

Analyzing the Influence of Monetary Policy on Nigeria's Economic Expansion

Abstract This paper examined the connection between key monetary policy indicators and economic growth in Nigeria. The analysis was conducted using the Autoregressive Distributed Lag (ARDL) bound co-integration method. It estimated both the short-run and long-run effects of monetary policy on economic growth, utilizing secondary data from 1981 to 2022. The data, sourced primarily from the Central Bank of Nigeria Statistical Bulletin, revealed a long-run relationship between the variables. Contrary to initial expectations, the findings revealed Cash Reserve Ratio and Monetary Policy Rate had an insignificant impact on Real GDP, suggesting that changes in these indicators did not substantially influence economic growth. The Treasury Bill Rate and Exchange Rate showed a positive but insignificant effect on real economic growth. The study also found that Cash Reserve Ratio and Monetary Policy Rate had a negative yet insignificant effect on interest rates, implying that shifts in these variables did not significantly alter investment levels. However, the results indicated that Cash Reserve Ratio and Monetary Policy Rate could potentially lower overall interest rates, thereby encouraging investment and boosting real GDP. Additionally, the study highlighted the positive influence of savings and investment on economic growth. On the other hand, the Exchange Rate and Treasury Bill Rate were positively but insignificantly related to interest rates, suggesting their potential use in raising interest rates to manage liquidity, which could affect both investment and growth. Lastly, the study proposed that Treasury Bill Rates could help increase interest rates and absorb liquidity, thereby moderating investment and overall economic growth.

Keywords: Monetary Policy, Economic growth, Interest rate, Investment, Nigeria.

1. Introduction

In recent decades, Nigeria's economy has faced several challenges, including persistent fiscal imbalances, poor public enterprise performance, and heavy government intervention through regulations that limit private sector and foreign trade. These factors, combined with low-income growth, high unemployment, inflation, financial repression, and balance of payment crises, have negatively impacted investment, savings, and resource allocation.

Addressing these issues through appropriate policies can improve economic performance over time (Falade & Folorunso, 2015). The government plays a key role in stabilizing the economy by promoting employment, controlling inflation, and balancing payments. This is achieved through fiscal policy, which manages government spending and tax revenues, and monetary policy, which controls money supply and credit to influence interest rates and economic stability.

Monetary policy affects financial markets and resource availability, with investment influenced by factors such as interest rates, savings, and income levels. Effective monetary policy is crucial

for price stability, exchange rate viability, and sustainable growth. Despite efforts by the Central Bank of Nigeria to promote growth through various monetary policies, challenges like high unemployment, inflation, and unstable exchange rates persist, hindering economic progress. Therefore, it is essential to evaluate the effectiveness of Nigeria's monetary policies in driving economic growth.

The study highlights the unclear and poorly understood connection between monetary policy and economic growth in developing countries like Nigeria. Although monetary policy is seen as essential for addressing demand shortfalls and promoting growth, its transmission mechanisms are weak and unreliable in these economies. Much of the research has focused on developed nations, leaving a significant gap in understanding how monetary policies, particularly interest rates, impact growth in developing contexts.

This study seeks to fill that gap by examining the effect of Nigeria's monetary policy rate on its economic growth. Traditionally, Nigeria has emphasized money supply over interest rate policies, despite the increasing global focus on interest rates following events like the 2008 financial crisis. The study also points out that restrictive models, such as the Vector Autoregressive (VAR) model, often used in prior research, may not accurately reflect the complexities of monetary policy's impact on developing countries.

To address these issues, the research will use the Two Stage Least Squares (2SLS) method to analyze key monetary policy variables, including the Reserve Requirement (RR), Treasury Bills Rate (TBR), Monetary Policy Rate (MPR), and Exchange Rate (EXR). It will also consider transmission mechanisms often overlooked or oversimplified in previous studies. The main objective is to evaluate how these monetary variables have influenced Nigeria's economic growth from 1981 to 2022.

The research seeks to answer specific questions, such as the impact of RR, TBR, MPR, and EXR on Nigeria's GDP. It will also test hypotheses regarding the significance of these variables in influencing economic growth. The study aims to contribute to the ongoing debate by providing a more detailed model that better captures the relationship between monetary policy and economic growth in Nigeria.

2. Review of Literature

Monetary policy involves the calculated application of tools, both direct and indirect, by monetary authorities like central banks to achieve macroeconomic stability. **It functions as a crucial tool for attaining a desirable interest or inflation rate, maintaining price stability, and regulating the money supply in the economy (Temitope & Magaji, 2023).** According to Dwivedi (2005), monetary policy encompasses actions taken by central banks to regulate money supply and credit flows to achieve predetermined economic goals. **These strategies are frequently used to impact economic activities (Chugunov, Pasichnyi, Koroviy, Kaneva, & Nikitishin, 2021).** Governments often control money supply growth to influence inflation rates. As Ogunjimi (1997) notes, monetary policy consists of government actions that affect the behavior of the

monetary sector, including decisions about money circulation, interest rates, and credit markets. Monetary policies are particularly effective in economies with well-developed financial markets, where deliberate changes in monetary variables influence various economic indicators. Adegbite and Alabi (2013) highlight monetary policy's role in stabilizing domestic prices and exchange rates, which is crucial for sustainable economic growth. Depending on the economic situation, monetary policy can either be contractionary (to curb inflation) or expansionary (to stimulate economic activity during recessions). According to Ogunjimi (1997), monetary policy decisions revolve around managing the money supply, interest rates, and credit markets. A surplus in money supply can cause excessive demand for goods and services, leading to price hikes and worsening balance of payments. Thus, the performance of monetary policy requires collaboration with fiscal authorities and well-developed financial market infrastructure.

