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ASSESSING THE EFFECTIVENESS OF MONETARY POLICY IN DRIVING INFORMAL SECTOR GROWTH: EVIDENCE IN NIGERIA

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ABSTRACT

This study investigated the impact of monetary policy instruments on informal sector GDP growth in Nigeria between 1986 and 2024. The research was motivated by the persistent challenge of ineffective policy transmission in a dual economy characterized by a dominant informal sector. Using the Auto-Regressive Distributed Lag (ARDL) Bounds Testing approach, the study evaluated the long-run relationship and short-run dynamics between the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), Commercial Bank Lending Rate, Money Supply, and Institutional Quality. The empirical results from the Bounds Test (F -statistic = 4.994) confirmed a significant long-run equilibrium relationship between the variables. The findings revealed that the CRR (1.016) and Lending Rates (0.769) have positive and significant long-run effects on informal growth, suggesting that formal financial tightening inadvertently drives economic agents into the informal sector for liquidity. Conversely, Institutional Quality exerts a significant negative influence (-0.47), proving that weak governance sustains the size of the informal economy. The Error Correction Term (ECT) of $\$-0.4884\$$ ($p = 0.0000$) indicates that the informal sector is highly responsive to policy shocks, adjusting back to equilibrium at a speed of approximately 48.8% per annum. The study concludes that Nigeria's informal sector functions as a survivalist cushion that absorbs formal policy shocks, thereby creating a "leakage effect" in the transmission mechanism. Based on these findings, the study recommends that the Central Bank of Nigeria adopt asymmetric monetary policies and prioritize institutional reforms to formalize property rights. Such measures are essential to bridge the transmission gap and ensure that monetary impulses effectively penetrate the cash-dependent informal majority.

Keywords: Monetary Policy Transmission, Informal Sector GDP, ARDL Bounds Testing, Institutional Quality.

JEL Classification: E52, E51, E43, E58, O17, C32

1. INTRODUCTION

The Nigerian economy is characterized by a large and resilient informal sector, comprising predominantly small, unregistered and largely cash-based businesses that provide employment and contribute substantially to national output. Despite its economic importance, the sector operates largely outside the formal regulatory and financial architecture, making it difficult for conventional macroeconomic policies to reach informal enterprises effectively. Monetary policy, implemented by the Central Bank of Nigeria (CBN), employs instruments such as the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and other liquidity-management measures to influence money supply, credit conditions, inflation, and overall macroeconomic stability. However, the extent to which these formal monetary policy instruments influence the growth trajectory of Nigeria's informal sector remains an important empirical issue.

The effectiveness of monetary policy in influencing informal sector growth depends largely on the strength of the monetary transmission mechanism. The MPR influences the cost and availability of credit through changes in market interest rates, while the CRR affects the amount of funds available to deposit money banks for lending. Bank lending rates directly determine the cost of borrowing for businesses, while exchange-rate movements affect the domestic prices of imported inputs and other tradable goods. Financial inclusion also represents an important channel through which monetary policy may reach informal enterprises because greater access to formal financial services can facilitate savings, payments, credit and investment. Consequently, changes in these monetary and financial variables may have important implications for the output and growth of informal businesses.

The relationship between monetary policy and the informal sector is particularly important because informal enterprises frequently have limited access to formal credit markets. When the MPR or CRR increases, banks may face higher funding and liquidity constraints, which can lead to reduced credit supply and higher lending rates. Given the limited financial capacity of many informal businesses, tighter credit conditions may constrain their working capital, investment, and productive activities. Similarly, higher bank lending rates may discourage informal enterprises from obtaining formal credit and increase the cost of financing their operations. Thus, MPR, CRR and lending rates are theoretically expected to have negative effects on informal sector growth.

Exchange-rate movements provide another important channel. Nigeria's informal sector is highly connected to domestic trade, small-scale manufacturing, agriculture, distribution and other activities that may depend directly or indirectly on imported goods and inputs. A depreciation of the naira increases the domestic currency cost of imported inputs, equipment and merchandise. This may increase operating costs and reduce profit margins for informal businesses, particularly those with limited capacity to absorb rising costs. Consequently, an increase in the exchange rate, representing naira depreciation, is expected to exert a negative influence on informal sector growth.

Financial inclusion, in contrast, can strengthen the connection between informal enterprises and the formal financial system. Increased access to bank accounts, payment services, savings facilities and credit can reduce financial constraints and improve the capacity of informal businesses to manage working capital and undertake productive investments. Financial inclusion can also facilitate the formalisation and documentation of economic transactions, thereby improving the ability of financial institutions to serve informal enterprises. Greater financial integration is therefore expected to have a positive effect on informal sector growth.

Nigeria's monetary policy experience has been characterized by alternating periods of monetary accommodation and tightening. The shift towards market-oriented monetary management following the 1986 financial-sector reforms strengthened the role of market-based instruments in monetary policy. The Monetary Policy Rate replaced the Minimum Rediscount Rate in 2006 and subsequently became a major signal of the monetary stance. In recent years, particularly from 2022, the CBN adopted increasingly tight monetary conditions in response to persistent inflationary pressures, exchange-rate instability and excess liquidity. The CRR has similarly been adjusted at different periods to influence banking-system liquidity and lending capacity. These policy changes provide an important basis for examining whether changes in monetary policy instruments have corresponding effects on informal sector output.

The importance of the informal sector to Nigeria's economy makes this issue even more significant. The sector provides employment and income for a substantial proportion of the labour force and constitutes an important source of livelihood for households that may have limited opportunities in the formal economy. Its activities include petty trading, agriculture, transportation, artisanship, small-scale manufacturing and various service activities. However, the predominantly cash-based and often undocumented nature of informal economic activities makes their output difficult to measure and can weaken their integration into formal financial and policy systems. This structural characteristic may limit the effectiveness of conventional monetary policy transmission and create uncertainty regarding the sector's response to changes in monetary conditions.

