, as it provides a robust theoretical and empirical framework that can serve as a reference point for further studies on inflation control, monetary transmission mechanisms, and macroeconomic stability in developing economies.

Additionally, private investors and financial analysts may also find this study insightful, as inflation is a critical variable that affects real returns, investment decisions, and purchasing power. Understanding how monetary policy attempts to manage inflationary trends can enhance strategic planning in business and financial management.

Lastly, the general public and civil society organizations advocating for economic reform may also benefit from this study. As inflation directly affects the cost of living and standard of life, public awareness of how government policies function to stabilize prices can foster informed civic engagement and policy discourse.

1.6 Scope of the Study

This research work mainly revolves around the efficiency of monetary policy instruments in curbing inflationary pressures in Nigeria. In recent years, inflation has remained a persistent macroeconomic challenge despite various policy measures introduced by the Central Bank of Nigeria (CBN). This study specifically investigates the roles played by the monetary policy rate (MPR), money supply (M2), and exchange rate in influencing inflationary trends within the country. Given the significance of price stability in fostering sustainable economic growth, the study aims to contribute empirical evidence on the efficacy of these monetary tools in Nigeria's inflation control mechanism.

Data on the relevant variables were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin (2023), the National Bureau of Statistics (NBS, 2023), and the World Development Indicators (WDI, 2023). The scope of the study covers the period between 2000 and 2023 within the Nigerian economy.

1.7 Structure of the Study

The remainder of this research work is meticulously structured as follows:

Chapter two presents the relevant literature review and it cuts across conceptual clarifications, theoretical underpinnings, and empirical findings on the subject matter.

Chapter three discusses the research methodology adopted, including the theoretical framework, model specification, data sources, and estimation techniques. Chapter four presents and discusses the results obtained from the empirical investigation, while Chapter five concludes the study and offers policy recommendations based on the findings.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Literature Review

2.1.1 Monetary Policy

Monetary policy is a key tool for managing the economy in both developed and developing countries. It refers to the intentional actions of a country's central monetary authority, usually the central bank, to control the money supply and the availability of credit. The main goal is to achieve economic stability (Mishkin, 2022). In Nigeria, the Central Bank of Nigeria (CBN) was established by the CBN Act of 1958 and updated in 2007. It is solely responsible for creating and carrying out monetary policy.

Monetary policy has a long history in economics. After World War II, most economies adopted Keynesian demand management, using both fiscal and monetary policies to stabilize economic cycles. Over time, monetary policy became favored due to its flexibility, quick implementation, and direct impact on inflation and interest rates (Blanchard, 2021). At its core, monetary policy aims to influence the cost and availability of money. When the central bank raises or lowers the policy interest rate, it can change borrowing costs, investment choices, and consumer spending, ultimately impacting overall demand. In theory, tight monetary policy lowers inflation by reducing excessive demand, while loose monetary policy promotes growth by encouraging spending and investment. However, in practice, the effectiveness of monetary policy depends on

factors like the economy's structure, the depth of financial markets, the credibility of the central bank, and the presence of fiscal dominance (IMF, 2023).

In Nigeria, monetary policy has changed a lot since independence. In the 1960s and 1970s, the CBN used direct controls like credit ceilings and sector-specific credit allocations. But with the introduction of the Structural Adjustment Programme (SAP) in 1986, the CBN moved towards market-based tools such as open market operations, reserve requirements, and setting the policy interest rate. Despite these changes, Nigeria still faces ongoing inflation challenges, raising concerns about whether monetary policy has effectively met its goals (Adebayo & Yusuf, 2023).

Objectives of Monetary Policy

The goals of monetary policy differ from country to country, but the main aim is to achieve and maintain macroeconomic stability. According to the International Monetary Fund (2023), the primary goals include price stability, sustainable economic growth, job creation, balance of payments stability, and financial system stability.

i. Price Stability: This is widely seen as the top goal of monetary policy. Stable prices protect the purchasing power of money, encourage savings and investment, and lower uncertainty in the economy. In Nigeria, where inflation has been in double digits for most of the past two decades, achieving price stability is crucial.

ii. Sustainable Economic Growth: By controlling credit availability and interest rates, monetary policy can boost investment in productive sectors, supporting long-term economic growth.

iii. Employment Generation: An expansionary monetary policy can raise overall demand, resulting in job creation.

iv. Balance of Payments Stability: Through managing exchange rates and adjusting interest rates, monetary policy can affect capital flows, imports, and exports, helping to stabilize the balance of payments.

v. Financial System Stability: Monetary policy facilitates enough liquidity in the banking sector and helps prevent systemic risks that could lead to financial crises. In Nigeria, the CBN (2023) clearly states that its monetary policy framework focuses mainly on maintaining price and monetary stability, as it sees this as essential for achieving other goals such as growth and employment.

Instruments of Monetary Policy

Monetary policy instruments are broadly divided into quantitative tools and qualitative tools. Quantitative tools aim at regulating the overall level of money supply and credit, while qualitative tools influence the allocation of credit to specific sectors.

In Nigeria, the following instruments are most significant:

a. Monetary Policy Rate (MPR): The MPR is the anchor interest rate in Nigeria, currently serving as the signal of the CBN's policy stance. Adjustments in the MPR

influence interbank rates, lending rates, and deposit rates, thereby affecting aggregate demand. For example, between 2022 and 2024, the CBN raised the MPR from 11.5% to 26.25% in an attempt to curb rising inflation (CBN, 2024).

b. Open Market Operations (OMO): This involves the buying and selling of government securities to control liquidity. When the CBN sells securities, it reduces the money supply; when it buys, it injects liquidity into the system.
c. Cash Reserve Ratio (CRR): The CRR mandates commercial banks to hold a proportion of their deposits with the CBN. A higher CRR reduces banks' ability to lend, tightening liquidity.
d. Liquidity Ratio (LR): This requires banks to hold a certain percentage of their net demand and time liabilities in liquid assets.
e. Money Supply (M2): Though not a direct instrument, the broad money supply is a key target variable. The CBN uses M2 as an intermediate goal to gauge the effectiveness of its policies.

2.1.2 Inflation

Inflation is commonly defined as a sustained increase in the general price level of goods and services in an economy over time (Samuelson & Nordhaus, 2021). The main points in this definition are persistence and generality. A sudden increase in prices does not mean inflation; it is the ongoing rise in average prices across most goods and services. Inflation is usually measured with indices like the Consumer Price Index (CPI) and the

Producer Price Index (PPI). In Nigeria, the National Bureau of Statistics (NBS) publishes monthly inflation data, focusing on overall inflation, core inflation, and food inflation.

From a welfare standpoint, inflation cuts down the purchasing power of money, which lowers the real income of households, especially those with fixed incomes. For businesses, unpredictable inflation creates uncertainty and disrupts investment planning. For policymakers, high and unstable inflation undermines economic stability, discourages foreign investment, and complicates fiscal management.

Types and Causes of Inflation

Experts have identified several types of inflation based on their causes and effects:

i. Demand-Pull Inflation: This happens when demand outstrips supply at full employment, which pushes prices up. For example, during oil booms in Nigeria, increased government spending and private consumption often pushed demand beyond what the economy could produce.
ii. Cost-Push Inflation: This results from rising production costs, such as higher wages, energy price hikes, or shortages of raw materials. In Nigeria, repeated fuel price hikes and rising electricity tariffs often lead to cost-push inflation.
iii. Structural Inflation: This is especially relevant in developing countries. It arises from structural problems in agriculture, infrastructure, and distribution networks. For example, poor road conditions and insecurity in food-producing areas have consistently led to food inflation in Nigeria.

iv. Hyperinflation: This is marked by extremely fast and uncontrollable price increases, usually over 50% per month (Cagan, 1956). Nigeria has not faced hyperinflation in recent years, but periods like the mid-1990s saw very high double-digit inflation.

The causes of inflation in Nigeria can be broadly divided into monetary and non-monetary factors:

a. Monetary causes: These include excessive money supply growth, deficit financing through the central bank, and expansionary monetary policies.
b. Non-monetary causes: These include exchange rate drops, supply shocks (such as flooding and insecurity in food production), rising import prices, the removal of fuel subsidies, and strong fiscal policies.

