RATE EFFECTS AND THE VALUE OF MONEY

BY

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DEPARTMENT OF FINANCE

FACULTY OF MANAGEMENT SCIENCES

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DECLARATION

I, **Maryam Iyabo AISUNUVBO** 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.

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Maryam Iyabo AISUNUVBO **Date**

CERTIFICATION

We, the undersigned certify that this research work was submitted by **Maryam Iyabo AISUNUVBO** and it is hereby approved for the partial fulfillment of the represent for the award of Bachelor of Science (BSc) degree in Finance, University of Benin, Benin City.

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ABSTRACT

In this study, the main aim was to examine the influence of rate structure on the value of money in the Nigerian economy. Literature was reviewed with respect to the value of money and rate effect. The study utilized data from variables that examine rate effect on economic activities such as inflation rate, exchange rate, interest rate, monetary policy rate and lending rate. The focus of the study was the Nigerian economy. The study employed the ARMA Maximum Likelihood to estimate the data for empiricism and inferences. And also to estimate the hypothesized equation and the findings from the empirical investigation revealed Based on the results obtained from the study, the study concludes that in the Nigerian economy, the value of money is greatly impacted by two major variables of inflation rate and exchange rate. These variables are variables that affect the activities of the economy given that the economy is not a closed economy. The other variables greatly associated with the banking sector are not found to have significant effect on the value of money in the economy. The Study therefore recommends that the major rate to watch out for in the economy are the inflation rate and the exchange rate, that investors should use the inflation rate and exchange rate trend to determine the trends in their investment decision and finally, that policy makers should use as proximate target, the inflation rate and exchange rate in policy formulation whether it be fiscal policy or monetary policy.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Money plays a pivotal role in the functioning of modern economies, serving as a medium of exchange, a unit of account, a store of value, and a standard of deferred payment (Mankiw, 2020). The value of money, however, is not static; it fluctuates in response to several economic factors, most notably inflation, interest rates, and monetary policy. The rate at which money loses or gains value often measured through inflation or deflation directly affecting its purchasing power and, consequently, the overall economy (Blanchard & Johnson, 2017). Understanding the rate of money's depreciation or appreciation is essential for individuals, businesses, and policymakers alike, as it influences consumption, savings, investment decisions, and economic planning.

The value of money, often described as its purchasing power, plays a fundamental role in economic stability and growth. It reflects the amount of goods and services that a unit of currency can purchase and is influenced by a wide range of macroeconomic indicators such as interest rates, inflation, exchange rates, and monetary policy tools (Mankiw, 2016). A stable value of money is essential for investment, savings, and planning, both at the micro and macroeconomic levels.

In Nigeria, fluctuations in the value of money have persisted over the years despite policy interventions by the Central Bank of Nigeria (CBN). These interventions include the manipulation of interest rates, regulation of the exchange rate, and control of inflation through monetary policy mechanisms. However, the effectiveness of these tools in stabilizing the Nigerian naira and maintaining its purchasing power remains questionable (CBN, 2022;

IMF, 2021). While economic theory suggests that higher interest rates, a stable exchange rate, and low inflation should support a strong currency (Blanchard & Johnson, 2017), empirical evidence in the Nigerian context often reveals otherwise.

This observation raises the need for an empirical investigation into whether conventional monetary indicators such as the real interest rate, prime lending rate, exchange rate, monetary policy rate, and inflation rate significantly affect the value of money in Nigeria. Previous studies (e.g., Akinbobola, 2012; Olayemi & Folorunsho, 2020) have found mixed results regarding the relationship between these variables and the currency value in Nigeria, suggesting a complex dynamic that warrants further exploration.

The value of money is a cornerstone concept in economic theory and practice. It determines the purchasing power of a currency, thereby influencing consumer behavior, investment decisions, national income, and economic stability. In a functioning economy, money serves not only as a medium of exchange but also as a store of value, a unit of account, and a standard of deferred payment (Mankiw, 2016). When the value of money is stable, economic actors can make rational financial decisions. However, when its value fluctuates—often due to inflation, exchange rate volatility, or interest rate movements—it introduces uncertainty and inefficiency into the economy.

Globally, the value of money is influenced by macroeconomic variables, including interest rates, inflation, exchange rates, and monetary policy decisions. These factors serve as levers through which central banks attempt to stabilize the economy and control the flow of money. For instance, an increase in interest rates is generally associated with a reduction in the money supply, which can enhance the currency's value by curbing inflation and attracting foreign capital (Blanchard & Johnson, 2017). Similarly, a stable exchange rate is considered

critical for maintaining confidence in a nation's currency, particularly in import-dependent economies like Nigeria.

In developing countries such as Nigeria, however, the practical relationships between these economic variables and the value of money appear more complex. Despite the implementation of monetary policy strategies by the Central Bank of Nigeria (CBN), including adjustments to the monetary policy rate (MPR), manipulation of the prime lending rate, and inflation targeting, the naira has experienced persistent depreciation and erosion of purchasing power (CBN, 2022). This contradiction has raised serious questions about the efficacy of traditional monetary tools in stabilizing the currency and promoting economic confidence. Historically, Nigeria has adopted various monetary frameworks, from exchange rate pegs to inflation targeting regimes, in an effort to control inflation and support the naira. However, structural weaknesses, such as dependence on crude oil exports, low production capacity, and fiscal imbalances, have often undermined these efforts (IMF, 2021). For instance, during periods of oil price shocks, the country experiences foreign exchange shortages that drive down the value of the naira, regardless of prevailing interest rates or inflation controls.

Moreover, recent empirical studies have begun to question the assumed significance of conventional monetary indicators in determining the value of money in Nigeria. Akinbobola (2012) found that while inflation impacts money demand, its effect on the actual purchasing power of the naira may be limited when other structural factors are unaddressed. Similarly, Okonkwo et al. (2020) observed that the effectiveness of interest rate policy in Nigeria is often muted by limited financial inclusion and underdeveloped capital markets, which reduce the transmission of policy signals to the broader economy. The exchange rate, often seen as a direct determinant of a currency's international value, is another area of

concern. Although the CBN has implemented various exchange rate regimes—from fixed to managed float—the naira has remained unstable, often diverging from official values in parallel markets (Olayemi & Folorunsho, 2020). This discrepancy creates inefficiencies that dilute the potency of monetary interventions.

Adding to this complexity is the inflation rate, which has persistently remained in double digits in Nigeria. While inflation is widely recognized as a major factor that erodes the value of money (Fischer, 1993), inflation targeting has not yielded the desired outcomes in Nigeria. This suggests a possible disconnect between inflation figures and real purchasing power, especially given the rising cost of living and weak wage growth.

From the foregoing, the prime lending rate and monetary policy rate, which are intended to regulate credit and money supply, have also been questioned in their ability to influence money value. High lending rates, often above 20%, have discouraged private investment and failed to effectively control inflation or stimulate economic growth (Adebayo & Olayemi, 2018). Additionally, the transmission of the CBN's policy rate into market interest rates is often weak due to inefficiencies in the banking system and fiscal dominance. Given this backdrop, there is a pressing need to empirically re-evaluate the relationships between these macroeconomic variables and the value of money in Nigeria. Are these indicators still relevant in predicting and controlling the purchasing power of the naira? Or are their impacts statistically insignificant in the Nigerian context, suggesting the presence of deeper structural issues beyond the scope of monetary policy? This study, therefore, seeks to critically investigate whether real interest rate, prime lending rate, exchange rate, monetary policy rate, and inflation rate have any statistically significant effect on the value of money in Nigeria. The findings aim to provide clarity to policymakers, economists, and investors on

whether these tools are adequate or whether more comprehensive fiscal and structural reforms are required to maintain monetary stability.

1.2 Statement of the Problem

Despite the Central Bank's continued application of monetary policy instruments, the naira has remained volatile, and its value has deteriorated over time. The rising inflation rate, high lending rates, and an unstable exchange regime have not translated into expected improvements in the value of the currency. This contradiction challenges the theoretical framework that positions these indicators as effective tools for monetary control. In particular, while real interest rates are expected to influence the value of money by affecting investment and consumption patterns, this impact seems muted in Nigeria. Similarly, the prime lending rate, exchange rate, and monetary policy rate have shown inconsistent influence on currency stability. Inflation, which theoretically erodes the value of money, has been persistent in Nigeria, yet currency devaluation continues without a direct proportional relationship.

This study, therefore, aims to examine whether these traditionally significant indicators actually influence the value of money in the Nigerian context. Are these tools effective, or are there structural and policy-related inefficiencies diminishing their impact?

1.3 Objectives of the Study

The primary objective of this study is to examine the relationship between selected monetary variables and the value of money in the Nigerian economy. Specifically, the study seeks to:

1. Examine the effect of real interest rate on the value of money in Nigeria.
2. Assess the influence of prime lending rate on the value of money.
3. Investigate the impact of exchange rate on the value of money.

4. Analyze the relationship between the monetary policy rate and the value of money.
5. Evaluate the effect of inflation rate on the value of money in Nigeria.

1.4 Research Hypotheses

- Real interest rate does not have significant effect on the value of money for the Nigerian economy.
- Prime lending rate does not have significant effect on the value of money for the Nigerian economy.
- Exchange rate does not have significant effect on the value of money for the Nigerian economy.
- Monetary policy Rate does not have significant effect on the value of money for the Nigerian economy.
- Inflation rate does not have significant effect on the value of money for the Nigerian economy.

1.5 Significance of the Study

This study is significant to several stakeholders. For policymakers, especially the Central Bank of Nigeria, it will provide empirical evidence on the effectiveness of key monetary instruments in preserving the value of the naira. Understanding these relationships will aid in the formulation of more targeted and responsive monetary policies.

Academicians and researchers will also benefit from this work, as it contributes to the ongoing debate on the relevance of traditional monetary tools in developing economies like Nigeria. Finally, financial institutions, investors, and economic analysts will gain insights into how various indicators affect currency stability, thereby enhancing risk assessment and decision-making.

1.6 Scope of the Study

This study focuses exclusively on the Nigerian economy and investigates the effects of real interest rate, prime lending rate, exchange rate, monetary policy rate, and inflation rate on the value of money. The study utilizes time-series data, likely spanning from 2000 to 2023, depending on data availability, to assess the long-term and short-term relationships between these variables.

1.7 Organization of the Study

This research is organized into five chapters. Chapter One provides the introduction, including the background, problem statement, objectives, hypotheses, significance, and scope of the study. Chapter Two reviews relevant literature and theoretical frameworks. Chapter Three presents the research methodology. Chapter Four focuses on data presentation, analysis, and interpretation of findings. Chapter Five offers conclusions, policy recommendations, and suggestions for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 The Value of Money

The value of money refers to the purchasing power of a currency. How much goods and services a unit of currency can buy. It is inversely related to the price level; as the general price level increases, the value of money decreases. In macroeconomic analysis, this concept is central to discussions about inflation, interest rates, and exchange rate movements (Mankiw, 2016). The value of money is also an important determinant of economic stability, investor confidence, and living standards, especially in economies like Nigeria where currency volatility is high.

In Nigeria economy, the value of money is fundamentally tied to its purchasing power, which represents the quantity of goods and services a unit of currency specifically, the Nigerian naira can buy at any given time. This purchasing power is not an inherent attribute of the physical currency, especially since Nigeria operates under a fiat monetary system, but rather reflects the public's confidence in the naira and the state of the Nigerian economy (CBN, 2021). As in other fiat systems, money in Nigeria serves primarily as a medium of exchange, and its value is practically assessed by the goods and services it can obtain in local markets (Adebayo & Olayemi, 2018).

From an economic standpoint, monetary value refers to the naira's worth as expressed in market transactions, whether for tangible items like food and fuel or for intangible services like education and healthcare. This monetary value is shaped significantly by inflation,

exchange rates, interest rates, and monetary policy decisions: factors that have historically fluctuated in the Nigerian economy (Olayemi & Folorunsho, 2020). On the microeconomic level, the economic value of a product in Nigeria is often determined by the highest price consumers are willing to pay, especially in informal markets where demand and supply operate with limited regulation (NBS, 2022).