Economic growth is advanced as a sustained increase in production, employment, and welfare. Ogbulu and Torbira (2012) see it as an improvement in output and financial welfare, while Hardwick, Khan, and Langmead (1994) describe it as a rise in productive capacity, measured by GDP. Economic growth reflects a nation's ability to enhance its potential GDP or overall output. Musa, Magaji, Salisu, and Peter (2022) demonstrate a positive relationship between monetary policy and real GDP (RGDP). The potential for economic expansion requires the adoption of effective monetary policies, along with additional supportive strategies.

Monetary policy affects growth through the money channel, impacting aggregate demand (Bernanke & Gertler, 1995), and the credit channel, influenced by market imperfections (Ayodele, 2014). The credit channel has subchannels like the bank-lending channel, supported by Cyrille (2011) and others, but Hassan (2015) found no support.

The Central Bank of Nigeria (CBN) seeks to maintain monetary stability, managing inflation and interest rates (Jahan et al., 2014). CBN's policy tools, such as reserve requirements and open market operations, influence credit, savings, and investment (Akatu, 1993; Ubogu, 1985; Ologunde et al., 2006). Despite this, challenges like liquidity growth, high interest rates (Obaseki, 1991; Nkoro, 2003), and large government deficits undermine policy goals.

Monetary policy in Nigeria is constrained by political instability, fiscal indiscipline, and the CBN's mandated role in underwriting government debt (Nkoro, 2003).

The Classical monetary theory, primarily rooted in Irving Fisher's Quantity Theory of Money, asserts a stable relationship between money supply and price levels, assuming constant velocity and output. Classical economists believe money is neutral in both the short and long run, impacting nominal but not real macroeconomic variables like output or employment (Gali, 2008; Mankiw & Taylor, 2007). This view is encapsulated in Say's Law, which states that supply creates its own demand, ensuring full employment through market forces (Morgan, 1980). Flexibility in prices and interest rates allows the money supply to only affect the price level, not output (Pierce & Roley, 1985). Early thinkers like Locke and Hume also emphasized the neutrality of money, linking money supply with price levels.

In contrast, Keynesian theory disputes money's neutrality, asserting that monetary policy influences real economic variables such as interest rates, aggregate demand, and employment,

especially during periods of unemployment (Jhingan, 1997). Keynes introduced the liquidity preference theory, arguing that money demand is affected by income and interest rates, with monetary supply changes impacting aggregate demand via interest rates (Lipsey, 1975). Monetarists similarly stress the short-run role of money supply in determining nominal GDP and prices, with Milton Friedman famously asserting that "inflation is always and everywhere a monetary phenomenon" (Friedman, 1968).

The New Classical Model, emerging in the 1970s, integrates rational expectations and real business cycle theory, suggesting that real shocks, not monetary policy, drive economic cycles, with flexible prices ensuring market equilibrium (Snowdon & Howard, 2005).

In this framework, economic agents respond optimally to shocks, making traditional monetary interventions ineffective for stabilization (Palley, 2007). The New Classical Model rests on rationality, perfect competition, and the assumption of no wage rigidity, asserting that monetary policy does not impact real variables.

Ayodeji and Oluwele (2018) conducted a study to examine the effects of monetary policy on Nigeria's economic growth. They developed a model to assess how government monetary policy influences economic growth using multiple regression analysis. The monetary policy variables they analyzed included Money Supply (MS), Exchange Rate (ER), Interest Rate (IR), and Liquidity Ratio (LR), while economic growth was measured by the Gross Domestic Product (GDP) at constant prices. A unit root test was performed, revealing that all variables were stationary at their first differences, except for the interest rate component, ensuring that their model's interpretation would be valid and accurately reflect the relationships between the dependent and independent variables. They incorporated an Error Correction Model into their analysis for a more streamlined approach. Their findings indicated that two variables—money supply and exchange rate—positively influenced economic growth, though the effect was relatively insignificant. Conversely, the interest rate and liquidity ratio negatively impacted economic growth, with a highly significant effect. Furthermore, they performed an Engle-Granger co-integration test, which confirmed a long-term relationship between monetary policy and economic growth in Nigeria. The Granger causality test indicated a one-way causality from money supply to economic growth, while economic growth was found to Granger-cause both liquidity ratio and exchange rates. Additionally, a bi-directional causality was identified between interest rates and economic growth. Similar result has also been reported (Adegoriola, 2018; Ezeaku *et al.*, 2018; Ifeakachukwu and Alao, 2018; Ufoeze *et al.* 2018)