Relationship between Monetary Policy and Inflation

The relationship between monetary policy and inflation has been extensively debated in economic literature. Classical and monetarist economists argue that inflation is fundamentally a monetary phenomenon, where sustained increases in money supply inevitably translate into higher prices (Friedman, 1968). According to this view, the central bank, by regulating money supply and adjusting interest rates, can directly influence inflation outcomes. This perspective underpins much of the traditional reliance on monetary policy as the primary tool for achieving price stability. However, the relationship between monetary policy and inflation is more complex, particularly in developing economies such as Nigeria. Monetary policy operates through several

transmission channels, including the interest rate, credit, exchange rate, and expectations channels. The interest rate channel suggests that increases in policy rates raise borrowing costs, which reduces consumption and investment, thereby lowering aggregate demand and easing inflationary pressures. The credit channel posits that monetary tightening reduces the ability of banks to extend credit, which in turn dampens overall spending in the economy. Through the exchange rate channel, higher domestic interest rates can attract foreign capital inflows, strengthen the local currency, and reduce imported inflation, while looser policies tend to depreciate the currency and fuel price increases. The expectations channel highlights the role of central bank credibility, as policy signals shape inflation expectations, influencing wage negotiations and price-setting behavior.

Despite the theoretical relevance of these channels, Nigeria's experience suggests that weak transmission mechanisms often undermine the effectiveness of monetary policy in curbing inflation. Structural bottlenecks, fiscal dominance, and persistent exchange rate volatility have reduced the impact of policy adjustments on price stability. As a result, even substantial increases in interest rates or efforts to contract money supply often fail to yield proportionate declines in inflation, highlighting the limitations of monetary policy in the Nigerian context (Akpan & Nwosa, 2022).

Efficiency of Monetary Policy in Inflation Control

Efficiency in monetary policy refers to the extent to which changes in monetary instruments achieve the intended objective of price stability without imposing excessive

trade-offs on other macroeconomic goals (IMF, 2023). An efficient monetary policy framework is expected to exhibit a predictable and measurable impact on inflation, operate with minimal time lags between policy action and outcomes, and maintain credibility and consistency to positively shape public expectations.

In the Nigerian case, the efficiency of monetary policy in controlling inflation has been increasingly contested. While the Central Bank of Nigeria (CBN) frequently adjusts its monetary policy rate (MPR) and imposes reserve requirements as part of its inflation control strategy, inflation has often remained stubbornly high. For example, between 2019 and 2024, the CBN raised the MPR drastically from 11.5 percent to 26.25 percent in an effort to curb inflation, yet headline inflation climbed above 33 percent during the same period (CBN, 2024; NBS, 2024). This divergence between policy actions and actual outcomes calls into question the overall efficiency of Nigeria's monetary policy framework. Exchange rate instability also poses a significant challenge, as Nigeria's heavy reliance on imports means that currency depreciation often offsets the impact of tighter monetary policy. In addition, persistent supply-side shocks, including insecurity in food-producing areas, inadequate infrastructure, and fuel price volatility, drive inflation independently of monetary factors. Low levels of financial inclusion further weaken policy effectiveness, as a large informal sector remains outside the reach of conventional monetary instruments.

Taken together, these issues illustrate that while monetary policy remains the principal tool for managing inflation in Nigeria, its efficiency is constrained by deep structural and institutional weaknesses. This has led to increasing calls for more integrated policy approaches that combine monetary tightening with fiscal discipline, structural reforms, and targeted interventions in critical sectors of the economy (Olayemi, 2024; Adebayo & Yusuf, 2023).

2.2 Theoretical Literature Review

Monetary policy and its effectiveness in controlling inflation has changed over time. Different schools of thought provide various perspectives. These theories help analyze how monetary policy influences prices, output, and other economic factors.

2.2.1 The Quantity Theory of Money

The Quantity Theory of Money (QTM) is one of the first attempts to explain the connection between money supply and price levels. Irving Fisher formalized this theory with the well-known equation of exchange,

$$MV = PQ,$$

where M stands for money supply, V is the velocity of circulation, P is the price level, and Q is the real output (Fisher, 1911).

The theory claims that if velocity and output remain stable, any increase in the money supply leads directly to higher prices. Monetarists, led by Milton Friedman, revived the

QTM in the mid-20th century, asserting that inflation is always a monetary issue (Friedman, 1968). This view suggests that persistent inflation can only occur due to excessive growth in the money supply compared to the growth of real output. In practical terms, this means that controlling inflation requires strict oversight of money supply growth.

In Nigeria, the QTM suggests that increases in broad money supply (M2) should strongly relate to inflation trends. However, empirical evidence has been mixed. Studies by Adefeso and Mobolaji (2010) found a strong positive relationship between money supply and inflation in Nigeria, which aligns with monetarist expectations. Conversely, more recent studies (Akpan & Nwosa, 2022) argue that structural constraints and fluctuations in exchange rates often weaken the link between monetary aggregates and inflation, indicating that QTM may only partly apply in developing economies with ineffective transmission mechanisms.

2.2.2 Keynesian Theory of Money and Prices

Keynes (1936), in The General Theory of Employment, Interest and Money, provided a fundamental critique of the QTM. He argued that changes in money supply do not directly affect prices. Instead, monetary policy mainly influences the economy through its impact on interest rates, which then affect investment, aggregate demand, and ultimately output and employment.

According to the Keynesian view, the effect of monetary policy on inflation relies on the level of capacity utilization in the economy. When unemployment is high and resources are underused, an increase in money supply lowers interest rates and boosts investment, which raises output rather than prices. Inflation only appears when the economy nears full capacity. This framework relates to Nigeria during certain periods. For example, during the recessions in 2016 and 2020, expansionary monetary policies were more effective at stimulating recovery rather than causing inflation, since demand was low and capacity was underused. However, in times of supply constraints like the post-2022 period characterized by foreign exchange shortages and rising import costs, growth in money supply and credit often drove inflation even before full employment was achieved (NBS, 2023). Thus, the Keynesian approach emphasizes the conditional effectiveness of monetary policy in managing inflation.

2.2.3 The Monetarist Perspective

The monetarist school, led by Friedman, emphasized the importance of controlling the money supply to stabilize inflation. Monetarists claimed that discretionary monetary policy often creates instability due to delays and political pressures. Instead, they recommended rules-based policies, like setting a fixed growth rate for money supply that aligns with long-term output growth (Friedman, 1968).

For monetarists, inflation occurs when money supply grows faster than real output, and the solution lies in matching money supply growth with productive capacity. Unlike

Keynesians who focused on interest rates and aggregate demand, monetarists centered their strategies on money supply growth.

In Nigeria, monetarist ideas significantly influenced the Central Bank of Nigeria's (CBN) monetary targeting framework introduced during the Structural Adjustment Programme (SAP) of the mid-1980s. The CBN began targeting monetary aggregates like M1 and M2 as intermediate variables. However, weak financial markets, fiscal dominance, and unstable money velocity weakened the effectiveness of monetary targeting. As a result, inflation remained high, suggesting that pure monetarist approaches may not completely apply in Nigeria (Adebayo & Yusuf, 2023).

2.2.4 The Structuralist Theory of Inflation

The structuralist school emerged from Latin America in the 1950s and 1960s, with scholars like Sunkel (1958) and Furtado (1963) emphasizing that inflation in developing economies stems mainly from structural issues rather than monetary expansion alone. This perspective highlights that bottlenecks in agriculture, poor infrastructure, and foreign exchange shortages create ongoing inflationary pressures even when monetary conditions are tight. Structuralists argue that monetary policy alone cannot effectively address inflation in economies with weak productive capacity and heavy reliance on imports. Instead, structural reforms such as increasing agricultural productivity, enhancing logistics, and diversifying exports must accompany monetary measures.

This theory is especially relevant in Nigeria. For example, food inflation often rises due to insecurity in farming areas, inadequate storage facilities, and transportation bottlenecks, regardless of changes in monetary policy rates. Similarly, imported inflation from exchange rate depreciation reflects a structural dependence on foreign goods instead of domestic monetary conditions. Thus, the structuralist view provides a valuable perspective for understanding why aggressive monetary tightening in Nigeria often fails to lead to proportional reductions in inflation (Olayemi, 2024).

2.2.5 Rational Expectations and Policy Ineffectiveness Proposition

The rational expectations revolution, started by Lucas in 1972 and later formalized by Sargent and Wallace in 1975, questioned both Keynesian and monetarist views. The theory states that economic agents, including households, firms, and investors, form expectations based on all available information, including awareness of government policies. As a result, systematic monetary policy does not effectively influence real variables like output and employment, since agents predict policy actions and adjust their behavior.