Money in Nigeria, as elsewhere, performs three primary roles: it functions as a store of value, a unit of account, and a medium of exchange. However, due to recurring inflation and currency depreciation, the naira has often struggled to effectively store value over time (CBN, 2021). For example, persistent inflation—averaging over 15% in recent years—has reduced Nigerians' purchasing power, thus weakening the naira's value in practical terms (NBS, 2023). A key distinction in Nigeria's monetary history is between commodity-backed money, used prior to independence when colonial economies operated on metallic standards, and today's fiat money, whose value is sustained by government backing and public confidence rather than intrinsic worth. The Nigerian naira, introduced in 1973, is fiat in nature, and its continued value depends largely on public trust and the effectiveness of the Central Bank of Nigeria's monetary policies (CBN, 2021; Sanusi, 2010).

The concept of "value for money" has gained attention in Nigeria's public and private sectors, especially in the context of procurement and service delivery. It reflects a measure of how efficiently and effectively resources are used to deliver services or goods, especially in sectors such as health, education, and infrastructure (World Bank, 2020). In an inflation-prone economy like Nigeria's, consumers are increasingly concerned not just with the price of items but whether the quality matches the cost. Nigeria's transition to a fiat currency system underscores the critical role of institutional trust and macroeconomic stability in maintaining the naira's value. The absence of intrinsic value means that poor fiscal

management, corruption, and policy inconsistency can quickly erode public confidence, leading to depreciation and inflation (Okonkwo et al., 2020). This was evident during periods of currency instability and the rapid decline in exchange rates between the naira and foreign currencies, such as the U.S. dollar.

In contrast to commodity money, the value is grounded in physical assets. Nigeria's fiat currency requires disciplined monetary policy, transparency, and economic reform to maintain its legitimacy and utility. Without these safeguards, the naira remains vulnerable to devaluation, black-market fluctuations, and the erosion of purchasing power, all of which directly impact everyday Nigerians (Igbodika & Jesse, 2020).

Purchasing power represents the real, functional value of money, measured by the quantity of goods and services a unit of currency can acquire at a given time. In the Nigerian context, this concept is particularly important, as it directly affects both individual livelihoods and business operations, serving as a concrete measure of what the naira is actually "worth" in everyday transactions (NBS, 2023). It reflects economic conditions on the ground and plays a crucial role in shaping consumer behavior, investment decisions, and living standards. A decline in purchasing power typically points to deeper economic instability, often tied to factors like inflation, exchange rate volatility, and weak fiscal discipline (CBN, 2021).

2.1.2 The Effects on the Value of Money

The value of money is primarily influenced by a combination of macroeconomic factors that directly impact its purchasing power, stability, and general acceptability over time. These factors are essential to understanding the performance of national economies and the financial well-being of individuals and businesses. In Nigeria, where the naira serves as

the legal tender, its value is shaped by key variables such as inflation, interest rates, exchange rates, monetary policy decisions, and economic confidence (CBN, 2021).

Inflation

One of the most immediate and noticeable effects on the value of money is inflation.

Inflation is the rate of increase in prices over a given period of time. Inflation is typically a broad measure, such as the overall increase in prices or the increase in the cost of living in a country. But it can also be more narrowly calculated for certain goods, such as food, or for services, such as a haircut, for example. Whatever the context, inflation represents how much more expensive the relevant set of goods and/or services has become over a certain period, most commonly a year. This is a persistent rise in the general price level has a direct and negative impact on purchasing power. As prices increase, the same amount of money buys fewer goods and services, effectively reducing its real value. This inverse relationship underscores how inflation erodes purchasing power, particularly in countries like Nigeria where inflationary pressures are frequent and sometimes severe (Adebayo & Olayemi, 2018). For example, between inflation in Nigeria has been on a sharp and sustained upward trajectory between 2020 and 2025, eroding the purchasing power of citizens and complicating macroeconomic management. The consistent rise in consumer prices has triggered widespread economic and social concerns, particularly regarding food affordability, living costs, and poverty levels weakening the value of money in the hands of average Nigerians (NBS, 2025).

In 2020, Nigeria's inflation rate stood at 13.25%, marking the beginning of a significant inflationary phase (National Bureau of Statistics, 2021). The inflation rate increased to 16.95% in 2021, largely driven by persistent food price hikes, border closures,

and supply chain disruptions caused by the COVID-19 pandemic. The situation worsened in 2022, with inflation reaching 18.85%, reflecting the effects of currency depreciation, high import dependency, and escalating energy costs (CBN, 2022).

By 2023, inflation had surged to 24.66%, the highest annual rate in over a decade. This escalation was attributed to factors such as:

- The removal of fuel subsidies,
- Depreciation of the naira in both official and parallel markets,
- Hikes in electricity tariffs, and
- Ongoing insecurity in food-producing regions (NBS, 2023; IMF, 2024).

In December 2024, inflation reached a new peak of 34.8%, placing severe pressure on household incomes and increasing the cost of living for millions of Nigerians (NBS, 2025). Analysts have described this as a stagflationary scenario, where high inflation coexists with low economic growth and high unemployment (World Bank, 2024). The inflationary trend persisted into 2025, albeit with some fluctuations. According to the latest data, Nigeria's inflation rate rose to 24.23% in March 2025, up from 23.18% in February. Although this appears to be a decrease from the December 2024 figure, the elevated rates still signal persistent inflationary pressures (NBS, 2025). The slight dip may reflect seasonal factors or the lagged effects of monetary tightening by the Central Bank of Nigeria (CBN), but the overall inflation rate remains dangerously high.

The above shows that Nigeria's economy in recent years has grappled with a complex interplay of structural weaknesses and policy-driven challenges. Four key macroeconomic issues exchange rate depreciation, monetary policy constraints, food supply disruptions, and the removal of fuel subsidies have significantly influenced the country's inflationary

trajectory and overall economic stability. One of the most pressing challenges has been the depreciation of the naira, Nigeria's local currency. The naira has experienced sustained downward pressure, particularly in the parallel market where exchange rates have significantly diverged from the official rates. According to Obadan (2023), this disparity has drastically increased the local cost of imported goods, especially fuel and food items, which are heavily dependent on foreign exchange. This trend has intensified cost-push inflation, undermining purchasing power and exacerbating poverty levels among the population.

In response to rising inflation, the Central Bank of Nigeria (CBN) has adopted a tightening stance by repeatedly raising the Monetary Policy Rate (MPR). However, this policy approach has yielded limited results. As Iyoha and Oriakhi (2013) note, the transmission of monetary policy in Nigeria remains weak, hindered by fiscal dominance, excess liquidity, and a general lack of confidence in monetary instruments. These structural inefficiencies have blunted the effectiveness of interest rate adjustments, limiting their impact on inflation and exchange rate stability.

Compounding these economic headwinds are disruptions in food supply. Nigeria's agricultural sector has faced severe setbacks due to persistent insecurity in farming regions, recurrent flooding, and inadequate infrastructure. These challenges have disrupted food production and distribution chains, leading to significant price hikes, particularly for staple crops like rice, maize, and yams. The National Bureau of Statistics (NBS, 2023) highlights that food inflation has remained one of the most volatile and burdensome components of the consumer price index, affecting both rural and urban households.

Further compounding the inflation in Nigeria is the removal of fuel subsidies by the federal government in mid-2023 marked a significant policy shift aimed at restoring fiscal balance. While endorsed by international institutions such as the International Monetary Fund

(IMF, 2024) as a necessary reform, the immediate consequence was a sharp rise in fuel prices. This increase cascaded through the economy, elevating transportation costs and, by extension, the prices of goods and services. The resulting inflationary pressures have deepened the cost-of-living crisis for many Nigerians.

Interest Rates

Interest rates, particularly the monetary policy rate (MPR) set by the Central Bank of Nigeria, also affect the value of money. Higher interest rates can help control inflation by reducing money supply, but they may also discourage borrowing and investment. Conversely, low interest rates may stimulate economic activity but risk stoking inflation (Mishkin, 2015). The effectiveness of these rates in Nigeria is sometimes undermined by structural issues such as informal lending practices and weak transmission mechanisms (Okonkwo et al., 2020). In Nigeria, the Central Bank of Nigeria (CBN) determines the Monetary Policy Rate (MPR), which serves as the benchmark interest rate in the economy. Changes in the MPR influence lending and borrowing rates in commercial banks and other financial institutions (CBN, 2023). For instance, when the CBN raises the MPR, it becomes more expensive to borrow money, which can reduce inflation but also slow down economic growth.

Interest rates in Nigeria have been volatile due to various economic challenges such as high inflation, exchange rate instability, and fiscal deficits. For example, in response to rising inflation in 2023, the CBN increased the MPR multiple times, reaching a record high of 18.75% by mid-year (Nwokocha, 2023). The goal was to curb inflation and stabilize the naira. High interest rates in Nigeria have mixed effects on the economy. On one hand, they help control inflation and support foreign capital inflows by offering higher returns to investors. On the other hand, they can discourage borrowing by businesses and consumers,

slow down investment, and increase the cost of servicing public debt (Adewumi & Adelowokan, 2020).

Nigeria's interest rate environment underwent significant shifts, driven primarily by the Central Bank of Nigeria's (CBN) attempts to curb inflation and stabilize the economy. The Monetary Policy Rate (MPR)—which serves as the benchmark rate for lending in Nigeria—was a central tool in this effort. In response to rising inflationary pressures, the CBN raised the MPR multiple times, reaching 18.75% by mid-2023, the highest level in nearly two decades (CBN, 2023). This tightening monetary stance aimed to reduce money supply and dampen inflation, which remained persistently high due to factors such as currency depreciation, high import costs, and insecurity in food-producing regions (NBS, 2023). However, while higher interest rates were intended to attract foreign investment and strengthen the naira, they also increased the cost of borrowing for businesses and consumers, thereby slowing economic growth (World Bank, 2023). The interest rate hikes were part of a broader macroeconomic strategy, but the effectiveness of this policy mix continues to be debated among economists, particularly in the face of structural challenges such as low productivity and fiscal imbalances (IMF, 2023).

Following its impact on consumers, higher interest rates meant increased costs of personal and business loans, credit cards, and mortgages. As borrowing became more expensive, household consumption declined, affecting overall economic demand (World Bank, 2023). For businesses, particularly in the real sector, the cost of capital increased, thereby reducing investment and job creation. Many small and medium-sized enterprises (SMEs), which form the backbone of Nigeria's economy, struggled to access affordable credit, leading to slower expansion and, in some cases, downsizing (CBN, 2023). This has contributed to Nigeria's high unemployment and underemployment rates, which remained

above 30% when combined, despite efforts to stabilize inflation through monetary tightening (NBS, 2023; IMF, 2023).

Exchange Rate

An exchange rate refers to the value of one country's currency in relation to another country's currency. It plays a crucial role in international trade and finance by determining how much of one currency can be exchanged for another. Exchange rates can be classified broadly into fixed, floating, and pegged systems. In a fixed exchange rate system**,** a country's currency is tied to another major currency, such as the U.S. dollar or gold. The government or central bank intervenes regularly to maintain the currency's value within a narrow band (Madura, 2021). Conversely, a floating exchange rate is determined by market forces of demand and supply without direct government or central bank intervention. This type is more flexible and reflects the economic conditions of a country (Krugman & Obstfeld, 2018).

In the context of Nigeria, the exchange rate is particularly important due to the country's dependence on international trade, especially oil exports and the importation of goods and services. It directly affects inflation, investment decisions, and the general cost of living. Nigeria has experienced different exchange rate regimes over time, including fixed, floating, and managed float systems. Under the fixed exchange rate system, the Central Bank of Nigeria (CBN) pegged the naira to foreign currencies, especially the U.S. dollar. However, economic pressures, such as declining oil revenues and foreign exchange shortages, led to the adoption of more flexible exchange rate mechanisms (CBN, 2023).