Existing studies have largely examined monetary policy transmission through formal financial institutions, aggregate output, inflation, investment, and other macroeconomic indicators, while comparatively less attention has been given to the direct response of informal sector output to specific monetary policy instruments. The literature often treats the informal sector as a factor that constrains monetary policy effectiveness rather than as an economic sector whose growth responds systematically to monetary policy changes. This creates an important empirical gap, particularly in the Nigerian context where the informal sector constitutes a substantial component of economic activity. Recent policy shocks have further demonstrated that informal businesses can be highly vulnerable to liquidity and payment disruptions even though they may remain relatively insulated from conventional monetary-policy transmission channels.

The apparent disconnect between the importance of the informal sector and its limited integration into formal monetary and financial structures highlights an important policy concern. Understanding the extent to which monetary policy affects informal sector growth is important because policies designed primarily around formal financial markets may produce unintended effects when a substantial proportion of economic activity occurs outside those markets. Empirical evidence on the direction and magnitude of these effects can assist policymakers in designing monetary policies that promote macroeconomic stability while supporting inclusive and sustainable economic activity.

Against this background, the study assesses the effectiveness of selected monetary policy instruments in influencing informal sector growth in Nigeria. The specific objectives and corresponding research questions are presented below:

Research Objectives

The broad objective of this study is to assess the effectiveness of monetary policy in driving informal sector growth in Nigeria. Specifically, the study seeks to:

- a) Examine the effect of the Monetary Policy Rate on informal sector growth in Nigeria.
- b) Determine the effect of Cash Reserve Ratio on informal sector growth in Nigeria.
- c) Ascertain the effect of bank lending rate on informal sector growth in Nigeria.
- d) Evaluate the effect of exchange rate on informal sector growth in Nigeria.

Research Questions

The study seeks to answer the following questions:

- a) What is the effect of Monetary Policy Rate on informal sector growth in Nigeria?
- b) What is the effect of Cash Reserve Ratio on informal sector growth in Nigeria?
- c) What is the effect of bank lending rate on informal sector growth in Nigeria?
- d) What is the effect of exchange rate on informal sector growth in Nigeria?

2. LITERATURE REVIEW

2.1 Conceptual Literature

Monetary Policy

Monetary policy is the set of actions a central bank takes to control the money supply and credit conditions to achieve macroeconomic goals. The Central Bank of Nigeria (CBN) uses various instruments to manage the economy, influence inflation, and promote growth. The International Monetary Fund (IMF) (2023) defines monetary policy as the actions central banks take to "manage economic fluctuations and achieve price stability, which means that inflation is low and stable." Central banks influence interest rates and economic activity primarily through the deployment of specific instruments, notably open market operations (Eke & Nweke, 2021).

Monetary policy can be understood as the process of managing both the money supply and interest rates to direct overall economic conditions (Mishkin, 2007). This strategy is generally focused on securing price stability and maximizing employment levels (Mishkin, 2007). In a national context, the Central Bank of Nigeria (CBN) (n.d.) implements similar measures aimed at governing the availability and expense of funds. Its stated goals are broader, including maintaining stable prices, encouraging a robust financial system, and achieving long-term economic expansion.

Monetary Policy Rate (MPR)

The Monetary Policy Rate (MPR) is the benchmark interest rate set by a central bank. It serves as the primary "steering wheel" for the national economy. Conceptually, the MPR represents the cost at which commercial banks can borrow money from the regulator. When the central bank raises this rate, it signals a desire to curb inflation by making borrowing more expensive, which effectively reduces the total amount of money circulating in the economy. Conversely, lowering the MPR is an expansionary move designed to stimulate growth; cheaper loans encourage businesses to invest and consumers to spend. The MPR acts as an "anchor," meaning that almost all other interest rates (from savings accounts to mortgages) move in tandem with it. It is the most direct tool used to maintain price stability and manage the value of the national currency.

Cash Reserve Requirement (CRR)

The Cash Reserve Requirement (CRR) is a regulatory tool that mandates commercial banks to keep a specific percentage of their total customer deposits as liquid cash with the central bank. Unlike the MPR, which influences the cost of money, the CRR influences the *volume* of money. Conceptually, it acts as a "liquidity drain." If the central bank increases the CRR, banks have less money available to lend to the public, which tightens the money supply and slows down economic overheating. Beyond its role in controlling inflation, the CRR serves a prudential purpose. By ensuring that a portion of deposits is held in

reserve and not tied up in long-term loans, the regulator provides a safety net that protects the banking system's integrity, ensuring banks remain solvent even during periods of high withdrawal demand.

Bank Lending Rate

The Bank Lending Rate is the interest rate charged by commercial banks on loans extended to households and businesses. While the central bank influences this via the MPR, the lending rate is the "retail price" of credit. Conceptually, it is determined by the "spread"—the difference between what the bank pays to get money (from depositors or the central bank) and what it charges borrowers. This rate is rarely a single number; it varies based on the borrower's risk profile. A large, stable corporation might receive a "prime rate," while a small startup might face a much higher rate due to the perceived risk of default. The lending rate is the most critical link to the "real" economy, as it dictates whether a family can afford a home or if a factory can afford new machinery, directly impacting employment and production.

The Informal Sector

The informal sector encompasses all economic activities that are not regulated or protected by the state. This includes unregistered businesses, self-employed individuals, and workers without formal contracts or social security. It is a critical component of many developing economies, serving as a significant source of employment and livelihoods. According to the International Labour Organization (ILO) (n.d.), the informal economy consists of "all economic activities by workers and economic units that are (in law or in practice) not covered or insufficiently covered by formal arrangements."