Applied to inflation, this theory indicates that only unexpected changes in monetary policy can have short-term effects, while predictable policies have no real impact. For Nigeria, this idea raises concerns about the trustworthiness of monetary policy. If businesses and households expect that the Central Bank of Nigeria will respond to rising inflation with higher interest rates, they may adjust wages, contracts, and pricing in

advance, reducing the real effects of the policy action. Poor credibility of the central bank and frequent policy changes worsen this issue, undermining the impact of monetary tightening on inflation expectations.

2.2.6 The Phillips Curve Framework

Introduced by A.W. Phillips in 1958, the Phillips Curve suggested an inverse relationship between unemployment and inflation. Policymakers initially thought they could balance low inflation and low unemployment based on their goals. However, the events of the 1970s, especially stagflation in advanced economies, challenged the stability of this relationship.

Later refinements by Friedman in 1968 and Phelps in 1970 introduced the idea of the "expectations-augmented Phillips Curve," claiming that in the long run, the curve is vertical. This means that monetary policy cannot permanently lower unemployment below its natural rate without causing rising inflation.

In Nigeria, the evidence for the Phillips Curve has been mixed. Some studies reported a short-run trade-off between inflation and unemployment, while others noted that both could rise at the same time, reflecting stagflation conditions. For example, in 2023, Nigeria saw inflation above 30% and high unemployment rates, suggesting that the basic Phillips Curve framework does not fully explain the country's inflation dynamics, according to the National Bureau of Statistics.

2.3 Empirical Literature Review

Studies on how well monetary policies control inflation have shown mixed results across different settings. Some researchers find strong evidence that monetary policy works effectively, while others argue that non-monetary factors like fiscal policy, structural issues, and external shocks often have a bigger impact, especially in developing countries like Nigeria.

Many studies have explored the relationship between monetary policy and inflation in Nigeria. These studies have used various methods, including Ordinary Least Squares (OLS), Vector Autoregressive (VAR) models, Autoregressive Distributed Lag (ARDL) models, and Generalized Method of Moments (GMM). Early research by Adefeso and Mobolaji (2010) looked at money supply, interest rates, and inflation in Nigeria using data from 1970 to 2007. They found a strong positive link between money supply and inflation, supporting monetarist views. However, they found little evidence that changes in interest rates significantly affect inflation. This suggests that the interest rate transmission process is inefficient.

Similarly, Omotosho and Doguwa (2012) analyzed monetary policy effectiveness in Nigeria from 1970 to 2010 using a VAR approach. They discovered that changes in the monetary policy rate (MPR) had only short-term effects on inflation, with these effects fading quickly due to structural issues and fiscal dominance. They concluded that monetary policy alone could not ensure price stability without additional fiscal discipline.

More recent studies have provided updated findings. Akpan and Nwosa (2022) used an ARDL approach with quarterly data from 1985 to 2019. They found that money supply and exchange rate had significant positive effects on inflation, while MPR and cash reserve ratio had weak or no effects. Their results support the idea that monetary policy tools generally fail to strongly influence inflation in Nigeria due to weak transmission.

Olayemi (2024) further examined inflation trends after COVID-19 using a structural VAR model. This study found that supply-side shocks, such as food insecurity, exchange rate fluctuations, and global commodity price changes, caused most inflation pressures in Nigeria, while monetary tightening only had a small effect. The author concluded that the persistent double-digit inflation from 2022 to 2024 largely reacted little to conventional monetary policy changes. Conversely, Adebayo and Yusuf (2023) used a GMM estimation framework and found that contractionary monetary policies, especially higher MPR and CRR, had statistically significant but modest effects on reducing inflation. They noted that these policies often slowed down output growth, raising concerns about the trade-offs between price stability and economic growth.

Several studies in Africa and other developing countries also show the limitations of monetary policy in achieving price stability. For example, Kasekende and Brownbridge (2011) studied inflation dynamics in Sub-Saharan Africa and argued that structural factors like agricultural productivity, exchange rate effects, and fiscal dominance are more important than monetary aggregates. Their findings suggest that the effectiveness of

monetary policy depends on the context and is weaker in countries with underdeveloped financial markets.

In Ghana, Frimpong and Adam (2010) used an ARDL model with data from 1970 to 2008 and found that money supply and exchange rate significantly influenced inflation. However, they highlighted that exchange rate changes had stronger and more lasting effects than monetary aggregates, emphasizing the vulnerability of economies reliant on imports. In Kenya, Mutuku and Koech (2014) applied a VAR model to evaluate monetary policy effects on inflation. They discovered that changes in interest rates had weak and delayed impacts on inflation, while money supply shocks significantly affected prices in the short term. This aligns with findings from Nigeria, reinforcing the idea that monetary transmission through interest rates is often weak in African countries.

Similarly, in South Africa, Nell (2000) provided evidence that targeting interest rates through monetary policy helped maintain long-term price stability. However, the study emphasized that the credibility of the South African Reserve Bank and well-developed financial markets were crucial in ensuring effective policy transmission. This indicates that stronger institutions and structures improve the success of monetary policy. In Ethiopia, Teshome (2018) employed an ARDL bounds testing approach and found that inflation was mainly driven by money supply growth and fiscal deficits, with monetary tightening having only short-term effects. The study concluded that coordinating fiscal and monetary policy is essential for long-term price stability. These findings across

African countries indicate that while monetary policy does influence inflation, its effectiveness is often overshadowed by exchange rate fluctuations, fiscal imbalances, and structural issues.

In contrast to developing nations, studies in advanced economies often indicate stronger effectiveness of monetary policy. For instance, Clarida, Galí, and Gertler (2000) demonstrated that central banks in advanced countries such as the United States, the Eurozone, and Japan can stabilize inflation effectively through systematic interest rate adjustments based on Taylor rules. The U.S. Federal Reserve's actions to combat post-pandemic inflation showcase this effectiveness. According to the Federal Reserve (2023), a series of interest rate increases between 2022 and 2023 successfully reduced inflation from over 8% to about 3% by mid-2023. Likewise, the European Central Bank (2023) and the Bank of England (2023) used contractionary measures, including rate hikes and quantitative tightening, which significantly lowered inflation within two years.

Bernanke and Mishkin (1997) noted that central banks with solid credibility can influence inflation expectations through forward guidance, making their policies more effective even before actual actions take place. This sharply contrasts with Nigeria, where credibility issues often lessen the impact of policy signals. However, debates continue in advanced economies about the trade-offs of aggressive monetary tightening. Blanchard (2021) argued that while central banks can effectively reduce inflation, these actions may

lead to higher unemployment or slower economic growth, raising concerns about overall economic efficiency.

Mishra and Montiel (2012) conducted a cross-country analysis of monetary policy transmission in developing economies. They found that weak financial systems, shallow credit markets, and high informality significantly weaken the impact of monetary policy on inflation. They contrasted this with advanced economies, where transmission is usually stronger and faster. Similarly, reports from the IMF (2023) highlighted that while inflation in advanced economies after COVID-19 was largely controlled through monetary tightening, inflation in developing economies stayed high despite aggressive rate hikes. The IMF attributed this difference to structural weaknesses, reliance on imports, and fiscal dominance in developing countries.

The empirical evidence suggests that while monetary policy is a crucial tool for controlling inflation, its effectiveness varies depending on the context. In advanced economies with credible central banks and well-developed markets, monetary policy tends to be very effective. In contrast, in developing countries like Nigeria, monetary policy often struggles to maintain price stability due to institutional weaknesses, structural issues, and fiscal pressures.

CHAPTER THREE

THEORETICAL FRAMEWORK AND METHODOLOGY

3.1 Theoretical Framework

Theoretical foundations provide substantial evidence that monetary policy instruments such as the monetary policy rate (MPR), money supply (M2), and exchange rate significantly influence inflation and overall price stability within an economy. This influence occurs through the regulation of credit, liquidity, and the cost of borrowing, which together determine aggregate demand and inflationary trends. The Quantity Theory of Money (QTM) serves as the theoretical framework for this study. The QTM posits that inflation is primarily a monetary phenomenon, resulting from excessive growth in money supply relative to real output.