Currently, Nigeria operates a managed float system, where the value of the naira is determined by market forces but influenced by the CBN through interventions in the foreign exchange market. This hybrid system is used to stabilize the naira while accommodating

economic realities (Akinlo & Adejumo, 2014). Several factors influence Nigeria's exchange rate. These include oil prices, foreign reserves, inflation rates, and capital flows. For example, a fall in global oil prices often leads to a depreciation of the naira due to reduced foreign earnings (Udoh & Egwaikhide, 2012). Political instability and inflation have also contributed to volatility in the exchange rate. The impact of fluctuating exchange rates on Nigeria's economy is significant. A weaker naira increases the cost of imports, contributing to inflation and higher living costs. Conversely, it may benefit exporters by making Nigerian goods cheaper on the international market (Nwosa, 2017). Understanding the dynamics of the exchange rate is vital for Nigeria's economic planning and policy formulation. The CBN continues to implement reforms aimed at achieving a more stable and transparent foreign exchange market.

Public Confidence in the Naira

Public confidence in the naira and the broader financial system plays a crucial role in determining the currency's value. When individuals and businesses lose faith in the naira's ability to serve as a stable store of value or a reliable medium of exchange, they often shift toward holding assets in foreign currencies particularly the U.S. dollar or in tangible goods such as real estate and commodities. This behavior intensifies pressure on the local currency by increasing demand for foreign exchange in both official and parallel markets (Sanusi, 2010). The resulting capital flight and dollarization of domestic transactions contribute to further depreciation of the naira, creating a feedback loop of declining confidence and weakening currency (CBN, 2023).

This lack of trust is often exacerbated by inconsistent monetary policies, perceived inefficiencies in the banking sector, and political instability, all of which discourage long-term investment in naira-denominated assets (IMF, 2023). Rebuilding confidence requires

transparent fiscal and monetary coordination, credible reforms, and effective communication from policymakers to assure the public and investors of the currency's long-term viability. Rebuilding confidence in the naira and stabilizing the exchange rate requires a multi-faceted approach that addresses both the symptoms and root causes of currency depreciation. A major factor is policy credibility when the Central Bank of Nigeria and fiscal authorities signal consistent, coherent policies, market participants are more likely to respond positively (Eichengreen & Hausmann, 2005). However, Nigeria's historical pattern of abrupt policy shifts and lack of coordination between monetary and fiscal authorities has often undermined investor and public trust (Chete et al., 2016).

Moreover, structural issues such as heavy reliance on oil exports for foreign exchange earnings have made the naira vulnerable to external shocks. For instance, fluctuations in global oil prices directly impact Nigeria’s forex reserves and, by extension, its ability to defend the naira (OPEC, 2023; CBN, 2023). In addition, inadequate non-oil export diversification limits the country's ability to earn foreign exchange from other sectors, compounding pressure on the naira during periods of oil price volatility (UNCTAD, 2023). The informal foreign exchange market, where the naira often trades at a significant discount to the official rate, also reflects public skepticism about the effectiveness of currency policies. When official channels are unable to meet demand, businesses and individuals turn to the parallel market, which further distorts price signals and undermines the unified exchange rate framework (World Bank, 2023; NBS, 2023).

Monetary Policy Rate

The Monetary Policy Rate (MPR) is the rate at which the Central Bank of Nigeria (CBN) lends to commercial banks, and it serves as the anchor for other short-term interest rates in the economy. In theory, changes in the MPR should influence borrowing costs across

the financial system, thereby affecting aggregate demand, inflation, credit supply, and ultimately the value of the domestic currency. When the MPR increases, lending becomes more expensive, discouraging borrowing and slowing down inflationary pressures. Conversely, a lower MPR is meant to stimulate borrowing and economic activity (CBN, 2023).

However, in practice, especially in many developing countries like Nigeria, the transmission mechanism of monetary policy is often weak and inconsistent. This is largely due to structural inefficiencies in the financial sector, including limited financial inclusion, high levels of informality, underdeveloped capital markets, and weak banking intermediation (Okonkwo et al., 2020; IMF, 2023). Additionally, high levels of non-performing loans and risk aversion among banks may limit their willingness to extend credit even when the policy rate is low, further dampening the intended impact of monetary policy (World Bank, 2023).

The dominance of fiscal policy and government borrowing from the domestic financial system can crowd out private sector lending, muting the effect of monetary policy adjustments (Chete et al., 2016). As a result, while the MPR remains an important signaling tool, its actual effectiveness in controlling inflation and stimulating growth in Nigeria has been limited by broader structural and institutional constraints. One major challenge is the low level of financial inclusion. A significant portion of Nigeria's population remains outside the formal banking system, relying instead on informal financial networks that are not directly influenced by changes in the MPR (EFInA, 2022). This reduces the responsiveness of consumer spending and saving behavior to monetary policy shifts.

Another barrier is the underdevelopment of Nigeria's capital markets, which limits alternative sources of long-term financing for businesses. In more advanced economies, changes in interest rates affect bond and equity markets, influencing investment decisions. In

Nigeria, however, limited depth and liquidity in the financial markets reduce these secondary channels of transmission (SEC Nigeria, 2023). Moreover, fiscal dominance remains a significant issue. The government's heavy reliance on domestic borrowing to finance budget deficits often drives up interest rates independently of CBN actions, thereby diluting the effectiveness of monetary policy (IMF, 2023). When commercial banks prefer lending to the government through risk-free instruments like treasury bills and bonds, the private sector is crowded out, limiting the intended stimulatory or contractionary effects of the MPR (Chete et al., 2016; World Bank, 2023).

Frequent changes in policy direction and weak communication strategies by the Central Bank can create uncertainty in the market, reducing the credibility and predictability of monetary policy (Sanusi, 2010). For monetary policy to be truly effective, there must be a stable and predictable macroeconomic environment, underpinned by policy coherence, transparency, and credibility.

2.2 Theoretical Review

Several theories help explain the relationship between macroeconomic indicators and the value of money:

The Quantity Theory of Money

The Quantity Theory of Money (QTM), traditionally associated with Irving Fisher, provides a fundamental framework for understanding the relationship between money supply and inflation. According to the theory, the general price level (P) is directly proportional to the money supply (M), assuming that the velocity of money (V) and real output (Q) remain constant. The classical equation, **MV = PQ**, encapsulates this relationship, suggesting that

any sustained increase in the money supply—without a corresponding rise in output—will lead to inflation (Mishkin, 2016).

In the Nigerian context, this theory lends support to the argument that expansionary monetary policies by the Central Bank of Nigeria (CBN), especially in the form of increased liquidity through deficit financing or direct intervention programs, can result in inflationary pressures. For instance, during periods of rapid money supply growth, Nigeria has experienced spikes in inflation, particularly when such growth was not matched by a corresponding increase in productivity or output (CBN, 2023).

The critics of the QTM in the Nigerian context argue that inflation dynamics in the country are far more complex. Ajakaiye and Fakiyesi (2009) contend that while money supply influences inflation, it is not the sole driver. Structural issues such as supply chain disruptions, insecurity in agricultural zones, poor infrastructure, and exchange rate volatility significantly contribute to rising prices. These factors can cause *cost-push inflation*, where prices rise due to increased production costs, regardless of monetary expansion.

Moreover, the velocity of money in Nigeria is not constant—as assumed in the classical model—but rather fluctuates in response to economic uncertainty, financial innovation, and shifts in consumer behavior (Okonkwo et al., 2020). This variability further weakens the predictive power of the QTM in isolation. Therefore, while the Quantity Theory of Money remains a useful starting point for analyzing inflation, its assumptions often fall short in explaining the full range of inflationary pressures in Nigeria's economy. A more comprehensive understanding requires integrating both monetary and structural variables, along with institutional and behavioral factors affecting money circulation and price stability.

2. Loanable Funds Theory

The Loanable Funds Theory, a classical theory of interest rate determination, suggests that interest rates are primarily set by the demand for and supply of loanable funds in the financial markets. According to this theory, when there is an increase in the demand for funds—typically driven by investment opportunities—interest rates tend to rise. Conversely, if the supply of funds (savings) decreases, the cost of borrowing increases, which also leads to higher interest rates. The balance between these two factors ultimately determines the equilibrium interest rate in the economy (Mishkin, 2016).

In the Nigerian context, high interest rates have been linked to several factors, including limited credit supply and elevated risk premiums, which reflect the high perceived risk associated with lending in the country. According to Acha and Acha (2011), Nigerian banks often face challenges such as a lack of liquidity, high levels of non-performing loans, and an underdeveloped financial infrastructure, which restrict the availability of credit to businesses and consumers. As a result, banks charge higher interest rates to compensate for these risks, making credit less accessible and stifling investment, particularly in the productive sectors of the economy.

The central role of government borrowing in the Nigerian financial market contributes to high interest rates. The government's reliance on domestic debt to finance fiscal deficits often crowds out private sector borrowing, as banks prefer to lend to the government, which is considered a low-risk borrower (Chete et al., 2016). This phenomenon exacerbates the credit squeeze faced by businesses, particularly small and medium-sized enterprises (SMEs), which are crucial for job creation and economic growth. The Loanable Funds Theory thus provides an important lens for understanding the relationship between interest rates, investment, and growth in Nigeria. It underscores the importance of interest rate policy in managing credit supply, encouraging savings, and stimulating investment. High interest rates

can deter investment by increasing the cost of capital, which can slow down economic growth and perpetuate a cycle of low productivity and high unemployment.

3. Purchasing Power Parity (PPP) Theory

The Purchasing Power Parity (PPP) theory of exchange rates posits that the exchange rate between two currencies will be in equilibrium when their respective purchasing powers are equal, meaning that a basket of goods should cost the same in both countries when expressed in a common currency. According to this theory, exchange rate movements are influenced by changes in relative price levels between countries. If the price level in one country rises relative to another, the currency of the country with higher inflation should depreciate to maintain purchasing power parity (Krugman & Obstfeld, 2018).

The PPP theory is highly relevant, particularly due to Nigeria's import-dependent economy. When the naira depreciates against major currencies like the US dollar, the cost of importing goods and services increases, contributing to domestic inflation. This is especially noticeable in sectors such as fuel, food, and raw materials, where price increases are often passed on to consumers (CBN, 2023). As the naira weakens, the cost of foreign goods rises, causing a direct effect on inflationary pressures within the country.

However, the practical application of PPP in Nigeria is complicated by several factors, most notably the persistent divergence between the official and parallel (black) exchange rates. While the official exchange rate is set by the Central Bank of Nigeria (CBN), the parallel market often operates at a significantly higher rate, reflecting a higher demand for foreign currency than is available through official channels (Obadan, 2006). This divergence indicates a lack of equilibrium between the naira's purchasing power in domestic and

international markets, which challenges the predictive power of the PPP theory in this context.

The PPP theory assumes that goods are tradable without barriers and that there are no transportation costs, taxes, or other frictions in trade. However, Nigeria's economy faces significant trade barriers, infrastructural challenges, and regulatory constraints that prevent the smooth application of PPP (NBS, 2023). These factors, along with speculative behaviors in the foreign exchange market, further distort the relationship between exchange rates and price levels.

5. Keynesian Liquidity Preference Theory

According to Keynes, the interest rate is determined by the intersection of the money demand and money supply, where the three motives for holding money (transactions, precautionary, and speculative) come into play. Keynes identified three motives for holding money: transactions, precautionary, and speculative. According to his theory, the equilibrium interest rate is determined at the point where the demand for money equals its supply (Keynes, 1936). This concept underpins the Central Bank of Nigeria's (CBN) approach to using interest rate adjustments, particularly through the Monetary Policy Rate (MPR), to influence liquidity and inflation (CBN, 2024).