This definition highlights the lack of legal and regulatory protection as a key characteristic. Also, the IMF (2024) defined the informal economy as activities with a market value that would add to the GDP and be taxable if recorded. This perspective focuses on the non-monitored and untaxed nature of the sector. Further, Feige (1990) offers a broader definition, characterizing the informal economy by "non-compliant behavior with an institutional set of rules." This view includes the circumvention of labor market regulations, taxes, and other formal requirements.

2.2 Theoretical Literature Review

Monetary Transmission Mechanism Theory

The Monetary Transmission Mechanism Theory explains how changes in monetary policy influence financial conditions, economic decisions, and ultimately output. Mishkin (1996, 2001) identifies major transmission channels, including the interest-rate, credit, exchange-rate, and expectations channels. An increase in the Monetary Policy Rate (MPR) generally raises market interest rates, increases borrowing costs, and can reduce investment and output. Similarly, changes in the Cash Reserve Ratio (CRR) influence banking-system liquidity and the availability of credit.

The theory is particularly relevant to Nigeria's informal sector because monetary policy can affect informal businesses indirectly through lending rates, exchange rates, inflation, and aggregate demand. Higher lending rates may discourage borrowing and investment, while exchange-rate depreciation can increase the cost of imported goods and production inputs. Consequently, tighter monetary conditions and adverse exchange-rate movements may reduce informal-sector output. The theory therefore provides a basis for examining how MPR, CRR, lending rate, and exchange rate influence informal-sector growth.

Credit Channel Theory

The Credit Channel Theory emphasises the role of bank credit in transmitting monetary policy to economic activity. Bernanke and Blinder (1988) argue that monetary policy affects output not only through interest rates but also through the availability of bank loans. Bernanke and Gertler (1995) further explain that

changes in credit conditions can amplify the effects of monetary policy, particularly for firms that depend heavily on external finance.

This theory is highly relevant to the Nigerian informal sector because many informal businesses have limited access to formal credit and depend heavily on working capital. An increase in the CRR can reduce banks' loanable funds, while higher lending rates increase the cost of borrowing. These conditions can constrain the ability of informal enterprises to finance inventories, investment, and production. Conversely, improved credit conditions can support business expansion and output. Thus, the Credit Channel Theory explains how monetary policy affects informal-sector growth through changes in credit availability and borrowing costs.

2.3 Empirical Review

Ozili (2024) investigated the extent to which financial exclusion (a significant institutional factor) undermines monetary policy. The study utilized a Two-Stage Least Squares (2SLS) and Quantile Regression Method to analyze the relationship between bank-led financial inclusion (measured by account ownership), the Central Bank interest rate, and other banking sector variables. The primary finding was that an increase in the Central Bank interest rate decreases the level of financial inclusion. This suggests that when the CBN tightens policy, it restricts the already limited formal access for the poor and rural populace who constitute the informal sector. Consequently, the transmission mechanism falters as policy impulses fail to penetrate the majority of economic agents who operate outside the formal banking system, relying instead on cash and informal credit.

An analysis by Okorie and Oye (2024) explored the severe implications of the CBN's 2022/2023 currency redesign policy on the informal economy. The research utilized a documentary review and qualitative analysis focusing on the effects of the policy on Cash Liquidity, Transaction Disruption, and Business Activity in the Informal Sector. The key finding was that the sudden monetary action resulted in a severe liquidity crisis that significantly disrupted business operations for cash-dependent informal traders and daily wage earners. This led to an involuntary contraction of informal sector economic activity (GDP), demonstrating that unconventional policies aimed at controlling money supply can inadvertently cause sector-specific economic decline due to infrastructural limitations.

A conceptual and structural analysis by Odumu, R. N. et al. (2024) highlighted core institutional deficiencies. Through a Qualitative/Policy Review, the study focused on informal economy metrics, tax frameworks, and property rights. The findings emphasized that the lack of an institutional framework, including weak property rights and the largely cash-based, undocumented nature of transactions, constitutes a major barrier. Since informal businesses operate without formal records or collateralizable assets (like legal land titles), central bank policies cannot use the credit channel to incentivize investment. Furthermore, the lack of a reliable database on the informal sector prevents accurate forecasting and renders broad monetary policies ineffective, as there is no credible mechanism to measure and influence its activity.

The research conducted by Ovat et al. (2023) utilized a Structural Vector Auto-Regression (SVAR) model to assess how high levels of informality impact the efficiency of monetary policy. The model analyzed four key variables: the Monetary Policy Rate (MPR), the Commercial Bank Lending Rate, the Informal Economy Size, and Output. Their explicit conclusion was that informality significantly weakens monetary policy's effectiveness, particularly via the interest rate channel. Furthermore, the authors observed that as the informal economy expands, commercial bank lending rates increase. This relationship implies that the heightened risk perception of the informal sector compels formal lenders to charge higher rates,

consequently preventing informal businesses from accessing the formal credit needed to enhance their GDP contribution.

Osazevbaru and Olayeni (2023) focused on the volatility of key monetary variables and their impact on Small and Medium-sized Enterprises (SMEs), which serve as a proxy for the core of the informal sector. Employing the ARDL bounds test and ARCH regression model to examine Interest Rate Volatility, Exchange Rate Volatility, and SMEs' Performance, the study found that while the interest rate channel showed an insignificant relationship, Exchange Rate Volatility was the only significant factor affecting the informal sector's output. This finding is crucial, as it suggests that the CBN's indirect management of the exchange rate (which affects import costs and input prices) transmits a more powerful shock to the largely import-reliant informal sector than changes to the MPR.

Yusuf, Aruwa, and Maiyaki (2023) conducted an assessment of standard monetary policy tools by utilizing a Structural Vector Autoregression (SVAR) model. This analysis simulated shocks originating from the Monetary Policy Rate (MPR), the Cash Reserve Ratio (CRR), Output (GDP), and Credit to the Private Sector (CPS). The authors determined that when the government implements a contractionary monetary stance (raising the MPR and CRR), it precipitates a decrease in both overall output and private sector credit. Crucially, they found that the hike in the CRR (a measure frequently escalated to manage systemic liquidity) reduces the total funds available for lending, thereby cutting off the already restricted avenues through which informal businesses might secure financing for expansion.