According to Fisher (1911), the relationship between money supply and price level can be expressed as:

$$MV = PQ \quad \text{.....(3.1)}$$

Where:

M = Money Supply

V = Velocity of Money

P = Price Level

Q = Real Output

The theory asserts that, assuming V and Q remain constant, any increase in M leads to a proportional increase in P. Thus, maintaining control over the growth rate of money supply is essential for achieving price stability. Friedman (1968) further emphasized this by asserting that "inflation is always and everywhere a monetary phenomenon." In developing economies such as Nigeria, the relevance of the QTM is clear: inflation has often risen during periods of monetary expansion or loose policy. However, because Nigeria is a largely import-dependent economy, exchange rate fluctuations also transmit external price pressures into domestic inflation. Therefore, this study incorporates exchange rate (EXR) as a control variable alongside MPR and M2 to capture both domestic and external determinants of inflation.

For the purpose of this research, the functional relationship is defined as follows:

$$INF_t = f(MPR_t, MS_t, EXR_t, GDP_t, FDI_t) \quad \text{.....(3.2)}$$

Where:

INF_t = Inflation rate

MPR_t = Monetary Policy Rate

MS_t = Broad Money Supply

EXR_t = Exchange Rate

GDP_t = Gross Domestic Product

FDI_t = Foreign Direct Investment

3.2 Methodology

3.2.1 Model Specification

The empirical model for evaluating the effect of monetary policy on inflation in Nigeria is given as follows:

$$INF_t = \beta_0 + \beta_1 MPR_t + \beta_2 MS_t + \beta_3 EXR_t + \beta_4 GDP_t + \beta_5 FDI_t + \mu_t \quad \text{.....(3.3)}$$

Variables Used in the study and its A Priori Expectations

Monetary Policy Rate (MPR) Expected Sign: Negative (−)

Rationale: The MPR represents the benchmark interest rate that reflects the stance of monetary policy in Nigeria. A higher MPR signals a contractionary policy, increasing lending rates and reducing borrowing by individuals and firms. This lowers aggregate demand and helps to curb inflationary pressures. Conversely, a lower MPR makes credit cheaper, expands demand, and could fuel inflation.

Broad Money Supply (MS) Expected Sign: Positive (+)

Rationale: Broad money supply represents the total liquidity circulating in the economy. According to the Quantity Theory of Money, an expansion in money supply beyond real output growth creates excess demand and drives up prices. Therefore, increases in M2 are expected to correlate positively with inflation.

Exchange Rate (EXR) Expected Sign: Positive (+)

Rationale: The exchange rate acts as a key channel linking domestic and foreign prices,

especially in import-dependent economies like Nigeria. Depreciation of the naira raises the cost of imported goods and inputs, leading to higher consumer prices (imported inflation). Conversely, appreciation tends to lower inflation by reducing import costs.

Gross Domestic Product (GDP)Expected Sign: Negative (−)

Rationale: Real GDP growth reflects increased productive capacity in the economy. When output expands, it helps to absorb excess liquidity and moderate price increases, thereby stabilizing inflation. However, when GDP growth slows, aggregate supply becomes constrained, which can intensify inflationary pressures.

Foreign Direct Investment (FDI) Expected Sign: Negative (−)

Rationale: FDI inflows enhance productive capacity, technology transfer, and infrastructure development, which expand aggregate supply and ease inflationary pressures. However, in cases where FDI inflows stimulate higher domestic demand without proportional output growth, a mild positive effect on inflation may occur.

3.3 Estimation Technique

Prior to estimation, the descriptive statistics was carried out. After which the unit root test and cointegration test were conducted.

Unit Root Test:

The first step involved testing the stationarity of the variables and determining their order of integration. The Augmented Dickey-Fuller (ADF) test was used, which is a popular

test for unit roots in time series data. The test determines whether a series is stationary or non-stationary. A series is considered to be integrated of order I(1) if it needs to be differenced once to become stationary.

Cointegration Test:

The second step aimed to test the presence of cointegration, which indicates a long-run relationship between variables. Cointegration analysis is used to study the interrelationships between non-stationary time series variables. The study employed the maximum-likelihood test procedure developed by Johansen and Juselius to determine the number of cointegration vectors. The test determines whether the variables have a long-run relationship by examining if the difference between them remains constant over time.

Autoregressive Distributed Lag (ARDL) Model

Since the unit root results revealed a mixture of I(0) and I(1) variables, the study adopts the Autoregressive Distributed Lag (ARDL) modelling technique developed by Pesaran, Shin, and Smith (2001). The ARDL approach is appropriate when the regressors are integrated of different orders, provided none of the variables is integrated of order two, I(2). The method allows for the estimation of both long-run and short-run dynamics within a single reduced-form model.

The first step in the ARDL procedure is the Bounds Test for cointegration, which evaluates whether a long-run relationship exists among the dependent variable (inflation) and its explanatory variables. The Bounds Test compares the calculated F-statistic with the critical values provided by Pesaran et al. (2001). If the F-statistic exceeds the upper bound, the null hypothesis of no cointegration is rejected, indicating the presence of a stable long-run relationship.

Once cointegration is established, the long-run coefficients are extracted from the ARDL model, showing the magnitude and direction of the relationship between monetary policy variables and inflation. The short-run dynamics are captured through an Error Correction Representation of the selected ARDL model, in which the Error Correction Term (ECT) reflects the speed of adjustment back to equilibrium after short-run shocks. The ECT must be negative and statistically significant to confirm convergence toward long-run equilibrium.

By employing the ARDL approach, this study is able to assess both short-run effects and long-run equilibrium relationships between inflation and monetary policy variables. This methodology is flexible in handling mixed integration orders, provides efficient and unbiased long-run estimates, and ensures robust inference even with relatively small sample sizes.

3.4 Sources of Data

This study makes use of secondary annual data covering the period from 2000 to 2023. Data on inflation rate (INF) were obtained from the National Bureau of Statistics (NBS), while figures on Monetary Policy Rate (MPR), Broad Money Supply (M2), and Exchange Rate (EXR) were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and the World Development Indicators (WDI, 2023). These sources were chosen because they provide consistent and reliable macroeconomic data for Nigeria. All data were organized and analyzed using EViews 10 econometric software.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF RESULT

4.1 DATA PRESENTATION

4.1.1 Descriptive Statistics

Descriptive statistics summarize datasets and can be categorized into central tendency (e.g., mean and median), variability (e.g., standard deviation), and normality (e.g., skewness and kurtosis) measures. They provide insights into variables such as average values, data spread, symmetry, and distribution shape. Mean represents typical values, median is the middle value, maximum shows the highest point, and standard deviation indicates data variation around the mean. Skewness measures symmetry, with positive skewness indicating a longer right tail and negative skewness a longer left tail. Kurtosis assesses distribution shape, with 3 being standard, higher values suggesting more peakedness, and lower values indicating flatter distributions. The Jarque-Bera statistic is another normality indicator.

Table 4.1 Descriptive Statistics

	EXR	FDI	GDP	INF	MPR	MS
Mean	217.5904	3.86E+09	55363.08	13.12700	12.88542	20306.55
Median	155.5850	3.19E+09	59425.20	12.70720	13.00000	16114.01
Maximum	645.1900	8.84E+09	77936.10	24.65955	20.50000	79252.46

Minimum	101.7000	1.87E+08	25430.42	5.388008	6.000000	1036.080
Std. Dev.	133.8696	2.57E+09	17053.19	4.462298	3.385534	19488.18
Skewness	1.643274	0.551994	-0.383304	0.496728	0.041221	1.296111
Kurtosis	5.358053	2.153282	1.704584	3.186525	3.259251	4.553687
Jarque-Bera	16.36181	1.935721	2.265790	1.021746	0.074008	9.133553
Probability	0.000280	0.379895	0.322100	0.599972	0.963672	0.010391
Sum	5222.170	9.27E+10	1328714.	315.0480	309.2500	487357.2
Sum Sq. Dev.	412184.4	1.52E+20	6.69E+09	457.9784	263.6224	8.74E+09
Observations	24	24	24	24	24	24

Source: Author's Computation using Eviews 10

The descriptive statistics provide a comprehensive summary of the dataset; Exchange Rate (EXR), Foreign Direct Investment (FDI), Gross Domestic Product (GDP), Inflation Rate (INF), Monetary Policy Rate (MPR), and Broad Money Supply (MS). The mean values across the 24-period study reveal the central tendency of each variable. EXR averaged 217.59, reflecting the average naira-to-USD rate, while FDI had a mean of $3.9 billion, indicating the average annual foreign investment inflows. GDP averaged ₦55,363.08 billion, showing the general level of economic output. INF had a mean of 13.13%, MPR averaged 12.89%, and MS had a mean of ₦20,306.55 billion, demonstrating substantial liquidity in the economy over the period.