However, in a structurally weak and largely informal economy like Nigeria's, the interest rate transmission mechanism is often weak. Several factors contribute to this phenomenon. Nigeria's economy faces significant structural challenges, such as underdeveloped infrastructure, limited industrialization, and a heavy reliance on oil exports (World Bank, 2023). These structural weaknesses reduce the effectiveness of monetary policy, as businesses and consumers may not respond to interest rate changes in the same way they

might in more developed economies (Aghion et al., 2009). A large portion of Nigeria's economy operates informally, with many businesses and individuals outside the formal banking system (National Bureau of Statistics, 2023). This informal sector limits the impact of monetary policy, as a significant amount of economic activity is not directly influenced by changes in interest rates set by the CBN. Furthermore, this disconnect weakens the transmission of policy adjustments (Ogunleye, 2021).

Despite changes in interest rates, liquidity constraints in Nigeria's financial sector can undermine the effectiveness of monetary policy. Commercial banks may be unwilling to lend due to high-risk environments and expensive borrowing costs (CBN, 2024). This reluctance to lend affects the broader economy, as businesses and consumers are less likely to take advantage of lower interest rates. Nigeria's persistent inflationary pressures contribute to the ineffectiveness of interest rate changes. Even when interest rates are adjusted, high inflation can result in negative real interest rates, discouraging both borrowing and saving (Umar & Dauda, 2022). This makes interest rate adjustments less effective in managing economic activity and inflation. The weak transmission mechanism in Nigeria is the result of factors like financial market inefficiencies, limited access to credit, and widespread informal lending practices (Ogunleye, 2021). These factors reduce the efficacy of monetary policy, making it difficult for the CBN's interest rate adjustments to influence the economy in the desired manner.

2.3 Empirical Review

Empirical research on inflation in Nigeria suggests that it is largely driven by cost-push factors, including exchange rate depreciation, supply chain disruptions, and structural inefficiencies. Oladipo and Akinbobola (2011) employed a vector autoregression (VAR) model to examine the link between budget deficit and inflation in Nigeria. Their findings

indicate that fiscal expansion, combined with structural weaknesses, fuels inflation rather than monetary factors alone. Similarly, Ajakaiye and Fakiyesi (2009) argued that inflation in Nigeria is non-monetary in nature and cannot be effectively controlled through monetary tightening alone, emphasizing the need for structural reforms.

Studies also highlight the distortionary effects of high interest rates on investment and economic growth. Acha and Acha (2011) analyzed the impact of interest rates on savings and investment in Nigeria and found that excessively high lending rates discourage private sector borrowing and reduce investment in productive sectors. Their regression analysis showed a negative correlation between lending rates and gross fixed capital formation. Furthermore, Onwumere et al. (2012) established that interest rate liberalization, though intended to improve market efficiency, led to volatility and increased cost of borrowing, especially for small and medium enterprises. Akinbobola (2012) found that real interest rates had limited influence on inflation and money value in Nigeria due to weak policy transmission mechanisms. Similarly, Igbodika and Jesse (2020) concluded that real interest rates were not statistically significant in determining Nigeria's currency performance, attributing the result to low savings culture and unstable macroeconomic conditions. Ogunmuyiwa and Ekone (2016) examined the effect of bank lending rates on macroeconomic indicators and concluded that high lending rates discouraged borrowing without significantly reducing inflation. This finding supports the notion that Nigeria's prime lending rate may not be effective in influencing the value of money due to structural inefficiencies in credit markets.

On exchange rates, Obadan (2006) provided a comprehensive analysis of Nigeria's exchange rate management from 1986 to the early 2000s. Using time-series data, he demonstrated that the persistent depreciation of the naira had adverse effects on domestic prices and external competitiveness. Sanusi (2010) emphasized that Nigeria's dependence on

crude oil exports makes its exchange rate highly susceptible to global oil price fluctuations. More recent empirical work by Alege and Ogundipe (2014), using cointegration and error correction models, found that exchange rate volatility negatively affects macroeconomic performance, including inflation, output, and investment levels. Olayemi and Folorunsho (2020) established a weak correlation between exchange rate movements and the domestic value of money. Despite sustained devaluation of the naira, inflation and price volatility persisted, suggesting that exchange rate dynamics alone do not sufficiently explain currency value trends in Nigeria.

Empirical assessments of Nigeria's monetary policy suggest limited effectiveness due to weak transmission mechanisms and structural rigidities. Iyoha and Oriakhi (2013), through econometric modeling, found that the Central Bank's monetary policy tools often have delayed and muted effects on inflation and output. They identified fiscal dominance and shallow financial markets as major impediments. Similarly, Ajakaiye and Fakiyesi (2009) showed that although the Central Bank uses tools like the Monetary Policy Rate and Cash Reserve Ratio, their impact is constrained by the informal nature of the economy and poor financial intermediation.

2.4 Summary of Literature Review

The reviewed literature provides mixed evidence on the impact of real interest rate, prime lending rate, exchange rate, monetary policy rate, and inflation on the value of money in Nigeria. While economic theory expects significant effects, empirical findings increasingly point to the limited effectiveness of these variables in Nigeria due to institutional inefficiencies, structural constraints, and policy misalignments. This study aims to contribute to this ongoing discourse by empirically testing whether these key macroeconomic indicators have any significant impact on the value of money in the Nigerian economy.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology adopted in the study to investigate the value of money and the impact of selected macroeconomic rates on it in the Nigerian economy. The methodology outlines the research design, data sources, model specification, methods of data analysis, and estimation techniques used to achieve the objectives of the study.

3.2 Research Design

This study adopts an ex-post facto research design. This design is appropriate because the study relies on historical data that have already been documented, and it seeks to establish the relationship between the value of money and key economic indicators such as real interest rate, prime lending rate, exchange rate, monetary policy rate, and inflation rate. The design enables the researcher to make objective inferences without manipulating the variables.

3.3 Nature and Sources of Data

The study employs secondary data covering a period from 1981 to 2023. The data were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin, publications from the National Bureau of Statistics (NBS), and other relevant financial and economic publications. Specifically, data were collected on:

Value of Money (VMY): proxied by the implicit price deflator.

Real Interest Rate (RIR)

Prime Lending Rate (PLR)

Official Exchange Rate (OER)

Monetary Policy Rate (MPR)

Inflation Rate (IFR)

All data series were sourced in time series format on an annual basis.

3.4 Model Specification

To examine the effect of economic rates on the value of money, the study specified the following functional relationship:

$$\mathbf{VMY = f(RIR, PLR, OER, MPR, IFR)}$$

Transforming this into an econometric model, we have:

$$\mathbf{VMY = \beta_0 + \beta_1 RIR + \beta_2 PLR + \beta_3 OER + \beta_4 MPR + \beta_5 IFR + \varepsilon}$$

Where:

VMY = Value of Money (dependent variable)

RIR = Real Interest Rate

PLR = Prime Lending Rate

OER = Official Exchange Rate

MPR = Monetary Policy Rate

IFR = Inflation Rate

β_0 = Constant term

$\beta_1 - \beta_5$ = Coefficients of the independent variables

ε = Error term

3.5 Method of Data Analysis

To ensure the robustness and reliability of the estimates, the following steps and techniques were applied:

3.5.1 Descriptive Statistics

Descriptive statistics such as mean, standard deviation, skewness, kurtosis, and Jarque-Bera statistics were used to examine the distributional characteristics of the variables.

3.5.2 Correlation Analysis

A correlation matrix was used to assess the linear relationship among the variables, and to detect potential multicollinearity prior to regression analysis.

3.5.3 Stationarity Test (Unit Root Test)

To ensure the validity of the regression results and to avoid spurious relationships, the Augmented Dickey-Fuller (ADF) test was conducted to determine the stationarity and order of integration of each variable.

3.5.4 Regression Estimation Technique

Due to the presence of non-stationary variables and some found to be stationary at second difference, the study employed the **ARMA Maximum Likelihood Estimation (OPG - BHHH)** technique. This method allows for robust handling of autocorrelation and heteroskedasticity, and adjusts for potential serial correlation using the Cochrane-Orcutt correction mechanism.

3.6 Diagnostic and Post-Estimation Tests

To validate the reliability of the regression model, several diagnostic tests were carried out:

Variance Inflation Factor (VIF): to detect multicollinearity among the independent variables.

Breusch-Pagan-Godfrey Test: to test for the presence of heteroskedasticity.

Durbin-Watson Statistic: to check for autocorrelation in the residuals.

Jarque-Bera Test: to assess the normality of the regression residuals.

These tests provided assurance on the appropriateness of the model and confirmed that the estimated parameters satisfy the classical linear regression assumptions.

3.7 Evaluation Criteria for Hypothesis Testing

The hypotheses were tested at a 5% level of statistical significance. The significance of each coefficient was evaluated using the p-values. A variable was considered statistically significant if its p-value was less than 0.05.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

4.1 Introduction

This section of the study focuses on the presentation of the data used in the study, analyzing the estimation conducted in the study and making inferences from the estimation. The focus of the estimation is geared toward answering the research question which was asked in the introduction of the study. The study investigate the value of money and the impact various rate in the economy have on the value of money in the economy. The various rates for consideration are real interest rate, prime lending rate of deposit money banks, monthly average official exchange rate of the Naira, minimum rediscounting rates/monetary policy rate and implicit price deflator. Hence the estimated model for the study is specified as:

VMY = *f* (RIR, PLR, OER, MPR, IFR)

4.2 Presentation of Results

The results for the study are presented in this section of the study. The data for the study are presented in appendix A of the study comprising of the dependent and the independent variables. This comprise of the preliminary test used, the main test and then the hypothesis tested based on the main statistical method for analysis.

4.2.1 Presentation of Descriptive Statistics

The trend analysis of the variables are presented in figure 4.1 and it revealed that for VMY, there is gradual increase in the value of money in Nigeria but this increase is seen to follow a very slow trajectory. Volatility is seen to be associated with RIR, PLR and MPR. With increase in value of money, OER and IFR are also seen to be on the increase as they are the

variables that have greater association to the value of money. While IFR explains the rate oof changes in prices OER explains its value in relation to the currency of other nations.

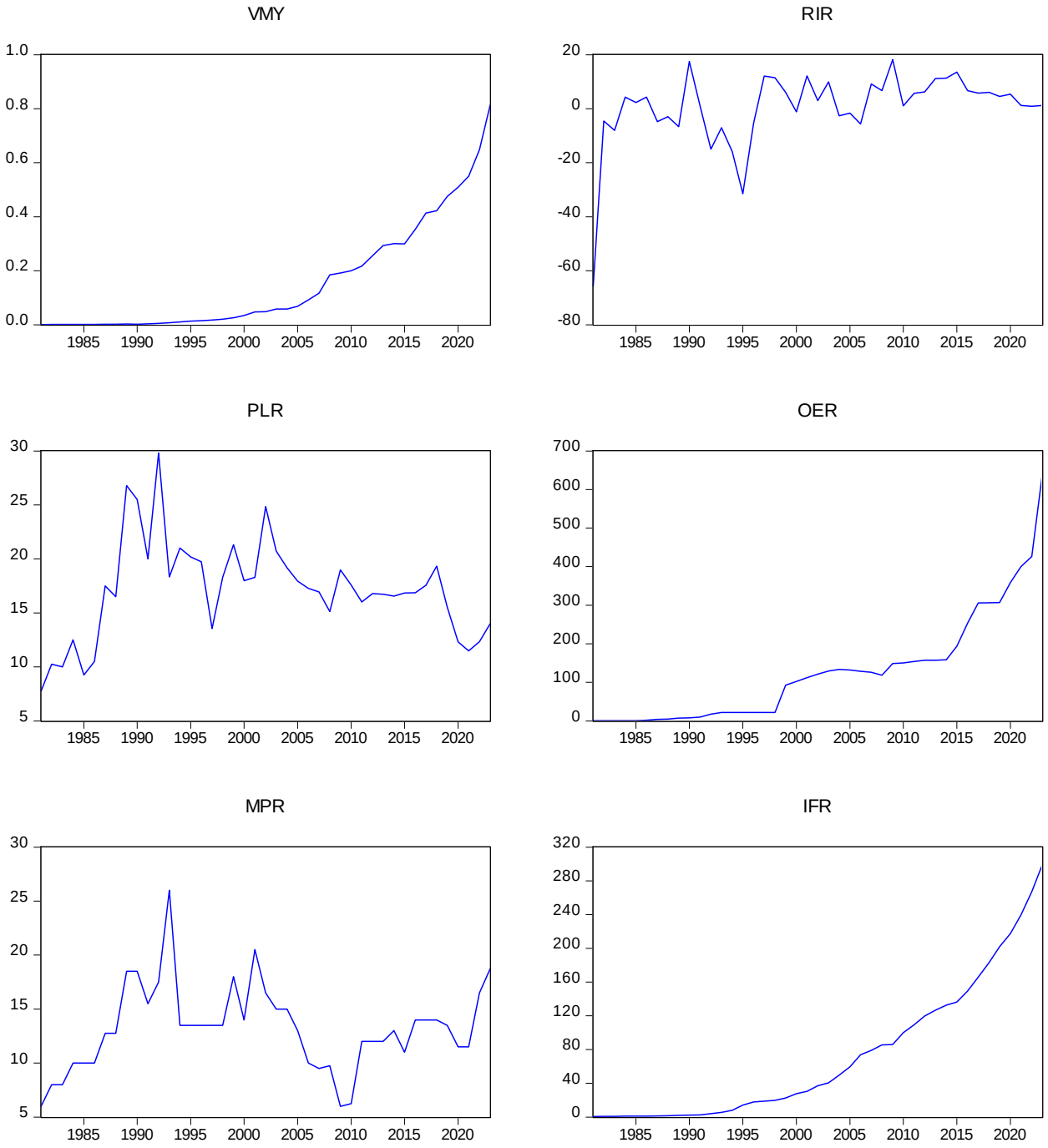


Figure 4.1: Distribution of the Variables used in the Study.