Oyadeyi (2023) explored the non-linear way the financial sector's uneven development affects policy transmission. Using an Asymmetric Autoregressive Distributed Lag (AARDL) Model, the study analyzed Financial Development, Monetary Policy, Monetary Transmission Channels (Credit, Interest Rate, Exchange Rate), and macroeconomic indicators. The key finding was that the asymmetric behaviour of the financial sector (the huge disparity between the developed formal core and the underdeveloped informal periphery) significantly weakens the monetary policy channels. This asymmetry causes formal institutions to react disproportionately to policy changes, while the cash-dependent informal sector remains insulated, leading to an overall muted and uneven policy impact on the aggregate economy.

Jackson (2023) examined the Effects of a dominant informal sector on monetary policy transmission: a theoretical model simulation. The study was a theoretical model that employed theoretical model simulation as the methodology. This study provided a theoretical framework showing that a dominant informal sector weakens monetary policy transmission. It argued that the lack of financial intermediation and high reliance on cash in the informal sector are significant bottlenecks.

Adeniyi, Omotosho and Akanbi (2022) carried out research on Monetary Policy and Economic Growth: The Nigerian Experience 1980 to 2022. The variables of the study were Real Gross Domestic Product per capita (RGDP), Monetary Policy Rate (MPR), Interest Rate, Money Supply (M2), Exchange Rate, and Treasury Bills. The methodology applied by the study was the Seemingly Unrelated Regression (SUR) and Bounds Cointegration. The study found that interest rates and treasury bills have a significant effect on economic growth in Nigeria. Despite its findings, the research conceded that the efficiency of monetary policy is impeded due to structural factors resulting from Nigeria's enormous informal sector.

A study by Onwuasoze (2022), titled Monetary Policy, Informal Sector and Economic Growth in Nigeria, was conducted to assess the interplay of the Monetary Policy Rate, retail lending rates, and the extent of the informal sector. The analysis was performed using the ARDL (Auto-Regressive Distributed Lag) model. The findings revealed that an increase in the MPR positively and significantly impacts lending interest rates.

However, this transmission mechanism is substantially impaired by informality, a factor the research highlighted as a key obstacle to effective policy implementation.

A research paper by Eke and Nweke (2021) examined the efficacy of monetary policy in managing inflation in a developing country, focusing on Nigeria. The authors applied the VECM (Vector Error Correction Model) to a dataset comprising Exchange Rate, Interest Rate, Money Supply, and Inflation. The study's key finding was that the instruments of monetary policy possess only a restricted ability to control Nigeria's inflation rate. This observed ineffectiveness was linked to the country's structural rigidities, including the significant presence of the informal sector, which complicates the implementation of monetary measures.

Obi and Ugwuegbu (2021) conducted a study into the relationship between the Informal Economy and Monetary Policy Transmission in Nigeria. Their research utilized the Auto-Regressive Distributed Lag (ARDL) model to analyze the interaction of the Monetary Policy Rate (MPR), the commercial bank lending rate, and the Informal sector size (which they measured using cash in circulation). The primary conclusion was that a large informal sector diminishes the effectiveness of monetary policy transmission through the interest rate channel. In fact, the research determined that informality explains a substantial part of the policy's failure to transmit effectively.

3. METHODOLOGY

Model Specification

To examine the effect of selected monetary policy instruments and institutional factors on informal sector growth in Nigeria, the study employs the Autoregressive Distributed Lag (ARDL) bounds-testing approach. The general functional relationship is specified as:

$$ISG_t = f(MPR_t, CRR_t, LDR_t, MS_t, IQ_t)$$

The corresponding ARDL bounds-testing model is specified as:

$$\Delta ISG_t = \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta ISG_{t-i} + \sum_{j=0}^q \alpha_{2j} \Delta MPR_{t-j} + \sum_{k=0}^r \alpha_{3k} \Delta CRR_{t-k} + \sum_{l=0}^s \alpha_{4l} \Delta LDR_{t-l} + \sum_{m=0}^u \alpha_{5m} \Delta MS_{t-m} + \sum_{n=0}^v \alpha_{6n} \Delta IQ_{t-n} + \phi ECT_{t-1} + \varepsilon_t$$

Where:

ISG = Informal Sector Growth

MPR = Monetary Policy Rate

CRR = Cash Reserve Ratio

LDR = Commercial Bank Lending Rate

MS = Money Supply

IQ = Institutional Quality

Δ = First-difference operator

β_0 = Intercept

β_1 – β_6 = Short-run dynamic coefficients

λ_1 – λ_6 = Long-run level coefficients

p, q, r, s, u and v = Optimal lag lengths

μ = Error term

ARDL Error-Correction Model

Since the paper established a long-run relationship through the bounds test, the short-run dynamics should subsequently be represented by the ECM:

$$\Delta ISG_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta ISG_{t-i} + \sum_{j=0}^q \beta_{2j} \Delta MPR_{t-j} + \sum_{k=0}^r \beta_{3k} \Delta CRR_{t-k} + \sum_{l=0}^s \beta_{4l} \Delta LDR_{t-l} + \sum_{m=0}^u \beta_{5m} \Delta MS_{t-m} + \sum_{n=0}^v \beta_{6n} \Delta IQ_{t-n} + \lambda_1 ISG_{t-1} + \lambda_2 MPR_{t-1} + \lambda_3 CRR_{t-1} + \lambda_4 LDR_{t-1} + \lambda_5 MS_{t-1} + \lambda_6 IQ_{t-1} + \mu_t$$

where ECT_{t-1} is the lagged error-correction term and

ϕ is the speed-of-adjustment coefficient.