Examining the median values offers further insights into the data's central tendency. EXR had a median of 155.59, lower than its mean, suggesting a distribution skewed by higher exchange rate values. FDI's median was $3.2 billion, slightly lower than its mean, indicating occasional large inflows. GDP had a median of ₦59,425.20 billion, slightly higher than the mean, pointing to a minor negative skew. INF's median of 12.71% was close to its mean, suggesting a fairly symmetric distribution. MPR had a median of 13%, almost equal to the mean, and MS had a median of ₦16,114.01 billion, lower than the mean, reflecting high values that skewed the distribution.

The range of observations is evident from the maximum and minimum values. EXR ranged from 101.70 to 645.19, indicating substantial exchange rate fluctuations. FDI spanned from $0.19 billion to $8.8 billion, highlighting variability in foreign investment. GDP had a maximum of ₦77,936.10 billion and a minimum of ₦25,430.42 billion, reflecting considerable economic growth variation. INF varied from 5.39% to 24.66%, MPR ranged from 6% to 20.5%, and MS showed the widest variability, ranging from ₦1,036.08 billion to ₦79,252.46 billion.

The standard deviation provides insight into the spread or dispersion of the data. EXR had a standard deviation of 133.87, indicating high volatility in exchange rates. FDI showed substantial variability with a standard deviation of $2.6 billion. GDP had a moderate standard deviation of ₦17,053.19 billion, INF exhibited a deviation of 4.46%,

MPR had 3.39%, and MS had ₦19,488.18 billion, confirming significant fluctuations in money supply over time.

Skewness and kurtosis provide insight into the distribution's shape. EXR had a positive skewness of 1.64, reflecting a long right tail, while FDI's skewness was 0.55, indicating mild right skew. GDP showed slight negative skewness at -0.38, INF had 0.50, MPR had 0.04, and MS had 1.30, suggesting positive skewness due to extreme values in liquidity. In terms of kurtosis, EXR (5.36) and MS (4.55) were leptokurtic, reflecting heavy tails and extreme values. FDI (2.15) and GDP (1.70) were platykurtic, showing flatter distributions. INF (3.19) and MPR (3.26) were mesokurtic, indicating distributions close to normal.

The Jarque-Bera statistic tests for normality. EXR ($p = 0.0003$) and MS ($p = 0.0104$) showed significant departures from normality, suggesting the presence of extreme values or outliers. FDI ($p = 0.380$), GDP ($p = 0.322$), INF ($p = 0.600$), and MPR ($p = 0.964$) did not significantly deviate from normality, indicating roughly symmetric distributions over the study period.

4.1.2 Correlation Analysis

Table 4.2 Correlation Matrix

	INF	LNEXR	LNFDI	LNGDP	LNMS	MPR
INF	1					
LNEXR	0.554968	1				

LNFDI	-0.387141	-0.403751	1			
LNGDP	0.168162	0.796484	0.019111	1		
LNMS	0.233614	0.849592	-0.034610	0.985227	1	
MPR	0.543697	0.239972	-0.674878	-0.182555	-0.130133	1

Source: Author's Computation using Eviews 10

From Table 4.2, the correlation matrix shows the relationships between inflation (INF) and its explanatory variables: Exchange Rate (LNEXR), Foreign Direct Investment (LNFDI), Gross Domestic Product (LNGDP), Money Supply (LNMS), and Monetary Policy Rate (MPR). Inflation exhibits a moderate positive correlation with the exchange rate at 0.555, suggesting that naira depreciation tends to be associated with higher inflation, consistent with the pass-through effect of currency movements on domestic prices. Conversely, inflation is negatively correlated with FDI at -0.387, indicating that higher foreign investment inflows are linked to lower inflation, possibly due to increased productive capacity and supply in the economy. The correlation between inflation and GDP is weakly positive at 0.168, implying that higher economic output has a minimal direct effect on inflation. Money supply shows a weak positive correlation with inflation at 0.234, consistent with the classical view that expansionary liquidity can exert upward pressure on prices. Inflation also has a moderate positive correlation with the monetary policy rate at 0.544, reflecting either the central bank's reaction to rising prices or concurrent movements in macroeconomic conditions.

Among the independent variables, the exchange rate and money supply are highly positively correlated at 0.850, indicating that periods of currency depreciation often coincide with increases in liquidity. The exchange rate and GDP show a strong positive correlation of 0.796, suggesting that economic growth is closely associated with exchange rate movements. FDI and the policy rate are strongly negatively correlated at -0.675, implying that higher interest rates may discourage foreign investment inflows. GDP and money supply are extremely highly correlated at 0.985, reflecting a close link between economic output and liquidity

4.1.3 Unit Root Test

In order to establish the stationarity of the data and to check if they move in the same proportion and the significance of the variables, the Augmented Dickey Fuller (ADF) unit root test was used. The series is not expected to have a unit root; hence, each variable was evaluated at level and at first difference in order to identify correlations between the variables over the long run. If the likelihood at the point is less than 0.05, we can assume that they are stationary at level; otherwise, we check for stationarity at the first difference. The decision rule according to the ADF is that the ADF test statistic must be greater than the critical value at 5%.

Table 4.3: Unit Root Test result

Variable	ADF Statistic (Level)	5% Critical Value	ADF Statistic (1st Difference)	5% Critical Value	Order of Integration
INF	-2.4615	-2.9981	-5.9790	-3.0049	I(1)
LNEXR	1.9262	-2.9981	-4.5660	-3.0049	I(1)
LNFDI	-1.9958	-3.0404	-7.4802	-3.0049	I(1)
LNGDP	-5.2231	-2.9981	-2.3290	-3.0049	I(0)
LNMS	-1.5297	-2.9981	-4.5346	-3.0049	I(1)
MPR	-1.6652	-2.9981	-5.3596	-3.0049	I(1)

Source: Author's Computation using Eviews 10

At levels, all variables except LNGDP fail to surpass the 5% critical threshold, indicating that they are non-stationary in their original form. For instance, the ADF statistic for INF is –2.4615, which is less negative than the 5% critical value of –2.9981, meaning the series contains a unit root. Similar patterns are observed for LNEXR, LNFDI, LNMS, and MPR.

Only LNGDP is stationary at level, with an ADF statistic of –5.2231, which is more negative than the 5% critical value (–2.9981). This result implies that GDP is integrated of order zero, I(0).

At the first difference, all previously non-stationary variables (INF, LNEXR, LNFDI, LNMS, and MPR) become stationary. Their ADF statistics are significantly more negative than the corresponding critical values. For example, D(INF) has an ADF statistic of –5.9790, which is far below the 5% threshold (–3.0049), confirming stationarity after differencing.

4.2 Bounds Cointegration Test

It is crucial to examine whether a long-run equilibrium relationship exists among the variables since the unit root test results revealed mixed stationarity, some variables are stationary at level [I(0)], while others are stationary at first difference [I(1)]. To test for this, the study employs the Autoregressive Distributed Lag (ARDL) Bounds Testing approach developed by Pesaran, Shin, and Smith (2001). This technique is suitable for the current analysis because it accommodates variables integrated of different orders (I(0) and I(1)) and performs efficiently in small sample sizes. The existence of a long-run relationship is confirmed when the computed F-statistic exceeds the upper critical bound value at a chosen significance level.

Table 4.4 **ARDL Bounds Test for Cointegration**

Test Statistic	Value	Significance	I(0) Bound	I(1) Bound
F-statistic	3.6798	10%	2.08	3

		5%	2.39	3.38
		2.50%	2.7	3.73
		1%	3.06	4.15

Source: Author's Computation using EViews 10

The ARDL Bounds Test in Table 4.4 evaluates whether a long-run equilibrium relationship exists between inflation (INF) and its monetary policy determinants: exchange rate (EXR), money supply (MS), monetary policy rate (MPR), GDP, and foreign direct investment (FDI).

The computed F-statistic of 3.6798 is compared with the Pesaran et al. (2001) critical bounds. At the 5% significance level, which is standard in empirical macroeconomic studies, the F-statistic exceeds the upper bound value of 3.38. This leads to a rejection of the null hypothesis of no long-run relationship. Even at the 10% level, the F-statistic remains above the upper bound (3.00), further confirming the presence of cointegration.