Source: Central Bank of Nigeria Statistical Bulletin and Author's Computation, 2025.

The result of the descriptive statistics revealed that VMY has a mean value of 0.157812 with a median value of 0.048479. the value of the standard deviation is seen to hoover around the

mean region for the distribution of the data but the skewness value is found to be greater one and the value of the Kurtosis is found to be greater than 3. The result of the Jarque-Bera statistic shows that the variable is not normally distributed since the probability value of the Jarque – Bera statistic is less than 0.05. in the same vein, RIR is not found to follow a normal distribution as the probability value of the Jarque-Bera statistic is also less than 5% level of statistical significance. The same is said of the variables OER and IFR as both variables are found to have probability values of Jarque-Bera statistic that is less than 5%/ but contrary to the non-normal distribution of the variables PLR and MPR are found to have normal distribution since the probability value of their Jarque-Bera statistic is greater than 5% level of statistical significance. With some of the variables being normally distributed, the ordinary least square method of analysis can be employed after other methods of examining the features of the data with respect to stationarity.

The results of the descriptive statistic are presented in table 4.1.

Table 4.1: Descriptive Statistics

	VMY	RIR	PLR	OER	MPR	IFR
Mean	0.157812	0.482534	17.11578	128.0539	13.21512	73.16922
Median	0.048479	3.023542	17.26000	118.5669	13.50000	37.02582
Maximum	0.814929	18.18000	29.80000	645.1941	26.00000	299.8150
Minimum	0.000733	-65.85715	7.750000	0.610025	6.000000	0.705537
Std. Dev.	0.207329	13.91620	4.616763	142.7435	3.995005	82.75016
Skewness	1.395695	-2.788874	0.346763	1.546409	0.604708	1.105424
Kurtosis	4.169046	13.56168	3.497852	5.553334	4.137800	3.242425
Jarque-Bera	16.40903	255.6000	1.305829	28.81903	4.940120	8.862684
Probability	0.000273	0.000000	0.520526	0.000001	0.084580	0.011899
Sum	6.785895	20.74898	735.9785	5506.318	568.2500	3146.277
Sum Sq. Dev.	1.805377	8133.748	895.2088	855780.1	670.3227	287598.8
Observations	43	43	43	43	43	43

Source: Author's Estimation from EView, 2025.

4.2.2 Correlation Analysis

The results of the correlation matrix revealed that for the variable RIR is not found to have significant relationship with VMY since the associated probability value for RIR is 0.0972 which is greater than 5% level of statistical significance. In the same vein, PLR is not found to have significant relationship with VMY because it has a correlation rank of 0.2585 and associated probability of 0.0943. OER is found to have significant relationship with VMY at the 5% level of statistical significance. Also MPR is not found to have significant relationship with the value of money but IFR is found to have significant relationship with the value of money. On the relationship between the independent variables, multi-collinearity and serial correlation is not evident implying the reliability and suitability of the time series for regression estimation and inferences.

Table 4.2: Correlation Results

Covariance Analysis: Ordinary
Date: 02/16/25 Time: 00:35
Sample: 1981 2023
Included observations: 43

Correlation Probability	VMY	RIR	PLR	OER	MPR	IFR
VMY	1.000000 -----					
RIR	0.256256 0.0972	1.000000 -----				
PLR	-0.258405 0.0943	0.139609 0.3719	1.000000 -----			
OER	0.967521 0.0000	0.259770 0.0925	-0.185730 0.2331	1.000000 -----		
MPR	0.030886 0.8441	0.137848 0.3780	0.542426 0.0002	0.109875 0.4831	1.000000 -----	

IFR	0.991105	0.282597	-0.242054	0.967536	0.002322	1.000000
	0.0000	0.0663	0.1179	0.0000	0.9882	-----

Source: Author's Estimation from EView, 2025.

4.2.3 Analysis of Unit Root Result

In order to avoid instances of having regression result that do not generate true estimators and are not representative of the data being estimated, the unit root is conducted. This is to avoid nonsensical results. Unit root is conducted to determine the stationarity and order of integration of the series. The result of the unit root test presented in table 4.3 revealed that VMY, PLR, OER and IFR are only stationary after second difference. This implied the presence of unit root in the series. One of the series is found to be stationary at level. And the variable is MPR. With the presence of uit root in the series, the estimation technique employed is the ARMA Maximum Likelihood (OPG - BHHH) this allow for the use Cochrain Ocult for the correction of serial correlation and possible elimination of multi-collinearity.

Table 4.3: Unit Root Test

	Augmented Dickey-Fuller test statistic		Remark
Series	Statistic	Prob.**	
VMY	7.547077	1.0000	
D(VMY)	-0.175347	0.9336	
D(VMY, 2)	-6.252456	0.0000	I(2)
RIR	-7.670572	0.0000	
PLR	-2.278508	0.1836	
D(PLR)	-6.124728	0.0000	I(2)
OER	4.136463	1.0000	
D(OER)	-1.422083	0.5622	
D(OER, 2)	-5.327462	0.0001	I(2)
MPR	-3.260569	0.0233	I(0)
IFR	12.97941	1.0000	

D(IFR)	1.814629	0.9996	
D(IFR, 2)	-5.360368	0.0001	I(2)

Source: Author's Estimation Using EView 10, 2025.

4.2.4 Regression Analysis for the Study

The regression result is presented in table 4.4. The result shows that RIR is not significant in determining variation in VMY. Also PLR is not found to have significant effect on VMY. This is the same with MPR whose probability value is found to be greater than 5% level of statistical significance. Variables that were not found to have significant effect on VMY are RIR, PLR and MPR. The other variables OER and IFR are found to have significant effect on the value of money. Both variables are found to have positive effect on VMY. This implied that increases in these variables improve the value of money in the economy.

Table 4.4: Regression Result on Rate Effect and the Value of Money

Dependent Variable: VMY
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 02/15/25 Time: 19:09
Sample: 1981 2023
Included observations: 43
Convergence achieved after 18 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIR	4.98E-05	0.000411	0.120993	0.9044
PLR	-0.000375	0.001150	-0.326179	0.7462
OER	0.000363	6.48E-05	5.591496	0.0000
MPR	0.000515	0.000992	0.519406	0.6067
IFR	0.001985	0.000183	10.86154	0.0000
C	-0.028619	0.034130	-0.838521	0.4074
AR(1)	0.855186	0.110996	7.704684	0.0000
SIGMASQ	0.000215	5.39E-05	3.987730	0.0003

R-squared	0.994876	Mean dependent var	0.157812
Adjusted R-squared	0.993851	S.D. dependent var	0.207329

S.E. of regression	0.016258	Akaike info criterion	-5.203706
Sum squared resid	0.009251	Schwarz criterion	-4.876041
Log likelihood	119.8797	Hannan-Quinn criter.	-5.082874
F-statistic	970.7919	Durbin-Watson stat	1.643107
Prob(F-statistic)	0.000000		
Inverted AR Roots	.86		

Source: Author's Estimation Using EView 10, 2025.

The regression parameters shows that the independent variables account for over 99% of the systematic variation in the dependent variable VMY. The result for the model fitness shows that the model is appropriately formulated to give the behavioural relationship between the dependent variable and the independent variables. The result of the F statistic shows that on the overall, the independent variables are significant in explaining the variation in the dependent variable. The result of the Durbin – Watson statistic shows that there is no serial correlation in the model. This implied that we can rely on the regression estimate to answer the research hypothesis. The mathematical representation of the model is stated as:

vmy = 4.97744361994e-05*rir - 0.000374990293769*plr + 0.000362565112277*oer + 0.000515340096098*mpr + 0.00198460457893*ifr - 0.0286189284529 + [ar(1)=0.855186495198,uncond]

The result of the variance inflation factor shows that all the centered factors are less than 5 which implied that the variance between the independent variables of the estimated model are not too far apart which signify a good model. This also implied that results from such model with such variables are reliable and do not violate the ordinary least square assumption.

Table 4.5: Diagnostic Test – Variance Inflation Factor

Variance Inflation Factors
Date: 02/16/25 Time: 00:31
Sample: 1981 2023
Included observations: 43

Variable	Coefficient Variance	Uncentered VIF	Centered VIF

RIR	1.69E-07	2.129391	1.482719
PLR	1.32E-06	2.481602	1.317352
OER	4.20E-09	4.681047	3.272256
MPR	9.84E-07	2.277654	1.278112
IFR	3.34E-08	7.185176	3.571657
C	0.001165	6.473675	NA
AR(1)	0.012320	3.455407	2.110631
SIGMASQ	2.91E-09	2.310062	2.123598

Source: Author's Estimation Using EView 10, 2025.

The result of the Jarque-Bera statistic for the series residual shows that the model estimated is normally distributed at 1% since the probability value of the Jarque Bera statistic is greater than 0.01.

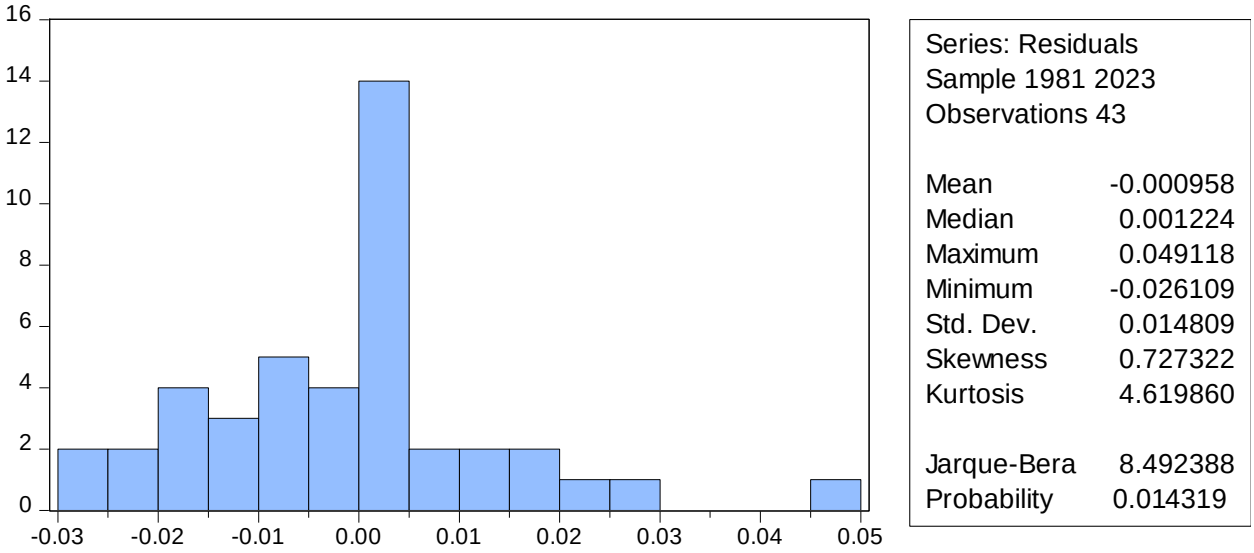


Figure 4.2: Series Residual.