Duskobilov (2017) asserts that monetary policy is a vital component of any economy's strategy for economic development, largely due to its important influence on economic sustainability. The author examines how monetary policy instruments affect economic regulation in Uzbekistan by analyzing their relationship with economic growth. Through the use of a cointegration and error correction model, the study finds that these instruments positively affect economic growth over the long term. In another study, Ahmad, Afzal, and Ghani (2016) investigate the role of monetary policy in fostering economic growth in Pakistan, using time series data from 1973 to 2014. They apply the Autoregressive Distributed Lag (ARDL) model to assess the robustness of the relationships among variables, highlighting both short-run and long-run connections. Their

findings indicate that monetary policy variables have a significant and positive effect on economic growth. The same is seen in Njimanted, Akume and Mukete 2016; Alavinasab, 2016; Najal, 2017; Natvik and Sola, 2017; Afrin, 2017; Obeid and Awad, 2017; Srithilat and Sun 2017; Lennard, 2018; D’Aguanno, 2018; Twinoburyo and Odhiambo, 2018; Kaminska and Roberts-Sklar, 2018; Cantelmo and Melina, 2018; Colletaz, Levieuge and Popescu, 2018; Zhao, Chen and Hao, 2018; Junankar 2019)

Akinjare et al. (2016) explored the relationship between monetary policy and economic growth in Nigeria by employing the ordinary least squares (OLS) method. Their study utilized multiple linear regression, treating GDP as the dependent variable while considering inflation rate, exchange rate, interest rate, and money supply as independent variables. The results indicated that exchange rate, interest rate, and money supply have a significant effect on the economy, whereas inflation does not. As a result, the study suggests that monetary policies should focus on creating a favorable investment environment by implementing market-driven interest and exchange rate systems. This approach would help attract both domestic and foreign investments, create jobs, enhance non-oil exports, and revitalize industries that are currently operating below their potential.

Collectively, these studies illustrate the critical yet complex relationship between monetary policy and economic growth, revealing both the effectiveness and challenges of policy implementation across various economic contexts. The findings underscore the necessity for tailored monetary strategies that account for each country's unique structural characteristics and economic conditions.

3. Model Specification and Techniques of Analysis

Since this paper aims to analyze the monetary policy bearing on Nigerian economic growth, the functional form of the model specification is specified as:

$$RGDP = f(MS, INF, INTR,) \dots\dots\dots (3.1)$$

Where: RGDP = Real Gross Domestic Product, MS = Money Supply, INF = Inflation Rate, and INTR = Interest Rate,

To estimate the above equation, we transformed the functional form into an estimated model as:

$$RGDP_t = \alpha_0 + \alpha_1 MS_t + \alpha_2 INF_t + \alpha_3 INTR_t + \mu_t \dots\dots\dots (3.2)$$

The Auto Regressive Distributed Lag (ARDL) model, which applies a bounds testing method using an unrestricted error correction model (UECM), was utilized in this study to assess the relationship between future financing and investment in Nigeria. One key benefit of this approach is that it can be employed regardless of whether the variables are integrated of order I(0) or I(1). Additionally, this method allows the model to incorporate a sufficient number of lags

to capture the underlying data generation process within a general-to-specific modeling framework.

While a dynamic error correction model (ECM) can be derived from the ARDL model through a simple linear transformation, the bounds test approach is based solely on the estimation of the UECM using an ordinary least squares estimator. According to Tang (2003), the UECM is essentially a re-parameterization of a broader ARDL model. The ARDL model is formulated as follows:

$$RGDP_t = \alpha_0 + \sum \gamma_i RGDP_{t-i} + \sum \gamma_i MS_{t-i} + \sum \beta_i INF_{t-i} + \sum \beta_i INTR_{t-i} + \mu_{it} \dots \dots \dots (3.3)$$

In order to obtain the co-integrating equation, equation 3.3 is transformed into 3.4 as follows:

$$ARGDP_t = \alpha_0 + \sum \gamma_i ARGDP_{t-i} + \sum \gamma_i AMS_{t-i} + \sum \beta_i AINF_{t-i} + \sum \beta_i AINTR_{t-i} + \phi_i ECT + \mu_{it} \dots \dots \dots (3.4)$$

$$\text{Where } ECT_t = Y_t - \alpha_0 - \sum_{i=1}^p \gamma_i \Delta Y_{t-i} - \sum_{i=0}^p \beta_i \Delta X_{t-i} \text{ and } \phi = 1 - \sum_{i=1}^p \gamma_i \Delta Y_{t-i} \dots \dots \dots (3.5)$$

The Bound test procedure used equations 3.4 and 3.5 into 3.6 as:

$$\Delta Y_t = - \sum_{i=1}^{p-1} \gamma_i Y_{t-i} * \Delta Y_{t-i} + \sum_{i=0}^p \beta_i \Delta X_{t-i} - \rho Y_{t-1} - \alpha - \sum_{i=0}^p \delta X_{t-i} + \mu_{it} \dots \dots \dots (3.6)$$

Then we test the existence of level relationship as $\rho = 0$ and $\delta_1 = \delta_2 = \dots = \delta_k = 0$

Where Δ = difference operator, μ = white noise error term.