4.3 Estimation Results

Table 4.5a: ARDL Long-Run Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
INF(-1)	-0.328098	0.295167	-1.111568	0.3030
INF(-2)	-0.673560	0.300346	-2.242612	0.0598
LNEXR	17.20883	8.999696	1.912156	0.0974

LNEXR(-1)	27.35556	14.01758	1.951518	0.0920
LNFDI	2.581178	1.514557	1.704246	0.1321
LNFDI(-1)	2.590622	1.946385	1.330991	0.2249
LNFDI(-2)	6.567964	2.885731	2.276014	0.0570
LNGDP	-50.87435	45.54857	-1.116925	0.3009
LNGDP(-1)	126.7252	62.29963	2.034124	0.0814
LNGDP(-2)	-91.61934	38.31192	-2.391406	0.0481
LNMS	-9.358921	5.011407	-1.867524	0.1041
MPR	0.111910	0.436406	0.256435	0.8050
MPR(-1)	0.726905	0.576424	1.261060	0.2477
MPR(-2)	-0.358171	0.381210	-0.939563	0.3787
C	-212.6205	149.6447	-1.420835	0.1983

R-squared	0.891707	Mean dependent var	13.14732
Adjusted R-squared	0.675122	S.D. dependent var	4.290540
S.E. of regression	2.445526	Akaike info criterion	4.844901
Sum squared resid	41.86417	Schwarz criterion	5.588794
Log likelihood	-38.29392	Hannan-Quinn criter.	5.020140
F-statistic	4.117115	Durbin-Watson stat	3.013963
Prob(F-statistic)	0.033583		

Source: Author's Computation using Eviews 10

From Table 4.5a, which presents the ARDL long-run estimates with inflation (INF) as the dependent variable, the model demonstrates substantial explanatory strength. The R-squared of 0.8917 and the adjusted R-squared of 0.6751 indicate that approximately 68 percent of the long-run variation in inflation is explained by the combined behaviour of exchange rate movements, foreign investment inflows, money supply changes, monetary policy stance, and output dynamics. The F-statistic of 4.1171 ($p < 0.05$) confirms the

joint statistical significance of the estimated long-run relationship, while the Durbin–Watson statistic of 3.01 suggests the absence of positive serial correlation, thereby supporting the reliability of the long-run parameter estimates.

The lag structure of inflation reveals important long-run dynamics. The first lag of inflation is negative and insignificant, while the second lag is negative and marginally significant (–0.6736, $p \approx 0.06$). This pattern suggests that past inflation exerts a corrective force on current inflation, signaling some degree of long-run mean reversion. In essence, previous increases in inflation tend to moderate over time, consistent with the presence of an adjustment mechanism in the Nigerian price system.

The exchange rate (LNEXR) shows a strong and persistent long-run influence on inflation. Both the contemporaneous coefficient (17.2088, $p < 0.10$) and the first lag (27.3556, $p < 0.10$) are positive and statistically significant at approximately the 10 percent level. This indicates that exchange rate depreciation exerts considerable upward pressure on domestic prices in the long run. The magnitude of these coefficients suggests that inflation in Nigeria is highly sensitive to movements in the exchange rate, reflecting the economy's heavy dependence on imported goods and foreign exchange market conditions.

Foreign direct investment (LNFDI) exhibits a delayed but significant long-run effect on inflation. While the current and first-lag coefficients are positive but insignificant, the second lag (6.5680, $p \approx 0.06$) is positive and marginally significant. This shows that the

inflationary impact of FDI materializes only after some time, possibly due to investment gestation periods, increased demand for foreign exchange, and expanded domestic consumption associated with investment activities. These results imply that FDI contributes to long-run inflationary pressures, but only after underlying investment cycles mature.

The behaviour of GDP (LNGDP) reflects a mixed long-run relationship with inflation. The contemporaneous coefficient is negative and insignificant, while the first lag is positive and significant (126.7252, $p < 0.10$), indicating that increases in output may initially stimulate inflationary pressures possibly through increased aggregate demand and economic activity. However, the second lag is negative and statistically significant (–91.6193, $p < 0.05$), suggesting that output expansion eventually contributes to moderating inflation. This alternating pattern supports the idea that supply-side improvements reduce inflation only after production cycles have strengthened, while short-term increases in economic activity may raise price levels.

Money supply (LNMS) also demonstrates meaningful long-run influence. Although the coefficient (–9.3589) is negative and slightly insignificant ($p \approx 0.10$), it indicates that increases in money supply may, counterintuitively, reduce long-run inflation. This may occur when liquidity growth is accompanied by improved financial sector efficiency or when monetary expansion is sterilized through policy interventions. While the effect is

not strongly significant, it suggests that monetary expansion does not directly feed long-run inflationary pressures in Nigeria.

The monetary policy rate (MPR) shows no significant long-run effect on inflation, as all its coefficients (current and lagged) are statistically insignificant. This implies that interest rate adjustments have limited long-run effectiveness in controlling inflation. The weak influence of MPR is consistent with structural inefficiencies in Nigeria's monetary transmission mechanism, including low financial inclusion, shallow credit markets, and weak responsiveness of borrowing costs to policy rate movements.

Table 4.5b: ARDL Short-Run Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	0.673560	0.188927	3.565191	0.0092
D(LNEXR)	17.20883	4.044705	4.254655	0.0038
D(LNFDI)	2.581178	0.668628	3.860410	0.0062
D(LNFDI(-1))	-6.567964	1.458768	-4.502404	0.0028
D(LNGDP)	-50.87435	18.30395	-2.779419	0.0273
D(LNGDP(-1))	91.61934	23.10608	3.965161	0.0054
D(LNMS)	-4.158371	2.016589	-2.058372	0.0041
D(MPR)	0.111910	0.238495	0.469232	0.6532
D(MPR(-1))	0.358171	0.188630	1.898804	0.0994
CointEq(-1)*	-2.001659	0.289406	-6.916446	0.0002

R-squared	0.873855	Mean dependent var	0.262996
Adjusted R-squared	0.796227	S.D. dependent var	3.975358
S.E. of regression	1.794525	Akaike info criterion	4.299447

Sum squared resid	41.86417	Schwarz criterion	4.745782
Log likelihood	-38.29392	Hannan-Quinn criter.	4.404590
Durbin-Watson stat	3.013963		

Source: Author's Computation using Eviews 10

From Table 4.5b, the short-run ARDL estimates provide insights into the immediate determinants of inflation in Nigeria. The model exhibits strong explanatory power, with an R-squared of 0.8739 and an adjusted R-squared of 0.7962, indicating that about 80 percent of short-term fluctuations in inflation are explained by variations in exchange rate movements, foreign direct investment, GDP changes, money supply, monetary policy, and past inflation. The Durbin–Watson statistic of 3.014 suggests the absence of positive serial correlation, further supporting the reliability of the short-run results.

The lag of inflation, D(INF(–1)), is positive and highly significant (0.6736, p = 0.0092), demonstrating strong short-run inflation persistence. This indicates that increases in inflation from previous periods spill over into the current period, reinforcing inertia in Nigeria's price formation process.

Exchange rate changes exert a powerful inflationary effect in the short run. The coefficient of D(LNEXR) = 17.2088 (p = 0.0038) is large, positive, and statistically significant, suggesting that a depreciation of the naira immediately raises domestic price levels. This underscores the dominant role of exchange rate pass-through in Nigeria's inflation dynamics, driven largely by import dependency and exposure to currency volatility.

Foreign direct investment (FDI) shows mixed short-run effects. The contemporaneous coefficient, D(LNFDI) = 2.5812 (p = 0.0062), is positive and significant, implying that FDI inflows tend to raise inflation in the short term, potentially through increased domestic demand, project-related spending, and pressure on the foreign exchange market. However, the lagged term, D(LNFDI(–1)) = –6.5680 (p = 0.0028), is negative and highly significant, indicating that after the initial shock, FDI contributes to a reduction in inflation. This suggests that once investment projects begin operation and expand productive capacity, they help moderate price pressures.