Source: Author's Estimation Using EView 10, 2025.

In examining the multi-collinearity among the variables, the heteroskedasticity shows that there is no multi-colinearity in the estimated model.

Table 4.6: Diagnostic Test – Multi-Collinearity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.810508	Prob. F(5,37)	0.5497
Obs*R-squared	4.244788	Prob. Chi-Square(5)	0.5147
Scaled explained SS	4.804981	Prob. Chi-Square(5)	0.4401

Source: Author's Estimation Using EView 10, 2025.

4.3 Test of Hypotheses

Based on the regression result presented in table 4.4, we test the hypotheses earlier presented in chapter one. The test is based on a statistical significance value of 5%.

It was stated in the first hypothesis that Real interest rate does not have significant effect on the value of money for the Nigerian economy. The regression result shows that the null hypothesis be accepted (RIR Prob. 0.9044 > 0.05).

It was also stated in the second hypothesis that Prime lending rate does not have significant effect on the value of money for the Nigerian economy. The regression result revealed that the null hypothesis be accepted (PLR Prob. 0.7462 > 0.05).

It was also stated that Exchange rate does not have significant effect on the value of money for the Nigerian economy. The regression result revealed that the null hypothesis be rejected and the alternate hypothesis be accepted that exchange rate does nit have significant effect on the value of the firm (OER Prob. 0.0000 < 0.05).

It also stated that Monetary policy Rate does not have significant effect on the value of money for the Nigerian economy. The regression result revealed that the null hypothesis be accepted (MPR Prob. 0.6067 > 0.05).

It was also stated that Inflation rate does not have significant effect on the value of money for the Nigerian economy. The regression result revealed that the null hypothesis be rejected and

the alternate hypothesis be accepted that Inflation rate have a positive and significant effect on the value of money for the Nigerian economy.

4.4 Discussion of Findings

From the empirical analysis of the data used for the study, it was revealed that Real interest rate does not have significant effect on the value of money for the Nigerian economy. The value of money in the Nigerian economy is not seen to be significantly impacted by the real interest rate in the economy. This is because of the large portion of the non-monetized sector of the Nigerian economy. Majority of the population do not have access to the banking sector for credit facilities which will have influenced greatly the value of money.

It was also found out that Prime lending rate does not have significant effect on the value of money for the Nigerian economy. This is because majority of the populace do not borrow from the banking sector. This does not translate into determining the activities in the real sector of the economy vis-à-vis the value of money.

Contrary to the finding of non significance, Exchange rate was found to have significant and positive effect on the value of money for the Nigerian economy. This is because the Nigerian economy was heavily dependent on the external economy which makes the Nigerian Naira vulnerable to fluctuation in foreign exchange.

It was also found out that Monetary policy Rate does not have significant effect on the value of money for the Nigerian economy. The monetary policy rate which is the basis rate for determining credit in the banking sector is found not to have significant effect on the value of money because the banking sector does not fund majority of the business which generate majority of the goods and services in the economy.

And lastly, it was found out that Inflation rate has significant and positive effect on the value of money for the Nigerian economy. The value of money is either reduced or improved depending on the level and rate of inflation the economy experiences per time.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

In this study, the main aim was to examine the influence of rate structure on the value of money in the Nigerian economy. Literature was reviewed with respect to the value of money and rate effect. The study utilized data from variables that examine rate effect on economic activities such as inflation rate, exchange rate, interest rate, monetary policy rate and lending rate. The focus of the study was the Nigerian economy. The study employed the ARMA Maximum Likelihood to estimate the data for empiricism and inferences. And also to estimate the hypothesized equation and the findings from the empirical investigation revealed as follows:

1. that Real interest rate does not have significant effect on the value of money for the Nigerian economy.
2. that Prime lending rate does not have significant effect on the value of money for the Nigerian economy.
3. Exchange rate has significant and positive effect on the value of money for the Nigerian economy.
4. that Monetary policy Rate does not have significant effect on the value of money for the Nigerian economy.
5. that Inflation rate has significant and positive effect on the value of money for the Nigerian economy.

5.2 Conclusion

Based on the results obtained from the study, the study concludes that in the Nigerian economy, the value of money is greatly impacted by two major variables of inflation rate and exchange rate. These variables are variables that affect the activities of the economy given that the economy is not a closed economy. The other variables greatly associated with the banking sector are not found to have significant effect on the value of money in the economy.

5.3 Recommendation

We recommend as follows:

1. That the major rate to watch out for in the economy are the inflation rate and the exchange rate.
2. That investors should use the inflation rate and exchange rate trend to determine the trends in their investment decision.
3. That policy makers should use as proximate target, the inflation rate and exchange rate in policy formulation whether it be fiscal policy or monetary policy.

5.4 Suggestion for Further study

While this study focused on Nigerian economy, future studies may increase the scope of this study to examine if the result from the empirical investigation which will differ from the outcome of this study. Future studies may also focus attention on broadening the variables directly related to this two variables of exchange rate and inflation to determine the trajectory to the value of money.

REFERENCE

1. Acha, I. A., & Acha, C. K. (2011). Interest rates in Nigeria: An analytical perspective. Research Journal of Finance and Accounting, 2(3), 1–12.

2. Adebayo, A., & Olayemi, T. (2018). Understanding money and its functions in a developing economy. Ibadan: Spectrum Books.

3. Adebayo, F. O., & Olayemi, T. M. (2018). Monetary policy and economic stability in Nigeria. Journal of Economics and Policy Studies, 12(3), 44–58.

4. Adewumi, M. O., & Adelowokan, O. A. (2020). Interest rate shocks and macroeconomic performance in Nigeria: A structural VAR approach. Journal of Economics and Policy Analysis, 10(2), 55–72.

5. Aghion, P., Bacchetta, P., Rancière, R., & Rogoff, K. (2009). Exchange rate volatility and productivity growth: The role of financial development. Journal of Monetary Economics, 56(4), 494–513.

6. Ajakaiye, O., & Fakiyesi, T. (2009). Global financial crisis discussion series: Paper 8—The global financial crisis and the Nigerian economy. Overseas Development Institute (ODI).

7. Akinbobola, T. O. (2012). The dynamics of money demand and monetary policy in Nigeria. Journal of Applied Statistics, 3(1), 27–45.

8. Akinbobola, T. O. (2012). The dynamics of money supply, exchange rate and inflation in Nigeria. Journal of Applied Finance & Banking, 2(4), 117–141.

9. Alege, P. O., & Ogundipe, A. A. (2014). Exchange rate volatility in Nigeria: Evidence from autoregressive distributed lag (ARDL) technique. Journal of Economics and Sustainable Development, 5(10), 100–110.

10. Blanchard, O., & Johnson, D. R. (2017). Macroeconomics (7th ed.). Pearson.

11. Central Bank of Nigeria (CBN). (2021). Annual report. https://www.cbn.gov.ng

12. Central Bank of Nigeria (CBN). (2022). Annual Report and Financial Statements.

13. Central Bank of Nigeria (CBN). (2022). Annual report and financial statements. https://www.cbn.gov.ng

14. CBN. (2023). Annual report and financial statements. Central Bank of Nigeria. Retrieved from https://www.cbn.gov.ng

15. Central Bank of Nigeria (CBN). (2023). Monetary policy communiqués and data. https://www.cbn.gov.ng

16. CBN. (2024). Monetary policy report. Central Bank of Nigeria. Retrieved from https://www.cbn.gov.ng

17. Chete, L. N., Adeoti, J. O., Adeyinka, F. M., & Ogundele, O. (2016). Industrial development and growth in Nigeria: Lessons and challenges. Brookings Institution.

18. Fischer, S. (1993). The role of macroeconomic factors in growth. Journal of Monetary Economics, 32(3), 485–512.

19. Igbodika, M. N., & Jesse, O. A. (2020). Monetary policy and currency depreciation in Nigeria: A historical perspective. Journal of African Economic Studies, 12(1), 45–59.

20. Igbodika, M. N., & Jesse, O. O. (2020). Interest rate and the performance of the Nigerian naira: Empirical insights. Journal of Economics and Finance, 11(2), 45–53.

21. International Monetary Fund (IMF). (2021). Nigeria: Staff Country Report No. 21/63.

22. International Monetary Fund (IMF). (2023). Nigeria: Staff country report and economic outlook. https://www.imf.org

23. International Monetary Fund (IMF). (2024). Post-subsidy reform and macroeconomic adjustment in Nigeria. https://www.imf.org

24. Iyoha, M. A., & Oriakhi, D. E. (2013). Explaining African economic growth performance: The case of Nigeria. African Economic Research Consortium (AERC) Special Paper Series, No. 3.

25. Iyoha, M. A., & Oriakhi, D. E. (2013). Explaining African economic growth performance: The case of Nigeria. African Economic Research Consortium (AERC).

26. Keynes, J. M. (1936). The general theory of employment, interest and money. Macmillan.

27. Krugman, P. R., & Obstfeld, M. (2018). International economics: Theory and policy (11th ed.). Pearson Education.

28. Mankiw, N. G. (2016). Principles of Economics (7th ed.). Cengage Learning.

29. Mankiw, N. G. (2016). Principles of macroeconomics (7th ed.). Boston, MA: Cengage Learning.

30. Mishkin, F. S. (2015). The economics of money, banking, and financial markets (10th ed.). Pearson Education.

31. Mishkin, F. S. (2016). The economics of money, banking, and financial markets (11th ed.). Pearson Education.

32. National Bureau of Statistics. (2023). Nigerian economic statistics. Retrieved from https://www.nigerianstat.gov.ng

33. National Bureau of Statistics (NBS). (2021). Inflation rate report: 2020–2021. https://www.nigerianstat.gov.ng

34. National Bureau of Statistics (NBS). (2022). Consumer price index report. https://www.nigerianstat.gov.ng

35. National Bureau of Statistics (NBS). (2023). Annual abstract of statistics. https://www.nigerianstat.gov.ng

36. National Bureau of Statistics (NBS). (2023). Consumer price index report. https://www.nigerianstat.gov.ng

37. National Bureau of Statistics (NBS). (2025). Inflation trend update: January–March 2025. https://www.nigerianstat.gov.ng

38. Nwokocha, O. A. (2023, July 18). Nigeria's central bank raises interest rates to 18.75% to tackle inflation. The Guardian Nigeria. https://guardian.ng

39. Obadan, M. I. (2006). Overview of exchange rate management in Nigeria from 1986 to date. Central Bank of Nigeria.

40. Obadan, M. I. (2023). Exchange rate management and the naira: Issues, challenges, and policy responses. Nigerian Journal of Economic Management, 27(1), 25–49.

41. Ogunleye, E. K. (2021). The effectiveness of monetary policy in Nigeria: Evidence from recent reforms. CBN Journal of Applied Statistics, 12(1), 33–56.

42. Ogunmuyiwa, M. S., & Ekone, A. F. (2016). Bank lending rate and macroeconomic performance: Evidence from Nigeria. Fountain Journal of Management and Social Sciences, 5(1), 18–29.

43. Oladipo, O. S., & Akinbobola, T. O. (2011). Budget deficit and inflation in Nigeria: A causal relationship. Journal of Emerging Trends in Economics and Management Sciences, 2(1), 1–8.

44. Okonkwo, O., Nwachukwu, T., & Agbonlahor, A. (2020). Monetary policy transmission in Nigeria: Evidence from interest rates and exchange rate channels. African Economic Review, 18(1), 13–30.