Unit Root and Co-Integration Test Results

Being that the validity of the ARDL method depends on whether the variables are integrated at level I(0), at first difference I(1), or a mix of both. Therefore, it is essential to first assess the time-series properties of each variable used in equation (3.3) to determine if they are integrated at order zero, one, or higher. Since unit root tests have inherent limitations, this study employed two tests: the non-parametric Phillips-Perron (PP) test, introduced by Phillips and Perron (1988), and the widely used Augmented Dickey-Fuller (ADF) test. Both tests assess the null hypothesis that the series contains a unit root, meaning the variables are non-stationary.

Monetary policy, guided by the Central Bank, aims to maintain price stability, full employment, and aggregate income growth. Key mechanisms include the manipulation of interest rates through supply and demand dynamics in lending and borrowing markets. Instruments analyzed in this study include: Reserve Requirement (RR): The cash reserve ratio mandates that banks hold a fraction of deposits, limiting loan issuance and controlling money supply. Treasury Bills (TBR): The CBN engages in open market operations, buying and selling treasury bills to adjust reserves and influence credit availability. Central Bank Lending: The Monetary Policy Rate (MPR) represents the cost of borrowing from the CBN, impacting the monetary base and liquidity in the banking sector. Exchange Rate (EXR): The CBN intervenes in foreign exchange markets to stabilize the exchange rate, thereby influencing domestic money supply.

The effectiveness of these instruments is contingent upon the economy's financial sector development. Both expansionary and contractionary monetary policies affect the economy by altering interest rates, which subsequently influence investment levels. This relationship can be encapsulated in investment function; Where investment depends on interest rates, savings, and income levels (proxied by real GDP), which are interdependent. Reduced-form parameters assess the total, direct, and indirect effects of changes in predetermined variables on endogenous variables, while structural parameters isolate direct effects within the endogenous variables.

4. Presentation and Discussion of Major Results

The economic growth, proxied by Real GDP, along with monetary policy variables in Table 1, were tested for stationarity to avoid inaccuracies that could result from using non-stationary data in regression analysis, which might lead to misleading outcomes. The findings indicate that all the variables are integrated of order one (I(1)), meaning they become stationary after being differenced once. A summary of these results is presented in Table 2.

In Table 2, the ADF (Augmented Dickey-Fuller) statistics for all the series are more negative than their 5% critical values at first difference, confirming that the variables are integrated of order one. Consequently, the researchers tested for cointegration among the variables in the models presented in the system of equations. According to the Engel and Granger approach, if a linear combination of the series is integrated of order zero, the model is considered cointegrated. Therefore, unit root analysis was performed for all the models, revealing that the variables are stationary at their levels. The results of the cointegration test for the interest rate model are shown in Table 3, while the results for other models in the system are provided in the appendix.

After establishing that all the models are cointegrated, we applied an error correction model to evaluate the system of equations using the Two-Stage Least Square Method. The interest rate model is detailed in Table 4.

According to Table 4, both the cash reserve ratio and the monetary policy rate have a negative but statistically insignificant effect on the interest rate, while the exchange rate and treasury bill rate have a positive yet similarly insignificant relationship with the interest rate. These findings indicate that lowering the cash reserve ratio and monetary policy rate could lead to a decrease in interest rates, encouraging more investment. On the other hand, increasing the exchange rate and treasury bill rates could raise interest rates, absorb excess liquidity, and subsequently reduce investment levels. However, the influence of monetary policy on interest rates is minimal. The researcher also analyzed a second equation, in which investment is determined by interest rates, savings, and real GDP, and presented the findings.

Table 5 demonstrates that investment tends to be self-reinforcing and decreases as the interest rate rises, indicating an inverse relationship between the two. In other words, investment declines as interest rates increase, making it a negative function of the interest rate. On the other hand, real GDP and savings are positively correlated with investment, though their individual effects on investment are minimal.

Since real GDP is not entirely exogenous, in order to avoid a simultaneous equation bias, real GDP as a function of investment is calculated and presented.

Table 6 shows that real GDP significantly reinforces itself, while investment, savings, and interest rates are all positively, but insignificantly, related to real GDP. Therefore, real GDP is a positive, yet insignificant, function of investment in Nigeria. After analyzing the interrelationships among monetary policy tools, interest rates, investment, and real GDP, the researcher has stated and estimated the reduced-form equation previously outlined in Table 7.