GDP growth displays a similarly mixed short-run pattern. The contemporaneous change, D(LNGDP) = –50.8744 (p = 0.0273), is negative and significant, meaning that immediate increases in output help reduce inflation, consistent with supply-side improvements. Conversely, the lagged GDP change, D(LNGDP(–1)) = 91.6193 (p = 0.0054), is positive and significant, indicating that previous expansions in economic activity may raise short-run inflation, possibly due to demand pressures or cyclical effects. These results highlight the dual nature of output–inflation interactions in the Nigerian economy. The money supply has a short-run deflationary effect, with D(LNMS) = –4.1584 (p = 0.0041), suggesting that increases in liquidity are absorbed by productive activities rather than fueling immediate price increases.

The monetary policy rate (MPR) shows no significant contemporaneous effect on inflation, as D(MPR) = 0.1119 (p = 0.6532). The lagged term, D(MPR(–1)) = 0.3582 (p =

0.0994), is positive and marginally significant, indicating that monetary tightening may produce mild inflationary effects in the short run. This may reflect structural rigidities in the transmission mechanism, where higher interest rates initially raise production and financing costs rather than stabilizing prices.

The error-correction term, CointEq(–1), is negative, highly significant (–2.0017, p = 0.0002), and greater than one in absolute value. This confirms a strong and rapid adjustment toward long-run equilibrium. The magnitude implies that approximately 200 percent of any short-run disequilibrium is corrected within one period, meaning the system overshoots and quickly converges back to its long-run path. This reinforces the stability of the ARDL model and validates the long-run cointegrating relationship.

4.4 Diagnostic Tests

Table 4.6 Presentation of Diagnostic Tests

Variable	Test Results
Ramsey RESET Prob.	0.5923
Breusch-Pagan-Godfrey Prob.	0.3967
Breusch-Godfrey Prob.	0.102
Jarque-Bera Prob.	0.6034

Source: Author's Computation using Eviews 10

The diagnostic tests presented in Table 4.6 confirm the robustness and reliability of the estimated ARDL model. The Ramsey RESET test, used to check for functional form

misspecification and omitted variable bias, returned a probability value of 0.5923. This p-value is above the 0.05 significance level, indicating that the null hypothesis of correct model specification cannot be rejected. This suggests that the functional form of the model is appropriate and that no significant variable has been omitted, confirming that the model adequately captures the underlying relationship between inflation and its explanatory variables.

The Breusch-Pagan-Godfrey test for heteroskedasticity yielded a probability value of 0.3967, which exceeds the 0.05 significance level. This implies that the null hypothesis of homoscedasticity cannot be rejected. Consequently, the variance of the error terms remains constant across observations, confirming the absence of heteroskedasticity. This enhances the reliability of the coefficient estimates and ensures that the standard errors are unbiased.

The Breusch-Godfrey serial correlation LM test assesses the presence of autocorrelation in the residuals. The F-statistic probability is 0.1020, slightly above the 0.05 threshold. Therefore, the null hypothesis of no serial correlation cannot be rejected, suggesting that the residuals are largely free from autocorrelation. This indicates that the model's dynamic structure is appropriately specified and that the lagged variables adequately capture the temporal behavior of the data.

Finally, the Jarque-Bera normality test yielded a probability value of 0.6034, which is well above the 0.05 significance level. This implies that the residuals are approximately

normally distributed. Normality of residuals is an essential assumption for valid hypothesis testing in regression analysis, ensuring that the estimated parameters and associated p-values are reliable.

The results of the diagnostic tests collectively indicate that the ARDL model is well-specified, free from heteroskedasticity, serial correlation, and specification errors, and that its residuals are normally distributed. These outcomes confirm the robustness of the model's estimates and lend credibility to the statistical inferences drawn from the analysis.

4.5 Test of Research Hypotheses

Hypothesis One H_0: The monetary policy rate (MPR) does not have a significant effect on inflation in Nigeria.

Given the coefficients:

- Variable: D(MPR)
- Coefficient: 0.111910
- Prob. (p-value): 0.6532

The coefficient for D(MPR) is 0.111910, indicating a positive relationship between the monetary policy rate and inflation in Nigeria. However, the p-value of 0.6532 is greater than the 0.05 significance level, implying statistical insignificance. Similarly, the lagged term, D(MPR(-1)), is positive (0.358171) and marginally significant ($p \approx 0.10$), suggesting that past monetary policy changes have only a weak influence on current

inflation. Therefore, we fail to reject the null hypothesis (H_0) and conclude that the monetary policy rate does not have a significant effect on inflation in Nigeria in the short run. This indicates that monetary policy adjustments may have limited immediate impact on inflation, likely due to delayed transmission or structural rigidities in the economy.

Hypothesis Two H_0: Money supply does not have a significant impact on inflation in Nigeria.

Given the coefficients:

- Variable: D(LNMS)
- Coefficient: –4.158371
- Prob. (p-value): 0.0041

The coefficient for D(LNMS) is –4.158371, showing a negative relationship between money supply and inflation in the short run. The associated p-value of 0.0041 is below the 0.05 significance level, indicating that the relationship is statistically significant. Hence, we reject the null hypothesis (H_0) and accept the alternative that money supply significantly affects inflation in Nigeria. Interestingly, the negative sign contradicts the a priori expectation that an increase in money supply should raise inflation. This may reflect short-term stabilizing effects of monetary management, productive absorption of liquidity, or lagged transmission mechanisms in the Nigerian financial system.

4.6 Policy Implications

The analysis of the relationship between monetary policy instruments and inflation in Nigeria provides several key policy implications regarding the efficiency of monetary policies in achieving price stability. The statistically significant and positive relationship between the exchange rate and inflation, both in the short and long run, suggests that currency depreciation continues to exert upward pressure on domestic prices through increased import costs. This implies that inflation in Nigeria is highly sensitive to exchange rate movements, emphasizing the need for policymakers to adopt strategies that enhance exchange rate stability. Measures such as diversifying the export base, promoting local production of import substitutes, and maintaining adequate foreign reserves could help reduce external vulnerabilities and strengthen the transmission of monetary policies on price control.

The monetary policy rate (MPR) was found to have an insignificant effect on inflation in both the short and long run, indicating possible inefficiencies in the transmission mechanism of monetary policy in Nigeria. This outcome suggests that adjustments in the policy rate do not effectively translate into lending rates that can dampen aggregate demand. Policymakers should, therefore, focus on strengthening financial intermediation and ensuring that policy signals are effectively transmitted through the banking system. Improved coordination between fiscal and monetary authorities is also essential to avoid policy conflicts that could undermine inflation control efforts.

The negative and significant relationship between broad money supply (MS) and inflation in the short run, and the marginally significant negative effect in the long run, indicates that increases in liquidity may not immediately fuel inflation. This may reflect delayed transmission effects, increased savings, or effective monetary sterilization by the Central Bank of Nigeria (CBN). Policymakers should continue to adopt prudent liquidity management practices, ensuring that credit expansion supports productive sectors such as agriculture and manufacturing, thereby stimulating output growth without generating inflationary pressures.

GDP and foreign direct investment (FDI) were found to have mixed and lagged effects on inflation. While short-run changes in economic output and foreign investment show immediate but sometimes contradictory effects, their long-run influence is more pronounced, with lagged GDP and FDI affecting inflation significantly. This suggests that sustained economic growth and stable foreign investment are vital in moderating inflationary pressures over time. Policies that promote consistent domestic production, attract long-term FDI, and strengthen supply-side capacities can help mitigate cost-push inflation and reinforce the effectiveness of monetary policy tools.

The findings indicate that while monetary policy instruments such as the MPR, money supply, and exchange rate exert measurable influence on inflation, their effectiveness in achieving price stability is constrained by weak transmission mechanisms, structural rigidities, and delayed effects. Therefore, enhancing monetary policy efficiency in

Nigeria requires improved coordination between fiscal and monetary policies, consistent policy signaling, and targeted interventions that address exchange rate volatility, production bottlenecks, and investment-driven inflationary pressures. Strengthening these areas will enhance the Central Bank's capacity to use monetary policy more effectively in controlling inflation and promoting sustainable economic stability.

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Summary of Findings

This study examined the efficiency of monetary policies in controlling inflation in Nigeria using an ARDL framework for the period 2000 to 2023. The variables considered include inflation rate (INF) as the dependent variable, while the explanatory variables were monetary policy rate (MPR), broad money supply (M2), exchange rate (EXR), gross domestic product (GDP), and foreign direct investment (FDI). The ARDL results revealed both short-run and long-run relationships among the variables, implying that monetary policy variables and inflation move together over time.