45. Okonkwo, U. C., Adeyemi, K. J., & Musa, I. S. (2020). Institutional trust and the value of fiat money in Nigeria. Nigerian Journal of Economic Policy, 27(2), 87–104.

46. Okonkwo, U. C., Adeyemi, K. J., & Musa, I. S. (2020). Institutional trust and the value of fiat money in Nigeria. Nigerian Journal of Economic Policy, 27(2), 87–104.

47. Olayemi, A. T., & Folorunsho, A. I. (2020). Inflation and currency depreciation in Nigeria: An empirical study. Nigerian Journal of Economic Studies, 14(2), 55–72.

48. Olayemi, A., & Folorunsho, S. A. (2020). Exchange rate volatility and currency value in Nigeria. Journal of Economics and International Finance, 12(2), 20–29.

49. Olayemi, T., & Folorunsho, B. (2020). Inflation, exchange rate, and the real value of the naira: An econometric analysis. West African Journal of Monetary Studies, 18(3), 112–127.

50. Onwumere, J. U. J., Ibe, I. G., Ozoh, F. O., & Mounanu, O. G. (2012). The impact of interest rate liberalization on investment in Nigeria. International Journal of Economics and Finance, 4(2), 12–24.

51. Sanusi, L. S. (2010). Growth prospects for the Nigerian economy. Convocation Lecture at the Igbinedion University, Okada.

52. Sanusi, L. S. (2010). The changing structure of the Nigerian economy and implications for development. Convocation Lecture at Igbinedion University. https://www.cbn.gov.ng/Out/Speeches/2010

53. Umar, A., & Dauda, R. O. S. (2022). Inflation targeting and monetary policy effectiveness in Nigeria: Empirical evidence. African Journal of Economic Policy, 29(1), 23–41.

54. World Bank. (2020). Value for money in public procurement: A toolkit for Nigeria. https://www.worldbank.org

55. World Bank. (2023). Nigeria development update: Seizing the opportunity. https://www.worldbank.org

56. World Bank. (2024). Macroeconomic outlook for Nigeria: Tackling stagflation and structural reform. https://www.worldbank.org

APPENDIX A: DATA FOR THE STUDY

Vmy rir plr oer mpr ifr

Period	Money Supply[2] (M_2/M_3) (N' Billion)	GDP at 2010 Constant Market Prices Annual (₦' Billion)	Value of Money (Money Supply /RGDP)	Value of Money (GDP/Money Supply)	Real interest rate (%)	Prime Lending Rates of Deposit Money Banks (Per Cent)	Monthly Average Official Exchange Rate of the Naira (N/US$1.00)	Minimum Rediscount Rates/ Monetary Policy Rate	Implicit Price Deflator - Annual
Year	MS2	RGDP	VMY	VOM	RIR	PLR	OER	MPR	IFR
1981	14.47	19,748.53	0.0007	1,364.68	-65.85715	7.75	0.61	6.00	0.71
1982	15.79	18,404.96	0.0009	1,165.85	-4.58618	10.25	0.67	8.00	0.81
1983	17.69	16,394.39	0.0011	926.87	-8.022386	10.00	0.72	8.00	0.97
1984	20.11	16,211.49	0.0012	806.30	4.3424926	12.50	0.76	10.00	1.02
1985	22.30	17,170.08	0.0013	769.98	2.3432306	9.25	0.89	10.00	1.09
1986	23.81	17,180.55	0.0014	721.68	4.3102922	10.50	2.02	10.00	1.15
1987	27.57	17,730.34	0.0016	643.02	-4.769645	17.50	4.02	12.75	1.38
1988	38.36	19,030.69	0.0020	496.15	-2.962676	16.50	4.54	12.75	1.66
1989	45.90	19,395.96	0.0024	422.54	-6.612412	26.80	7.39	18.50	2.14
1990	47.42	21,680.20	0.0022	457.16	17.466244	25.50	8.04	18.50	2.28
1991	75.40	21,757.90	0.0035	288.56	0.9908473	20.01	9.91	15.50	2.71
1992	111.11	22,765.55	0.0049	204.89	-14.98717	29.80	17.30	17.50	3.98
1993	165.34	22,302.24	0.0074	134.89	-7.052475	18.32	22.05	26.00	5.64
1994	230.29	21,897.47	0.0105	95.09	-15.92023	21.00	21.89	13.50	8.08
1995	289.09	21,881.56	0.0132	75.69	-31.45257	20.18	21.89	13.50	14.17
1996	345.85	22,799.69	0.0152	65.92	-5.260784	19.74	21.89	13.50	17.92
1997	413.28	23,469.34	0.0176	56.79	12.126612	13.54	21.89	13.50	18.83
1998	488.15	24,075.15	0.0203	49.32	11.484669	18.29	21.89	13.50	19.96
1999	628.95	24,215.78	0.0260	38.50	6.0472483	21.32	92.69	18.00	22.64
2000	878.46	25,430.42	0.0345	28.95	-1.140889	17.98	102.11	14.00	27.77
2001	1,269.32	26,935.32	0.0471	21.22	12.138702	18.29	111.94	20.50	30.57
2002	1,505.96	31,064.27	0.0485	20.63	3.0235423	24.85	120.97	16.50	37.03
2003	1,952.92	33,346.62	0.0586	17.08	9.9357134	20.71	129.36	15.00	40.65
2004	2,131.82	36,431.37	0.0585	17.09	-2.604847	19.18	133.50	15.00	49.75
2005	2,637.91	38,777.01	0.0680	14.70	-1.59368	17.95	132.15	13.00	59.63
2006	3,797.91	41,126.68	0.0923	10.83	-5.627968	17.26	128.65	10.00	73.86
2007	5,127.40	43,837.39	0.1170	8.55	9.1871712	16.94	125.83	9.50	79.10
2008	8,643.43	46,802.76	0.1847	5.41	6.6849086	15.14	118.57	9.75	85.37
2009	9,687.51	50,564.26	0.1916	5.22	18.180002	18.99	148.88	6.00	85.95
2010	11,101.46	55,469.35	0.2001	5.00	1.0677361	17.59	150.30	6.25	100.00

2011	12,628.32	58,180.35	0.2171	4.61	5.6855799	16.02	153.86	12.00	109.51
2012	15,503.41	60,670.05	0.2555	3.91	6.2248086	16.79	157.50	12.00	119.66
2013	18,743.07	63,942.85	0.2931	3.41	11.201622	16.72	157.31	12.00	126.69
2014	20,415.61	67,977.46	0.3003	3.33	11.356213	16.55	158.55	13.00	132.60
2015	20,885.52	69,780.69	0.2993	3.34	13.596153	16.85	193.28	11.00	136.39
2016	24,259.00	68,652.43	0.3534	2.83	6.6862336	16.87	253.49	14.00	149.40
2017	28,604.47	69,205.69	0.4133	2.42	5.7905669	17.56	305.79	14.00	166.02
2018	29,774.43	70,536.35	0.4221	2.37	6.0559772	19.33	306.08	14.00	183.00
2019	34,257.90	72,094.09	0.4752	2.10	4.5221885	15.53	306.92	13.50	202.01
2020	36,038.01	70,800.54	0.5090	1.96	5.3712802	12.32	358.81	11.50	217.56
2021	40,370.41	73,382.77	0.5501	1.82	1.2277185	11.48	400.24	11.50	239.70
2022	48,461.42	74,752.42	0.6483	1.54	0.9192319	12.33	425.98	16.50	267.07
2023	63,512.40	77,936.10	0.8149	1.23	1.2330505	14.01069	645.19	18.75	299.81

APPENDIX B: ESTIMATION RESULTS-Rate Effect and the Value of Money

Group unit root test: Summary
Series: VMY, RIR, PLR, OER, MPR, IFR
Date: 02/16/25 Time: 00:36
Sample: 1981 2023
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	16.0725	1.0000	6	250
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	9.50862	1.0000	6	250
ADF - Fisher Chi-square	43.9392	0.0000	6	250
PP - Fisher Chi-square	47.4179	0.0000	6	252

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

Group unit root test: Summary
Series: VMY, RIR, PLR, OER, MPR, IFR
Date: 02/16/25 Time: 00:37
Sample: 1981 2023
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.56651	0.0002	6	242
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-7.23818	0.0000	6	242
ADF - Fisher Chi-square	104.697	0.0000	6	242
PP - Fisher Chi-square	97.4430	0.0000	6	246

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic

normality.

UNIT ROOT

VMY

Null Hypothesis: VMY has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		7.547077	1.0000
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(VMY)
Method: Least Squares
Date: 02/16/25 Time: 00:39
Sample (adjusted): 1982 2023
Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
VMY(-1)	0.136918	0.018142	7.547077	0.0000
C	-7.94E-05	0.004164	-0.019079	0.9849

R-squared	0.587452	Mean dependent var	0.019386
Adjusted R-squared	0.577138	S.D. dependent var	0.032574
S.E. of regression	0.021182	Akaike info criterion	-4.824839
Sum squared resid	0.017948	Schwarz criterion	-4.742093
Log likelihood	103.3216	Hannan-Quinn criter.	-4.794509
F-statistic	56.95838	Durbin-Watson stat	1.325695
Prob(F-statistic)	0.000000		

Null Hypothesis: D(VMY) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.175347	0.9336
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(VMY,2)
Method: Least Squares
Date: 02/16/25 Time: 00:39
Sample (adjusted): 1983 2023
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(VMY(-1))	-0.029218	0.166632	-0.175347	0.8617
C	0.004523	0.004620	0.978899	0.3337

R-squared	0.000788	Mean dependent var	0.004061
Adjusted R-squared	-0.024833	S.D. dependent var	0.024019
S.E. of regression	0.024315	Akaike info criterion	-4.547883
Sum squared resid	0.023058	Schwarz criterion	-4.464294
Log likelihood	95.23159	Hannan-Quinn criter.	-4.517444
F-statistic	0.030747	Durbin-Watson stat	1.959443
Prob(F-statistic)	0.861714		

Null Hypothesis: D(VMY,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.252456	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(VMY,3)
Method: Least Squares
Date: 02/16/25 Time: 00:39
Sample (adjusted): 1984 2023
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(VMY(-1),2)	-1.116430	0.178559	-6.252456	0.0000
C	0.004446	0.003898	1.140509	0.2612

R-squared	0.507090	Mean dependent var	0.001710
Adjusted R-squared	0.494119	S.D. dependent var	0.034443
S.E. of regression	0.024497	Akaike info criterion	-4.531788
Sum squared resid	0.022805	Schwarz criterion	-4.447344
Log likelihood	92.63576	Hannan-Quinn criter.	-4.501256

F-statistic	39.09321	Durbin-Watson stat	1.830660
Prob(F-statistic)	0.000000		

RIR

Null Hypothesis: RIR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.670572	0.0000
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RIR)
Method: Least Squares
Date: 02/16/25 Time: 00:40
Sample (adjusted): 1982 2023
Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIR(-1)	-0.752230	0.098067	-7.670572	0.0000
C	1.946921	1.365433	1.425863	0.1617

R-squared	0.595296	Mean dependent var	1.597386
Adjusted R-squared	0.585178	S.D. dependent var	13.73164
S.E. of regression	8.844089	Akaike info criterion	7.243824
Sum squared resid	3128.716	Schwarz criterion	7.326570
Log likelihood	-150.1203	Hannan-Quinn criter.	7.274153
F-statistic	58.83767	Durbin-Watson stat	1.667344
Prob(F-statistic)	0.000000		

PLR

Null Hypothesis: PLR has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.278508	0.1836
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PLR)
Method: Least Squares
Date: 02/16/25 Time: 00:40
Sample (adjusted): 1984 2023
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PLR(-1)	-0.343770	0.150875	-2.278508	0.0287
D(PLR(-1))	-0.284508	0.178465	-1.594194	0.1196
D(PLR(-2))	-0.079608	0.159193	-0.500074	0.6201
C	6.172607	2.705018	2.281910	0.0285