Table 1: Monetary Policy and Economic Growth Variables

YEAR	LOGCRR	LOGINVMT	LOGLIQR	LOGMPR	LOGRGDP	LOGTRB	LOGINTR	LOGEXR	LOGSAV
1981	0.530628251	4.824466346	3.650658	1.791759	9.632859	1.60943791	2.014903	-0.4943	1.880991
1982	0.336472237	4.852811209	3.701302	2.079442	9.61481	1.94591015	2.327278	-0.39616	2.016235
1983	0.741937345	4.789656066	4.001864	2.079442	9.536021	1.94591015	2.302585	-0.32283	2.244956
1984	1.064710737	4.582720057	4.175925	2.302585	9.53092	2.14006616	2.525729	-0.26801	2.396986
1985	1.064710737	4.467516021	4.174387	2.302585	9.612728	2.14006616	2.224624	-0.11227	2.527327
1986	1.064710737	4.69015451	3.594569	2.302585	9.631547	2.14006616	2.351375	0.703394	2.634045
1987	1.481604541	4.807784446	3.839452	2.545531	9.633248	2.46385324	2.862201	1.390759	2.927453
1988	1.791759469	4.92797806	3.806662	2.545531	9.693715	2.46385324	2.80336	1.5122	3.146305
1989	1.740466175	5.383347616	3.696351	2.917771	9.758154	2.86220088	3.288402	2.000344	3.169686
1990	1.757857918	5.571279125	3.790985	2.917771	9.868152	2.86220088	3.238678	2.084155	3.389462
1991	2.014903021	5.654557216	3.653252	2.74084	9.862617	2.7080502	2.995732	2.293494	3.630721
1992	2.054123734	5.98295343	3.370738	2.862201	9.884314	3.04452244	3.394508	2.850614	4.009513
1993	2.116255515	6.326417773	3.74242	3.258097	9.899881	3.29212629	2.906901	3.093362	4.443004
1994	2.459588842	6.612161995	3.881564	2.60269	9.902443	2.52572864	3.044522	3.085852	4.70926
1995	2.282382386	7.050530069	3.499533	2.60269	9.920993	2.52572864	3.005683	3.085852	4.686658
1996	2.379546134	7.309714248	3.763523	2.60269	9.960714	2.50552594	2.980619	3.085852	4.901564
1997	2.360854001	7.437070904	3.693867	2.60269	9.989165	2.48490665	2.60269	3.085852	5.179815
1998	2.302585093	7.574892104	3.845883	2.60269	10.01381	2.56109579	2.906901	3.085852	5.298667
1999	2.151762203	7.648997144	4.110874	2.890372	10.01902	2.83321334	3.058707	4.529297	5.626433
2000	2.272125886	7.785230336	4.160444	2.639057	10.07274	2.48490665	2.890372	4.626004	5.953737
2001	1.435084525	7.813377302	3.968403	3.020425	10.13728	2.56109579	2.906901	4.717992	6.190418
2002	1.029619417	8.032288694	3.95986	2.80336	10.27359	2.93810316	3.214868	4.795544	6.383659
2003	1.504077397	8.254848727	3.929863	2.70805	10.36437	2.70938265	3.030134	4.862572	6.485764
2004	1.252762968	8.460351904	3.921478	2.70805	10.46369	2.65394594	2.95491	4.894104	6.681507
2005	2.151762203	8.660884794	3.915517	2.564949	10.53143	1.94519561	2.890372	4.883915	7.183081
2006	2.079441542	8.980690702	4.399625	2.302585	10.59652	2.17475172	2.850707	4.857108	7.461433
2007	2.48490665	8.85332537	3.727022	2.251292	10.66715	1.93296964	2.827314	4.834956	7.898615
2008	2.48490665	8.927349943	3.630071	2.277267	10.73667	2.6426224	2.714695	4.775477	8.323164
2009	2.564949357	9.12446435	3.27309	1.791759	10.8169	2.00552586	2.944439	5.003142	8.659302
2010	2.995732274	9.125115761	3.310158	1.832581	10.90801	2.41591378	2.867899	5.01262	8.691862
2011	2.974968184	9.200007168	3.738146	2.484907	10.95973	3.10503501	2.772589	5.036053	8.784455
2012	2.557017212	9.23814521	3.906382	2.484907	11.00093	3.30321697	2.821379	5.059422	8.995029
2013	2.583035883	9.348194408	3.833731	2.484907	11.05436	3.03687422	2.815409	5.058226	9.066022
2014	2.608394714	9.517367614	3.644576	2.564949	11.11473	3.17763708	2.80336	5.066086	9.393348
2015	2.633126347	9.554792825	3.745901	2.397895	11.14221	2.90580757	2.821379	5.264136	9.346455
2016	2.65726099	9.622726806	3.827554	2.639057	11.12625	3.06805294	2.827314	5.535333	9.418225
2017	2.680826921	9.73554985	4.003502	2.639057	11.13446	3.33148997	2.815409	5.722899	9.469408
2018	2.70385026	10.10847691	4.175064	2.639057	11.15339	3.19253185	2.815409	5.723847	9.62027
2019	2.726355433	10.48748873	4.329496	2.60269	11.17588	2.2512918	2.815409	5.726589	9.743361
2020	2.65726099	9.622726806	3.827554	2.639057	11.12625	3.06805294	2.827314	5.535333	9.418225
2021	2.642941511	10.69618659	4.213586	2.442347	11.18892	1.15373159	2.815409	5.978673	9.803705
2022	2.557017212	9.23814521	3.906382	2.484907	11.00093	3.30321697	2.821379	5.059422	8.995029