The short-run ARDL estimates showed that the error correction term was correctly signed, negative, and highly significant (–2.0017, p = 0.0002), indicating a strong and rapid adjustment toward long-run equilibrium. This implies that deviations from equilibrium in the short run are corrected at a fast rate in subsequent periods. The findings further revealed that the exchange rate had a positive and significant relationship with inflation in both the short and long run, suggesting that depreciation of the naira increases domestic price levels.

The monetary policy rate was found to have no significant effect on inflation in the short or long run, indicating limited transmission of policy rate changes to price levels. Broad

money supply showed a negative and significant relationship with inflation in the short run, and a marginally significant negative effect in the long run, suggesting that increases in liquidity do not immediately fuel inflation, possibly due to productive absorption of funds or delayed policy transmission.

GDP and FDI were found to have mixed and lagged effects on inflation. While contemporaneous changes were sometimes insignificant, lagged GDP and FDI had significant impacts on inflation in the long run, highlighting the delayed but important role of economic output and investment in shaping inflationary trends.

Diagnostic tests and model statistics confirmed that the ARDL model is robust, with good explanatory power (short-run $R^2 = 0.8739$; long-run adjusted $R^2 = 0.6751$) and no major concerns regarding serial correlation or model misspecification. This enhances the reliability of the results for policy formulation.

5.2 Policy Recommendations

Based on the findings, several policy recommendations are advanced:

i. **Strengthen the monetary policy transmission mechanism**: Given the insignificant effect of MPR on inflation, the CBN should ensure that changes in monetary policy rates are effectively transmitted to the banking and real sectors. This requires deepening financial intermediation and improving the responsiveness of lending rates to policy rate adjustments.

ii. **Enhance exchange rate management:** The positive and significant impact of exchange rate movements on inflation emphasizes the need for a stable and market-reflective exchange rate policy. Measures such as export diversification, promoting local production of import substitutes, and maintaining adequate foreign reserves can help mitigate imported inflation and improve monetary policy effectiveness.

iii. **Ensure effective liquidity control:** While broad money supply shows a negative effect on inflation, the CBN should maintain prudent liquidity management to support productive sectors without triggering inflationary pressures. Targeted interventions in agriculture, manufacturing, and infrastructure investment can channel liquidity toward output-enhancing activities.

iv. **Promote coordination between fiscal and monetary policies:** The effectiveness of monetary policy depends on complementary fiscal discipline. Excessive government borrowing or deficit financing can weaken outcomes; therefore, fiscal-monetary coordination should be strengthened to support price stability.

v. **Encourage economic diversification and investment:** Given the mixed and lagged effects of GDP and FDI, policies that promote productive investment, manufacturing, and export diversification can help stabilize prices by reducing dependence on imports, mitigating exchange rate pass-through, and enhancing long-run inflation management.

vi. **Institutional strengthening and transparency:** The CBN should continue to improve policy communication, transparency, and accountability to foster credibility, manage inflation expectations, and strengthen the transmission of monetary policy.

5.3 Conclusion

The study concludes that monetary policy remains a vital tool for managing inflation in Nigeria, but its effectiveness depends on the strength of the transmission mechanisms, the stability of the macroeconomic environment, and the consistency of policy implementation. The findings demonstrate that the exchange rate continues to be a key driver of inflation, with depreciation exerting significant upward pressure on domestic prices. The monetary policy rate (MPR), while positive in its impact, is statistically insignificant in the long run, indicating that interest rate adjustments alone may not immediately curb inflationary pressures, particularly when structural rigidities, exchange rate volatility, and imported price shocks dominate the inflationary process.

The negative relationship between broad money supply (MS) and inflation persists, suggesting that monetary expansion, when prudently managed, does not necessarily generate inflationary pressures, especially if liquidity is directed toward productive sectors of the economy. This underscores the importance of targeted monetary interventions by the Central Bank of Nigeria (CBN) to enhance real sector productivity and stabilize aggregate supply.

The study also highlights the dual role of GDP and foreign direct investment (FDI), which exhibit mixed short- and long-run effects on inflation. While short-term changes in output and FDI have limited influence on price dynamics, their long-term impact remains important in reinforcing monetary policy effectiveness. Policies promoting sustained economic growth, productive investment, and export diversification can therefore complement monetary measures to stabilize prices.

While monetary policy remains essential for inflation control, its success is contingent upon effective coordination with fiscal policy, robust institutional frameworks, and complementary structural reforms. Sustained efforts toward financial sector deepening, exchange rate stability, and macroeconomic transparency will be necessary to enhance the credibility and long-term effectiveness of Nigeria's monetary policy regime.

5.4 Need for Further Studies

To build on the findings of this study, future research efforts should consider the following directions:

- ✓ Examine the asymmetric and nonlinear effects of monetary policy instruments on inflation using advanced models such as Threshold VAR, PSTR, or Markov-Switching approaches.
- ✓ Investigate the interaction between monetary and fiscal policies to understand how coordination or conflict between them influences inflation outcomes in Nigeria.

- ✓ Explore the role of institutional quality, political stability, and governance structures in determining the effectiveness of monetary policy transmission.

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APPENDIX

Year	INF	MPR	MS	EXR	GDP	FDI
2000	6.933292156	14.00	1,036.08	101.7	25,430.42	1140167556
2001	18.87364621	20.50	1,315.87	111.23	26,935.32	1190618644
2002	12.8765792	16.50	1,599.49	120.58	31,064.27	1874070753
2003	14.03178361	15.00	1,985.19	129.22	33,346.62	2005353563
2004	14.99803382	15.00	2,263.59	132.89	36,431.37	1874060887
2005	17.86349337	13.00	2,814.85	131.27	38,777.01	4982533930
2006	8.22522152	10.00	4,027.90	128.65	41,126.68	4854353979
2007	5.388007969	9.50	6,689.37	125.81	43,837.39	6036021405
2008	11.58107517	9.75	9,513.85	118.57	46,802.76	8194071895
2009	12.53782773	6.00	10,928.02	148.88	50,564.24	8555990007
2010	13.74005214	6.25	11,662.91	150.3	55,469.35	6026253091
2011	10.82613719	12.00	14,192.09	153.86	58,180.35	8841062051
2012	12.2242413	12.00	18,035.94	157.5	60,670.05	7069908428
2013	8.495518383	12.00	20,615.45	157.31	63,942.85	5562857987
2014	8.04741088	13.00	20,451.73	158.55	67,977.46	4693828632

2015	9.00943498	11.00	21,288.24	192.44	69,780.69	3064168904
2016	15.69681264	14.00	28,083.91	253.49	68,652.43	3453258408
2017	16.50226621	14.00	28,473.66	305.79	69,205.69	2412974916
2018	12.09510652	14.00	32,739.62	306.08	70,536.55	775247400
2019	11.39642234	13.50	34,850.88	306.92	72,094.09	2305099812
2020	13.24602343	11.50	38,904.92	358.81	70,800.54	2385277666
2021	16.95284572	11.50	44,443.97	401.15	73,382.77	3313210000
2022	18.84718778	16.50	52,187.27	425.98	75768.95	186792428
2023	24.6595502	18.75	79,252.46	645.19	77936.1	1872520530

Null Hypothesis: INF has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.461500	0.1373

Test critical values:	1% level	-3.752946
	5% level	-2.998064
	10% level	-2.638752

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNEXR has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.926180	0.9996
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNFDI has a unit root

Exogenous: Constant

Lag Length: 5 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.995758	0.2858
Test critical values:	1% level	-3.857386	
	5% level	-3.040391	
	10% level	-2.660551	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNGDP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.223098	0.0003

Test critical values:	1% level	-3.752946
	5% level	-2.998064
	10% level	-2.638752

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNMS has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.529679	0.5011
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: MPR has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.665229	0.4347
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INF) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-5.979019	0.0001
Test critical values:	1% level	-3.769597	
	5% level	-3.004861	
	10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNGDP) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.329010	0.1723
Test critical values:	1% level	-3.769597	
	5% level	-3.004861	
	10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNEXR) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.566008	0.0008
Test critical values:	1% level	-3.769597	
	5% level	-3.004861	
	10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNFDI) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.480183	0.0000
Test critical values:	1% level	-3.769597	
	5% level	-3.004861	
	10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNMS) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.534628	0.0003
Test critical values:	1% level	-3.769597	
	5% level	-3.004861	
	10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(MPR) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.359600	0.0003
Test critical values:	1% level	-3.769597	
	5% level	-3.004861	
	10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.