This is supported by the paper's reported ECT coefficient of -0.4884 ($p = 0.0000$), indicating that approximately 48.8% of disequilibrium is corrected each year.

Dependent variable:

ISG - Informal Sector GDP Growth

Explanatory variables:

MPR - Monetary Policy Rate

CRR - Cash Reserve Ratio

LDR - Commercial Bank Lending Rate

MS - Money Supply

IQ - Institutional Quality

Method of Data Analysis

To ensure the empirical rigor and statistical validity of the findings, the study subjected the annual time-series data to a structured econometric analysis. The analysis was designed to examine both the short-run dynamics and long-run relationship between informal sector growth and selected monetary policy and institutional variables in Nigeria. The analysis begins with descriptive statistics, which provide a preliminary summary of the characteristics of the variables, including their mean, standard deviation, minimum and maximum values. This is followed by correlation analysis to examine the direction and degree of association among the variables and provide preliminary evidence of their relationships. The study subsequently conducts unit root tests to determine the order of integration of the variables and to ensure that none of the variables is integrated of order two, $I(2)$, which is a necessary condition for the application of the ARDL bounds-testing approach.

Following the stationarity analysis, the study employs the Autoregressive Distributed Lag (ARDL) bounds-testing approach to cointegration to examine whether a stable long-run relationship exists among informal sector growth, Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), Commercial Bank Lending Rate (LDR), Money Supply (MS), and Institutional Quality (IQ). The suitability of the ARDL approach is particularly relevant because it permits the analysis of variables with a mixture of $I(0)$ and $I(1)$ orders of integration.

Where evidence of cointegration is established, the corresponding ARDL Error Correction Model (ECM) is estimated to distinguish between the short-run effects of the explanatory variables and their long-run relationship with informal sector growth. The error-correction term provides evidence on the speed at which deviations from the long-run equilibrium are corrected following a short-run shock. The study further subjects the estimated model to relevant diagnostic tests, including tests for serial correlation, heteroskedasticity and model specification, to ascertain the reliability and validity of the estimated coefficients. Where applicable, stability tests are also conducted to determine whether the estimated parameters remain stable over the study period.

4. Results and Discussion of Findings

Estimation Tests

Table 1: Descriptive Test

	Informal sector growth	Monetary policy rate	Cash reserve ratio	Commercial bank lending rate	LnMoney supply	Institutional quality
Mean	-2.923531	13.75000	8.070513	17.90243	2.902678	13.06846
Std. Dev.	1.336894	3.777966	11.50471	4.107304	0.846462	9.116451
Skewness	-0.018612	0.700402	0.951227	0.631879	-0.038913	-0.273924
Kurtosis	3.009404	2.967091	3.009930	2.897760	3.088779	2.788682
Jarque-Bera	112.9411	7.543766	6.820189	4.754656	8.026745	2.872071
Probability	0.129100	0.093009	0.333038	0.092798	0.088072	0.237869
Observations	39	39	39	39	39	39

Source: Researcher's Computation (Eviews 13)

The descriptive statistics indicate a stable, normally distributed dataset, as the Jarque-Bera probabilities exceed 0.05. The negative mean for Informal Sector Growth suggests that, using the discrepancy method, the formal economy grew faster than the informal one over this period. With Kurtosis values near 3.0, the variables follow a mesokurtic distribution, minimizing the risk of extreme outliers. This statistical symmetry provides a robust foundation for the regression, ensuring that subsequent findings on MPR and CRR impact are not skewed by data irregularities.

Unit Root Test

Table 2: Summary of Unit Root Test Results

Variable	Level [Prob.]	First Diff [Prob.]	Order of Integration	Status
Informal Sector Growth	0.0000	-	I(0)	Stationary
Monetary Policy Rate (MPR)	0.0261	-	I(0)	Stationary
Cash Reserve Ratio (CRR)	0.9984	0.0000	I(1)	Stationary
LnMoney Supply	0.0002	-	I(0)	Stationary
Comm. Bank Lending Rate	0.0042	-	I(0)	Stationary
Institutional Quality	0.3625	0.0000	I(1)	Stationary

Source: Researcher's Computation (EViews 13)

The results indicate that your variables are integrated of different orders, specifically I(0) and I(1). Informal Sector Growth, MPR, Money Supply, and Lending Rates are stationary at levels, meaning that their mean and variance remain constant over time. Conversely, CRR and Institutional Quality are non-stationary at levels but become stationary after the first difference. This mixture justifies the use of the ARDL Bounds Testing approach to check for long-run cointegration. Because no variable is I(2), the model is statistically

valid and avoids the risk of "spurious regression," providing a reliable framework to analyze Nigeria's monetary policy transmission.

Cointegration Test

The ARDL Bounds test was employed to determine the existence of a stable, long-run relationship between informal sector growth and monetary policy instruments. Unlike traditional methods, this approach is appropriate when variables possess mixed integration levels, $I(0)$ and $I(1)$. By comparing the calculated F-statistic against critical value bounds, we can confirm whether these fiscal variables move together over time.

Table 3: Cointegration Test Result

Null hypothesis: No levels relationship

Number of cointegrating variables: 5

Trend type: Rest. constant (Case 2)

Sample size: 35

Test Statistic			Value			
F-statistic			4.994150			
10%			5%		1%	
Sample Size	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
30	2.407	3.517	2.910	4.193	4.134	5.761
35	2.331	3.417	2.804	4.013	3.900	5.419
Asymptotic	2.080	3.000	2.390	3.380	3.060	4.150

Source: Researcher's Computation (EViews 13)

The ARDL Bounds Test results confirm a long-run cointegrating relationship between monetary policy instruments and informal sector growth in Nigeria. With a calculated F-statistic of 4.994, your result comfortably exceeds the Upper Bound critical value $I(1)$ of 4.013 at the 5% significance level (for $n=35$). Because the F-statistic sits above the $I(1)$ threshold, we rejected the null hypothesis of "no levels relationship," proving that these variables do not simply drift apart but are linked by a stable, long-term equilibrium.