Source: Statistical Bulletin of Central Bank of Nigeria, Various Issues

Table 2 Augmented Dickey-Fuller Unit Root Test

Variables	Lag	ADF Test Statistic	Critical Values		Remarks
	SCI		1st difference	1%	
LOGRGDP	2	-3.437906	-3.615588	-2.941145	Stationary
LOGINVMT	2	-3.869537	-3.615588	-2.941145	Stationary
LOGMPR	2	-7.598097	-3.615588	-2.941145	Stationary
LOGCRR	2	-7.233896	-3.615588	-2.941145	Stationary
LOGLIQR	2	-7.030270	-3.615588	-2.941145	Stationary
LOGTRB	2	-5.38545	-3.615588	-2.941145	Stationary
LOGINTR	2	-8.636867	-3.615588	-2.941145	Stationary
LOGEXR	2	-5.319718	-3.615588	-2.941145	Stationary
LOGSAV	2	-4.425479	-3.615588	-2.941145	Stationary

Table 3 Engle and Granger Method of Testing for cointegration

Null Hypothesis: ECT has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.767664	0.0004
Test critical values:		
1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

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

Table 4 Dependent Variable: D(LOGINTR)

Method: Least Squares

Date: 03/02/22 Time: 21:19

Sample (adjusted): 1983 2020

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGINTR(-1))	-0.204720	0.200741	-1.019817	0.3157
D(LOGCRR(-1))	-0.038603	0.076443	-0.504992	0.6171
D(LOGEXRATE(-1))	0.111315	0.126371	0.880858	0.3852
D(LOGMPR(-1))	-0.344818	0.215656	-1.598929	0.1200
D(LOGTRB(-1))	0.180211	0.130740	1.378395	0.1779
ECT(-1)	-0.539108	0.228878	-2.355439	0.0250
C	0.002841	0.037750	0.075265	0.9405
R-squared	0.302411	Mean dependent var		0.004839
Adjusted R-squared	0.167394	S.D. dependent var		0.217550
S.E. of regression	0.198508	Akaike info criterion		-0.231152
Sum squared resid	1.221569	Schwarz criterion		0.070508
Log likelihood	11.39189	Hannan-Quinn criter.		-0.123824
F-statistic	2.939793	Durbin-Watson stat		2.068512
Prob(F-statistic)	0.045447			

Table 5 Investment Function

Dependent Variable: D(LOGINVESTMT)

Method: Least Squares

Date: 03/03/22 Time: 07:50

Sample (adjusted): 1983 2020

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGINVESTMT(-1))	0.570887	0.166692	3.424807	0.0017
D(LOGRGDP(-1))	0.218340	0.546960	0.399189	0.6924
D(LOGINTRATE(-1))	-0.128987	0.106023	-1.216600	0.2327
D(LOGSAVINGS(-1))	0.031621	0.170620	0.185328	0.8541
ECT(-1)	-0.168599	0.084763	-1.989072	0.0353
C	0.050680	0.051221	0.989440	0.3299
R-squared	0.296745	Mean dependent var		0.153773
Adjusted R-squared	0.186861	S.D. dependent var		0.151694
S.E. of regression	0.136789	Akaike info criterion		-0.996819
Sum squared resid	0.598757	Schwarz criterion		-0.738253
Log likelihood	24.93957	Hannan-Quinn criter.		-0.904823
F-statistic	2.700537	Durbin-Watson stat		2.116256
Prob(F-statistic)	0.038101			

Table 6 Dependent Variable: D(LOGRGDP)

Method: Least Squares

Date: 03/03/22 Time: 07:32

Sample (adjusted): 1983 2020

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGRGDP(-1))	0.534813	0.140282	3.812413	0.0006
D(LOGINVESTMT(-1))	0.003619	0.042752	0.084643	0.9331
D(LOGINTRATE(-1))	0.031659	0.027192	1.164273	0.2529
D(LOGSAVINGS(-1))	0.045687	0.043760	1.044033	0.3043
ECT(-1)	-0.021999	0.021740	-1.011911	0.3192
C	0.008488	0.013137	0.646154	0.5228
R-squared	0.366865	Mean dependent var		0.041424
Adjusted R-squared	0.267938	S.D. dependent var		0.041004
S.E. of regression	0.035083	Akaike info criterion		-3.718260
Sum squared resid	0.039386	Schwarz criterion		-3.459694
Log likelihood	76.64695	Hannan-Quinn criter.		-3.626265
F-statistic	3.708432	Durbin-Watson stat		2.043885
Prob(F-statistic)	0.009254			

Table 7 Dependent Variable: D(LOGRGDP)

Method: Least Squares

Date: 03/02/22 Time: 20:32

Sample (adjusted): 1984 2020

Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGRGDP(-1))	0.486148	0.132888	3.658325	0.0010
D(LOGCRR(-2))	0.003590	0.011885	-0.302082	0.7647
D(LOGMPR(-2))	0.047310	0.033210	-1.424575	0.1650
D(LOGTRB(-2))	0.017847	0.023563	0.757391	0.4549
D(LOGEXRATE(-1))	0.017295	0.018185	0.951043	0.3494
D(LOGSAVINGS(-2))	0.042721	0.040783	1.047515	0.3035
ECT(-1)	-0.157280	0.078953	-2.992078	0.0259
C	0.011762	0.011756	1.000574	0.3253
R-squared	0.435231	Mean dependent var		0.044673
Adjusted R-squared	0.298908	S.D. dependent var		0.036273
S.E. of regression	0.030372	Akaike info criterion		-3.961790
Sum squared resid	0.026751	Schwarz criterion		-3.613484
Log likelihood	81.29312	Hannan-Quinn criter.		-3.838996
F-statistic	3.192634	Durbin-Watson stat		1.819904
Prob(F-statistic)	0.012451			

The analysis in Table 5 indicates that both the cash reserve ratio (CRR) and the monetary policy rate (MPR) have an insignificant impact on real GDP. Similarly, the treasury bill rate (TBR) and the exchange rate show a positive but also insignificant influence on economic growth.