R-squared	0.299857	Mean dependent var	0.100267
Adjusted R-squared	0.241512	S.D. dependent var	4.061397
S.E. of regression	3.537121	Akaike info criterion	5.459143
Sum squared resid	450.4040	Schwarz criterion	5.628031
Log likelihood	-105.1829	Hannan-Quinn criter.	5.520207
F-statistic	5.139356	Durbin-Watson stat	1.951660
Prob(F-statistic)	0.004628		

Null Hypothesis: D(PLR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.124728	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PLR,2)
Method: Least Squares
Date: 02/16/25 Time: 00:40
Sample (adjusted): 1984 2023
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PLR(-1))	-1.669646	0.272607	-6.124728	0.0000
D(PLR(-1),2)	0.178727	0.161575	1.106156	0.2758
C	0.142531	0.590440	0.241398	0.8106

R-squared	0.716422	Mean dependent var	0.048154
Adjusted R-squared	0.701094	S.D. dependent var	6.826305
S.E. of regression	3.732101	Akaike info criterion	5.543858
Sum squared resid	515.3573	Schwarz criterion	5.670524
Log likelihood	-107.8772	Hannan-Quinn criter.	5.589656
F-statistic	46.73781	Durbin-Watson stat	1.916734
Prob(F-statistic)	0.000000		

OER

Null Hypothesis: OER has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		4.136463	1.0000
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OER)
Method: Least Squares
Date: 02/16/25 Time: 00:41
Sample (adjusted): 1982 2023
Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OER(-1)	0.171730	0.041516	4.136463	0.0002
C	-4.528932	6.853626	-0.660808	0.5125

R-squared	0.299601	Mean dependent var	15.34724
Adjusted R-squared	0.282091	S.D. dependent var	37.37964
S.E. of regression	31.67158	Akaike info criterion	9.795165
Sum squared resid	40123.56	Schwarz criterion	9.877911
Log likelihood	-203.6985	Hannan-Quinn criter.	9.825494
F-statistic	17.11033	Durbin-Watson stat	1.447677
Prob(F-statistic)	0.000176		

Null Hypothesis: D(OER) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.422083	0.5622

Test critical values:	1% level	-3.600987
	5% level	-2.935001
	10% level	-2.605836

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OER,2)
Method: Least Squares
Date: 02/16/25 Time: 00:41
Sample (adjusted): 1983 2023
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OER(-1))	-0.429157	0.301781	-1.422083	0.1630
C	9.797589	6.517794	1.503206	0.1408

R-squared	0.049298	Mean dependent var	5.345124
Adjusted R-squared	0.024921	S.D. dependent var	37.06851
S.E. of regression	36.60370	Akaike info criterion	10.08573
Sum squared resid	52253.41	Schwarz criterion	10.16932
Log likelihood	-204.7574	Hannan-Quinn criter.	10.11616
F-statistic	2.022319	Durbin-Watson stat	1.364869
Prob(F-statistic)	0.162951		

Null Hypothesis: D(OER,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.327462	0.0001
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OER,3)
Method: Least Squares
Date: 02/16/25 Time: 00:41
Sample (adjusted): 1984 2023
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OER(-1),2)	-1.433598	0.269096	-5.327462	0.0000
C	5.757402	5.818848	0.989440	0.3287

R-squared	0.427554	Mean dependent var	4.837062
Adjusted R-squared	0.412490	S.D. dependent var	47.99189
S.E. of regression	36.78540	Akaike info criterion	10.09679
Sum squared resid	51420.30	Schwarz criterion	10.18123
Log likelihood	-199.9357	Hannan-Quinn criter.	10.12732
F-statistic	28.38185	Durbin-Watson stat	1.520263
Prob(F-statistic)	0.000005		

MPR

Null Hypothesis: MPR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.260569	0.0233
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MPR)
Method: Least Squares
Date: 02/16/25 Time: 00:42
Sample (adjusted): 1982 2023
Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR(-1)	-0.402022	0.123298	-3.260569	0.0023
C	5.563353	1.683308	3.305012	0.0020

R-squared	0.209975	Mean dependent var	0.303571
Adjusted R-squared	0.190224	S.D. dependent var	3.463457
S.E. of regression	3.116680	Akaike info criterion	5.157861
Sum squared resid	388.5477	Schwarz criterion	5.240608
Log likelihood	-106.3151	Hannan-Quinn criter.	5.188191
F-statistic	10.63131	Durbin-Watson stat	2.172708
Prob(F-statistic)	0.002276		

IFR

Null Hypothesis: IFR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		12.97941	1.0000
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IFR)
Method: Least Squares
Date: 02/16/25 Time: 00:42
Sample (adjusted): 1982 2023
Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IFR(-1)	0.094885	0.007310	12.97941	0.0000
C	0.691047	0.737901	0.936505	0.3546

R-squared	0.808121	Mean dependent var	7.121653
Adjusted R-squared	0.803324	S.D. dependent var	7.991098
S.E. of regression	3.543903	Akaike info criterion	5.414782
Sum squared resid	502.3698	Schwarz criterion	5.497528
Log likelihood	-111.7104	Hannan-Quinn criter.	5.445112
F-statistic	168.4650	Durbin-Watson stat	1.299685
Prob(F-statistic)	0.000000		

Null Hypothesis: D(IFR) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.814629	0.9996
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IFR,2)
Method: Least Squares
Date: 02/16/25 Time: 00:43
Sample (adjusted): 1986 2023
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IFR(-1))	0.193602	0.106689	1.814629	0.0787
D(IFR(-1),2)	-0.406675	0.183959	-2.210685	0.0341
D(IFR(-2),2)	-0.204101	0.188873	-1.080626	0.2877
D(IFR(-3),2)	-0.643391	0.169753	-3.790150	0.0006
C	0.176414	0.828478	0.212937	0.8327

R-squared	0.393169	Mean dependent var	0.859970
Adjusted R-squared	0.319613	S.D. dependent var	4.129475
S.E. of regression	3.406221	Akaike info criterion	5.411163
Sum squared resid	382.8772	Schwarz criterion	5.626635
Log likelihood	-97.81210	Hannan-Quinn criter.	5.487826
F-statistic	5.345210	Durbin-Watson stat	2.275752
Prob(F-statistic)	0.001972		

Null Hypothesis: D(IFR,2) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.360368	0.0001
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IFR,3)
Method: Least Squares
Date: 02/16/25 Time: 00:43
Sample (adjusted): 1986 2023
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IFR(-1),2)	-1.778288	0.331747	-5.360368	0.0000
D(IFR(-1),3)	0.569662	0.275957	2.064315	0.0467
D(IFR(-2),3)	0.542372	0.165685	3.273517	0.0024
C	1.246166	0.601414	2.072060	0.0459

R-squared	0.741168	Mean dependent var	0.141274
Adjusted R-squared	0.718330	S.D. dependent var	6.630915
S.E. of regression	3.519201	Akaike info criterion	5.453645
Sum squared resid	421.0823	Schwarz criterion	5.626023
Log likelihood	-99.61926	Hannan-Quinn criter.	5.514976
F-statistic	32.45308	Durbin-Watson stat	2.053123
Prob(F-statistic)	0.000000		

vmyrirplroermprifr

Dependent Variable: VMY
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 02/15/25 Time: 19:09
Sample: 1981 2023
Included observations: 43
Convergence achieved after 18 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIR	4.98E-05	0.000411	0.120993	0.9044
PLR	-0.000375	0.001150	-0.326179	0.7462
OER	0.000363	6.48E-05	5.591496	0.0000
MPR	0.000515	0.000992	0.519406	0.6067
IFR	0.001985	0.000183	10.86154	0.0000
C	-0.028619	0.034130	-0.838521	0.4074
AR(1)	0.855186	0.110996	7.704684	0.0000
SIGMASQ	0.000215	5.39E-05	3.987730	0.0003

R-squared	0.994876	Mean dependent var	0.157812
Adjusted R-squared	0.993851	S.D. dependent var	0.207329
S.E. of regression	0.016258	Akaike info criterion	-5.203706
Sum squared resid	0.009251	Schwarz criterion	-4.876041
Log likelihood	119.8797	Hannan-Quinn criter.	-5.082874
F-statistic	970.7919	Durbin-Watson stat	1.643107
Prob(F-statistic)	0.000000		

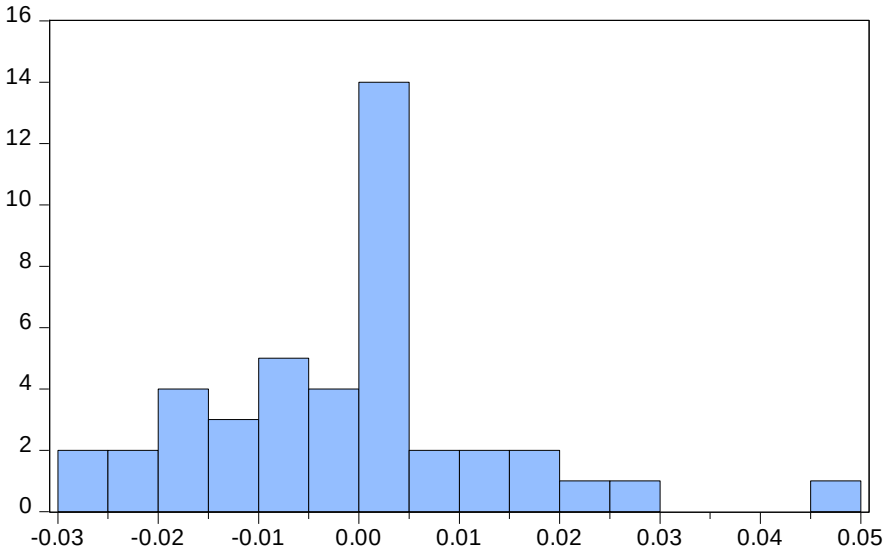
Inverted AR Roots	.86

vmy = 4.97744361994e-05*rir - 0.000374990293769*plr + 0.000362565112277*oer + 0.000515340096098*mpr + 0.00198460457893*ifr - 0.0286189284529 + [ar(1)=0.855186495198,uncond]

Variance Inflation Factors
Date: 02/16/25 Time: 00:31
Sample: 1981 2023
Included observations: 43

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
RIR	1.69E-07	2.129391	1.482719
PLR	1.32E-06	2.481602	1.317352
OER	4.20E-09	4.681047	3.272256
MPR	9.84E-07	2.277654	1.278112
IFR	3.34E-08	7.185176	3.571657
C	0.001165	6.473675	NA

AR(1)	0.012320	3.455407	2.110631
SIGMASQ	2.91E-09	2.310062	2.123598



Series: Residuals
Sample 1981 2023
Observations 43

Mean	-0.000958
Median	0.001224
Maximum	0.049118
Minimum	-0.026109
Std. Dev.	0.014809
Skewness	0.727322
Kurtosis	4.619860
Jarque-Bera	8.492388
Probability	0.014319

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.810508	Prob. F(5,37)	0.5497
Obs*R-squared	4.244788	Prob. Chi-Square(5)	0.5147
Scaled explained SS	4.804981	Prob. Chi-Square(5)	0.4401

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 02/16/25 Time: 00:32
Sample: 1981 2023
Included observations: 43

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000185	0.000301	0.615329	0.5421
RIR	-5.01E-07	4.87E-06	-0.102913	0.9186
PLR	2.00E-06	1.72E-05	0.116213	0.9081
OER	-1.18E-07	1.94E-06	-0.060761	0.9519
MPR	-8.70E-06	2.06E-05	-0.421774	0.6756
IFR	1.72E-06	3.37E-06	0.511016	0.6124

R-squared	0.098716	Mean dependent var	0.000215
Adjusted R-squared	-0.023079	S.D. dependent var	0.000402
S.E. of regression	0.000407	Akaike info criterion	-12.64666
Sum squared resid	6.13E-06	Schwarz criterion	-12.40091
Log likelihood	277.9032	Hannan-Quinn criter.	-12.55604
F-statistic	0.810508	Durbin-Watson stat	2.393399
Prob(F-statistic)	0.549736		