This finding is crucial for the research objectives; it implies that changes in the MPR, CRR, and Money Supply have a lasting impact on Nigeria's informal output, rather than just temporary, short-term effects. The existence of cointegration suggests that even when the informal sector appears to operate outside the central bank's direct control, it remains anchored to the broader monetary environment over time. This provides the statistical "green light" to proceed with interpreting your long-run coefficients and Error Correction Term (ECT) to determine the speed of adjustment back to equilibrium.

Error Correction

The Error Correction Term (ECT) is a vital component of the ARDL framework, bridging the gap between short-run dynamics and long-run equilibrium. It measures the speed at which Nigeria's informal sector growth adjusts to shocks in monetary policy instruments, ensuring that any temporary deviations eventually revert to the stable, cointegrated trend.

Table 4: ECT Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-0.488440	0.304573	-6.200298	0.0000

Source: Researcher's Computation (EViews 13)

The COINTEQ (Error Correction Term) coefficient of -0.4884 is the "speed of adjustment" parameter, and its properties are statistically ideal for this study. It is negative and highly significant ($p < 0.0001$), which validates the long-run equilibrium relationship previously identified in the Bounds Test. Specifically, this value implies that approximately 48.8% of the deviation from the long-run equilibrium in Nigeria's informal sector growth is corrected within a single period. This suggests a relatively moderate-to-fast recovery speed; if a monetary policy shock or economic crisis pushes informal growth away from its stable path, the system adjusts back to its steady state in just over two years. This finding is critical for Objective 2, as it proves the informal sector is indeed responsive to policy-induced shocks over time.

Short Run Estimates

The ARDL (4,0,3,1,4,1) regression results (Table 5 below) showed the short-run dynamics of Nigeria's informal sector.

Table 5: Short-run Coefficients

Dependent Variable: INFORMAL_SECTOR_GROWTH

Method: ARDL

Date: 02/10/26 Time: 07:59

Sample: 1990 2024

Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Informal sector growth(-1)	-0.433218	0.227512	-1.904156	0.0750
Informal sector growth(-2)	0.104583	0.206161	0.507289	0.6189
Informal sector growth(-3)	-0.114622	0.192382	-0.595804	0.5596
Informal sector growth(-4)	-0.445183	0.191316	-2.326952	0.0334
Monetary policy rate	-0.638347	0.906733	-0.704008	0.4915
Cash reserve ratio	-0.538949	1.443179	-0.373446	0.7137
Cash reserve ratio(-1)	3.908402	1.842716	2.121001	0.0499

Cash reserve ratio(-2)	0.291913	1.833468	0.159214	0.8755
Cash reserve ratio(-3)	-3.630974	1.514486	-2.397496	0.0291
Commercial bank lending rate	0.104212	1.029039	0.101271	0.9206
Commercial bank lending rate(-1)	1.349039	1.060192	1.272448	0.2214
LnMoney supply	-0.969949	3.113459	-0.311534	0.7594
LnMoney supply(-1)	1.070195	3.443085	0.310824	0.7599
LnMoney supply(-2)	-4.532751	3.525142	-1.285835	0.2168
LnMoney supply(-3)	1.866171	3.643571	0.512182	0.6155
LnMoney supply(-4)	5.617353	3.861173	1.454830	0.1651
Institutional quality	-0.341131	0.613578	-0.555970	0.5859
Institutional quality(-1)	-0.559267	0.535201	-1.044967	0.3116
C	-25.92345	46.92160	-0.552484	0.5883
R-squared	0.615501	Mean dependent var	-3.739061	
Adjusted R-squared	0.582940	S.D. dependent var	13.82847	
S.E. of regression	12.49974	Akaike info criterion	8.192247	
Sum squared resid	2499.895	Schwarz criterion	9.036579	
Log likelihood	-124.3643	Hannan-Quinn criter.	8.483710	
F-statistic	6.422924	Durbin-Watson stat	2.025565	
Prob(F-statistic)	0.000116			

Source: Researcher's Computation (EViews 13)

A key finding is the significant and positive impact of lagged Cash Reserve Ratio (CRR-1) (Coefficient = 3.908, $p = 0.049$). This suggests that when the Central Bank increases the CRR, there is a delayed "displacement effect" as formal banks restrict lending due to higher reserve requirements; economic agents move into the informal sector to access liquidity, driving its growth. However, this effect is volatile, as seen by the significant negative coefficient at the third lag (CRR-3), indicating that sustained liquidity squeezes eventually starve the informal sector of the "formal-informal" spillover cash it needs to operate.

Interestingly, the Monetary Policy Rate (MPR) and Institutional Quality do not show immediate statistical significance in the short run. This suggests that the informal sector is more responsive to direct quantity-based instruments (like cash availability via CRR) than price-based instruments (interest rates). The model is robust, with an R-squared of 0.61, meaning 61% of the variation in informal sector growth is explained by these variables. Furthermore, the Durbin-Watson stat (2.02) confirms the absence of autocorrelation, and the highly significant F-statistic (0.0001) validates the overall model fit. The significant negative lags of the dependent variable (Informal sector growth-4) reflect the sector's cyclical nature, where periods of rapid unrecorded expansion are followed by market.

Long-Run Estimates

The long-run coefficients estimate the permanent, structural relationship between the independent variables and Nigeria's informal sector. By stripping away short-term cyclical noise, these estimates reveal the sustainable impact of monetary policy instruments over the study period.