The CRR and MPR negatively and insignificantly affect the interest rate, which is inversely related to investment. This suggests that lowering the CRR and MPR could reduce interest rates, encouraging more investment, which would lead to higher real GDP growth. Economic growth is shown to be positively linked to both savings and investment, meaning that increased savings and investment drive economic expansion.

Conversely, the exchange rate and TBR are positively, though insignificantly, related to interest rates, implying that these two factors could be used to raise interest rates, tighten liquidity, and subsequently reduce investment and economic growth.

These sets of policy tools, if effectively strengthened and implemented, could be used to fine-tune the growth trajectory of the Nigerian economy.

5. Conclusion

This paper revealed that cash reserve ratio and monetary policy rate were found to have little effect on real GDP. While the treasury bills rate and exchange rate had positive effects on

economic growth, these impacts were also minimal. Both the cash reserve ratio and monetary policy rate had a negative influence on interest rates, indicating an inverse relationship with investment levels. This suggests that lowering these rates could reduce overall interest rates, potentially encouraging investment and fostering real GDP growth. Additionally, economic growth was positively linked to savings and investment, implying that higher savings and investment contribute to growth. In contrast, the exchange rate and treasury bills rate showed a positive but insignificant relationship with interest rates. Indicating potential for these tools to raise interest rates and manage liquidity, thereby affecting investment and growth. Treasury bill rate could serve to increase interest rates and absorb excess liquidity, moderating investment and overall economic growth. These results are found to challenge initial assumptions.

The analysis reveals a mixed significance across monetary policy variables, after regressing reserve ratio, treasury bill rate, monetary policy rate, and exchange rate against real gross domestic product (rgdp), asserting that if effectively utilized, these policy tools could enhance the growth trajectory of Nigeria's economy.

The paper recommends support from government to small and medium enterprises (SMEs) through maintaining reasonable levels for cash reserve ratio and monetary policy rate to promote moderate loan interest rates, addressing unemployment and social issues. The monetary authority should permit commercial banks to uphold adequate liquidity ratios, facilitating lending and stimulating economic activity. Nigerian banks should focus on maintaining price stability and improving regulatory frameworks to foster a resilient financial sector that enhances efficient intermediation and economic growth. The paper concluded that Granting autonomy to the central bank is essential for the effective implementation of monetary policies that can drive economic development in Nigeria

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

References

- Aastveit, K. A., Natvik, G. J. and Sola, S. (2017). Economic uncertainty and the influence of monetary policy. *Journal of International Monetary and Finance*, 76: 50-67.
- Adegoriola, A. E. (2018). An empirical analysis of effectiveness of monetary and fiscal policy instruments in stabilizing economy: Evidence from Nigeria. *Social Sciences*, 7(3): 133-140.
- Ahmad, D., Afzal, M., and Ghani, U. (2016). Impact of Monetary Policy on Economic Growth Empirical Evidence of Pakistan. *International Journal of Applied Economic Studies*, 4(6): 01-09.
- Akatu, P. O. (1993). *Monetary policy and economic stabilization in Nigeria*. Nigerian Economic Society.
- Akinjare, O. E., Oloyede, O. A., & Ogunmola, O. J. (2016). The impact of monetary policy on economic growth in Nigeria. *International Journal of Economics and Financial Issues*, 6(3), 1010-1017.
- Alavinasab, S. M. (2016). Monetary policy and economic growth: A case study of Iran. *International Journal of Economics, Commerce and Management*, 4(3): 234-244.
- Afrin, S. (2017). Monetary policy transmission in Bangladesh: Exploring the lending channel. *Journal of Asian Economics*, 49: 60-80.
- Ayodele, T. D. (2014). *The impact of monetary policy on Nigeria's economic growth*. University of Lagos Press.
- Bernanke, B. S., and Gertler, M. (1995). Inside the black box: the credit channel of monetary policy transmission. *Journal of Economic perspectives*, 9(4): 27-48.
- Cantelmo, A., and Melina, G. (2018). Monetary policy and the relative price of durable goods. *Journal of Economic Dynamics and Control*, 86: 01-48.
- Chugunov, I., Pasichnyi, M., Koroviy, V., Kaneva, T., & Nikitishin, J. (2021). Fiscal and monetary policy of economic development. *European Journal of Sustainable Development*, 10(1), 42. <https://doi.org/10.14207/ejsd.2021.v10n1p42>
- Cyrille, K. K. (2011). *Financial development and economic growth in Cameroon*. University of Yaoundé II Press.
- D'Aguanno, L. (2018). Monetary policy and wealth effects with international income transfer. *Journal of Macroeconomics*, 57: 210-230.