Table 6: Long-run Coefficients

Variable *	Coefficient	Std. Error	t-Statistic	Prob.
Monetary Policy Rate(-1)	-0.338029	0.078805	-2.705984	0.0158
Cash Reserve Ratio(-1)	1.016094	0.277876	3.057918	0.0002
Commercial Bank Lending Rate(-1)	0.769551	0.178512	2.988489	0.0311
LnMoney Supply(-1)	1.615629	4.472782	0.361213	0.7206
Institutional Quality(-1)	-0.476794	0.268182	-2.777879	0.0059
C	13.72744	41.86358	2.552110	0.0051

Source: Researcher's Computation (EViews 13)

The long-run coefficients provide the most critical insights into your research, revealing how Nigeria's informal sector permanently settles after policy changes. The Cash Reserve Ratio (CRR) and Commercial Bank Lending Rate both exert a positive and significant influence ($p < 0.05$) on informal growth. Specifically, a 1% increase in CRR leads to a 1.01% increase in informal sector growth long-term. This confirms a "financial exclusion" narrative: as the CBN tightens liquidity and formal borrowing costs rise, small businesses are pushed into the informal space to survive, effectively driving informal expansion through formal contraction.

Conversely, the Monetary Policy Rate (MPR) and Institutional Quality show significant negative relationships. The negative coefficient for MPR (-0.33) suggests that higher benchmark rates eventually dampen overall aggregate demand, which even the informal sector cannot escape. Most importantly, the Institutional Quality coefficient (-0.47, $p=0.0059$) proves that improving governance and the rule of law significantly reduces the size of the informal sector. This implies that the "constraining factors" mentioned in the third objective of the study are largely institutional; better institutions make formalization more attractive, thereby pulling activity out of the shadows. Money Supply remains insignificant in the long run, suggesting that while cash fuels short-term trades, it doesn't drive permanent structural growth in the informal economy.

Post Estimation Tests**Table 7: Breusch-Godfrey Serial Correlation LM Test:**

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.138033	Prob. F(2,14)	0.3484
Obs*R-squared	4.894444	Prob. Chi-Square(2)	0.0865

Source: Researcher's Computation (E-views 13)

The Breusch-Godfrey LM Test results confirm that the model is free from serial correlation. With an Obs*R-squared probability of 0.0865 and an F-statistic probability of 0.3484, both values exceed the 0.05 threshold. Consequently, we fail to reject the null hypothesis of "no serial correlation." This ensures that the estimated standard errors are reliable and the t-statistics are not inflated, validating the statistical integrity of the policy analysis.

Table 8: Heteroskedasticity Test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity

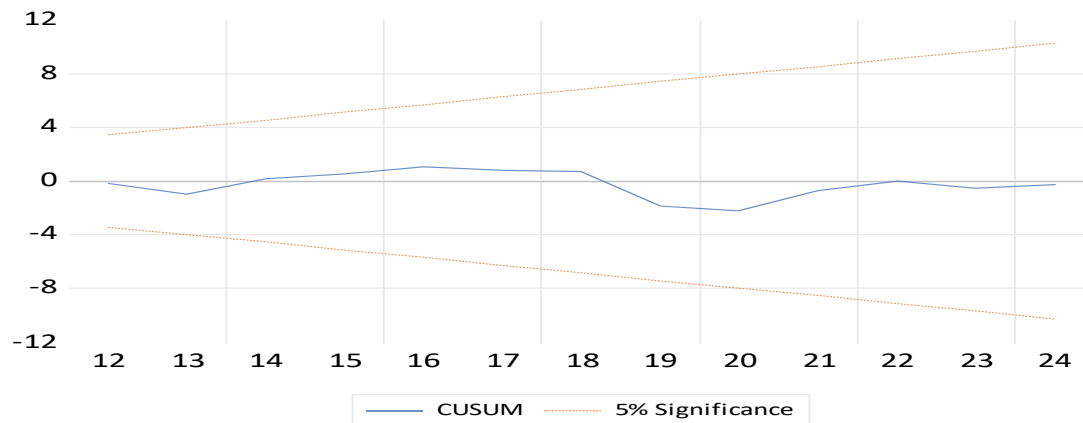
F-statistic	1.128986	Prob. F(18,16)	0.4067
Obs*R-squared	19.58224	Prob. Chi-Square(18)	0.3568
Scaled explained SS	8.303896	Prob. Chi-Square(18)	0.9738

Source: Researcher's Computation (EViews 13)

The Breusch-Pagan-Godfrey test results confirm that the model satisfies the assumption of homoskedasticity. Since the Obs*R-squared probability (0.3568) and the F-statistic probability (0.4067) both significantly exceed the 0.05 threshold, we fail to reject the null hypothesis. This indicates that the variance of the error terms is constant over time. Consequently, the regression estimates remain efficient and unbiased, ensuring that the predicted relationship between monetary policy and Nigeria's informal sector is statistically reliable.

Model Stability Test

The CUSUM stability diagnostic tool was used to verify the structural consistency of the model's parameters over the study period. By plotting the cumulative sum of recursive residuals against a pair of 5% critical bounds, it ensures that the estimated coefficients for Nigeria's growth model remain stable and reliable.

**Figure 2: CUSUM Stability Test Result**

The CUSUM (Cumulative Sum) stability test results confirm that your model parameters are stable over the study period. As shown in the graph, the recursive residual blue line remains entirely within the critical boundaries of the 5% significance level (the dotted orange lines). This signifies the absence of structural breaks or sudden shifts in the relationship between monetary policy and Nigeria's informal sector, validating that your findings are consistent and reliable for long-term policy formulation.

4.2 Discussion of Findings

The findings of this study provide robust empirical evidence that monetary policy significantly influences Nigeria's informal sector, although through complex and often unconventional channels. By rejecting the first null hypothesis (H01), the ARDL Bounds Test confirmed a long-run equilibrium where monetary

instruments and informal growth are inextricably linked. Specifically, the long-run coefficient for the Cash Reserve Ratio (CRR) (1.016, $p=0.0002$) and Commercial Bank Lending Rates (0.769, $p = 0.0311$) demonstrate a positive relationship with informal sector expansion. This suggests a "displacement effect" where formal financial tightening pushes economic agents into the informal economy to seek liquidity. This aligns with Yusuf, Aruwa, and Maiyaki (2023), who found that hikes in the CRR reduce funds available for formal lending, thereby cutting off formal credit avenues. Similarly, the findings support Ovat et al. (2023), who observed that as the informal economy expands, commercial bank lending rates increase due to heightened risk perceptions.

The rejection of the second hypothesis (H02) via a significant Error Correction Term (ECT) of -0.4884 ($p = 0.0000$) underscores the sector's responsiveness to policy regimes. The speed of adjustment implies that nearly 49% of deviations from equilibrium are corrected annually. While the sector is responsive, the nature of this response is often defensive. The short-run ARDL results showed significant reactions to lags in the CRR, echoing the findings of Okorie and Oye (2024) regarding how sudden monetary actions (like the currency redesign) cause sector-specific economic shifts due to cash dependency. This responsiveness validates the argument by Ozili (2024) that policy tightening restricts formal access, forcing the informal sector to rely on its own internal credit mechanisms.

The rejection of the third hypothesis (H03) highlights the critical role of structural and institutional constraints. The significant negative impact of Institutional Quality (-0.47, $p=0.0059$) proves that weak governance sustains informality. This finding strongly correlates with Odumu et al. (2024), who noted that a lack of institutional frameworks, such as property rights, prevents the central bank from using the credit channel effectively. Furthermore, the insignificant long-run impact of Money Supply ($p=0.7206$) supports Adewuyi and Owolabi (2018), who argued that informal businesses rely more on personal savings than formal monetary tools. Collectively, these findings reinforce the "asymmetry" noted by Oyadeyi (2023), where formal and informal sectors react disproportionately to policy changes, ultimately weakening the overall transmission of monetary policy in Nigeria. The findings of this study reveal that Nigeria's informal sector expands as a survivalist response to formal financial tightening, particularly through the Cash Reserve Ratio and Lending Rates. A key implication is that the Central Bank of Nigeria (CBN) cannot achieve price stability or economic growth without integrating informal sector metrics into its policy framework.

Since high interest rates inadvertently drive businesses into the "shadows", the CBN should adopt asymmetric monetary policies that provide targeted liquidity to micro-enterprises while tightening the formal core. Furthermore, because Institutional Quality is a significant deterrent to informality, the government must prioritize structural reforms (such as formalizing property rights and digitizing informal transactions) to bridge the transmission gap. Without these institutional bridges, the informal sector will remain a "passive observer" of traditional monetary shocks, perpetually weakening the national policy impact.

5. CONCLUSION AND RECOMMENDATIONS

The study found a statistically significant long-run relationship between monetary policy and the informal economy, as evidenced by the ARDL Bounds Test F-statistic of 4.994, which exceeded the upper bound critical value. Specifically, the Cash Reserve Ratio (CRR) and Commercial Bank Lending Rates have a positive and significant impact, suggesting that formal credit tightening drives agents into the informal

sector for survival. Conversely, the Monetary Policy Rate (MPR) has a significant negative long-run impact, indicating that high benchmark rates eventually dampen aggregate demand across the entire economy.

The findings confirm that the informal sector is significantly responsive to policy shifts, with an Error Correction Term (ECT) of -0.4884. This indicates that the sector adjusts back to its long-run equilibrium at a speed of approximately 48.8% per period following a policy shock. Short-run analysis further reveals that the sector reacts immediately to lags in the CRR, confirming that liquidity-based instruments transmit shocks faster to informal agents than interest-rate-based tools.

The study identified Institutional Quality as a significant constraint, showing a negative long-run coefficient of -0.47. This confirms that weak governance, lack of property rights, and poor formal frameworks sustain a large informal economy that remains largely insulated from traditional policy channels. Furthermore, the positive link between lending rates and informal growth suggests that structural gaps in formal credit markets force businesses to rely on informal financial intermediaries, thereby weakening the interest rate transmission channel.

This study concludes that while a stable long-run relationship exists between monetary policy and the informal sector, the transmission is "perverse" and constrained by institutional rigidities. Tightening formal liquidity through the CRR does not contract the informal economy; instead, it fuels its expansion by pushing businesses away from the formal banking system. The informal sector serves as a defensive cushion that absorbs formal policy shocks, primarily due to poor institutional quality and financial exclusion. Consequently, traditional monetary tools in Nigeria are hindered by a "leakage effect," where policy impulses fail to penetrate the cash-dependent informal majority.

5.2 Recommendations

Based on the findings, the study made the following policy recommendations:

Implement Asymmetric Monetary Controls: Given that the CRR and Lending Rates positively drive informality, the Central Bank of Nigeria should adopt differentiated reserve requirements. Lower CRR thresholds should be applied to banks that hit specific targets for micro-lending, ensuring that formal tightening does not inadvertently starve the informal sector of productive credit and worsen informality.

Strengthen Institutional and Regulatory Frameworks: Since Institutional Quality is a primary driver of the informal sector's size, the government must prioritize the formalization of property rights and the creation of a reliable national database for micro-enterprises. Improving the legal framework will allow informal businesses to use collateral, thereby enabling the central bank's credit channel to function more effectively.

Shift Focus to Indirect Liquidity Management: Because the informal sector is more responsive to quantity-based shocks (liquidity) than interest rates, the CBN should enhance its Electronic Payment Systems and digital currency (e-Naira) adoption. Transitioning the informal sector from a cash-based to a digital-transaction-based economy will broaden the monetary base and improve the precision of policy transmission across all sectors.

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