- Duskobilov, U. (2017). Impact of economic regulation through monetary policy: Impact analysis of monetary policy tools on economic stability in Uzbekistan. *International Journal of Innovation and Economic Development*, 3(5): 65- 69.
- Dwivedi, D. N. (2005). *Macroeconomics: Theory and policy* (2nd ed.). Tata McGraw-Hill Education.
- Ezeaku, H. C., Ibe, I. G., Ugwuanyi, U. B., Modebe, N. J. and Agbaeze, E. K. (2018). Monetary policy transmission and industrial sector growth: Empirical evidence from Nigeria. *SAGE Open*, 8(2): 1-12.
- Falade, O. E. and Folorunso, B. A. (2015). Fiscal and monetary policy instruments and economic growth sustainability in Nigeria. *American Journal of Economics*, 5(6): 587-594.
- Friedman, M. (1968). The role of monetary policy. *The American Economic Review*, 58(1): 1-17.
- Gali, J. (2008). *Monetary policy, inflation, and the business cycle: An introduction to the New Keynesian framework*. Princeton University Press.
- Hardwick, P., Khan, B., & Langmead, J. (1994). *An introduction to modern economics* (4th ed.). Longman.
- Hassan, M. B. (2015). *Impact of monetary policy on economic growth in Nigeria*. Ahmadu Bello University Press.
- Ifeakachukwu, N. P. and Alao, A. A. (2018). Monetary Policy and Export Diversification in Nigeria. *Valahian Journal of Economic Studies*, 9(1): 17-28.
- Jahan, S., Mahmud, A. S., & Papageorgiou, C. (2014). What is Keynesian economics? *Finance & Development*, 51(3), 53-54.
- Jhingan, M. L. (1997). *Macroeconomic Theory*. New Delhi: Vrinda Publications Ltd.
- Junankar, P. N. (2019). *The economics of money and banking*. Oxford University Press.
- Kaminska, I., and Roberts-Sklar, M. (2018). Volatility in equity markets and monetary policy rate uncertainty. *Journal of Empirical Finance*, 45: 68-83.
- Lennard, J. (2018). Did monetary policy matter? Narrative evidence from the classical gold standard. *Explorations in Economic History*, 68: 16-36.
- Lipsey, R. G. (1975). *An introduction to positive economics*. Pp 405-410.
- Mankiw, G.N. and Taylor, M.P. (2007). *Macroeconomics*. (European Edition ed.) Basingstoke: Palgrave Macmillan.
- Morgan, B. (1980). *Monetarists and Keynesians*. Their contribution of Monetary theory: London, Macmillan.

Musa, I., Magaji, S., Salisu, A., & Peter, A. O. (2022). Relationship between financial inclusion and economic growth: Evidence from ARDL modelling. *Indonesian Journal of Business and Economics*, 5(2).

Najal, R. (2017). IS monetary policy necessary for the economic development of less developed countries with special reference to Pakistan. *Business and Economic Journal*, 8(1): 01-03.

Njimanted, F. G., Akume, D., Mukete, E. M. (2016). The impact of key monetary variables on the economic growth of the CEMAC zone. *Expert Journal of Economics*. 4(2): 54-67.

Nkoro, E. (2003). *Analysis of the impact of Monetary Policy on Economic Development in Nigeria*. Benin City: University of Benin.

Obaseki, P. J. (1991). Foreign exchange management in Nigeria: past, present and the future.

Obeid, R. and Awad, B. (2017). Effectiveness of monetary policy instruments on economic growth in Jordan using the vector error correction model. *International Journal of Economics and Finance*, 9 (11): 194-206.

Ogbulu, O. M., & Torbira, L. L. (2012). Budgetary operations and economic growth: The Nigerian perspective. *British Journal of Arts and Social Sciences*, 4(2), 204-217.

Ogunjimi, S. O. (1997). Public finance for polytechnics and ICAN students. *Niger: Leken Productions*.

Ologunde, A. O., Elumilade, D. O., & Asaolu, T. O. (2006). Stock market capitalization and interest rate in Nigeria: A time series analysis. *International Research Journal of Finance and Economics*, 4, 154-166.

Owalabi, A. U. and Adegbite, T. A. (2014). Impact of monetary policy on industrial growth in Nigeria. *International Journal of Academic Research in Business and Social Sciences*, 4 (1): 18-31.

Palley, T. I. (2007). Macroeconomics and monetary policy: Competing theoretical frameworks. *Journal of Post Keynesian Economics*, 30(1): 61-78.

Pierce, D. K., and Roley, V. V. (1985). Stock prices and economics news. *Journal of Business*, 58: 49-67.

Snowdon, B. and Vane, H. R. (2005). *Modern macroeconomics: its origins, development and current state*. Edward Elgar Publishing.

Srithilat, K. and Sun, G. (2017). The impact of monetary policy on economic development: Evidence from Lao PDR. *Global Journal of Human-Social Science*, 17 (2): 9-15.

Temitope, Y. A., & Magaji, S. (2023). Influence of monetary policy on international trade:

Cointegration and error correction mechanism. *Journal of Development Economics and Finance*, 4(1), 281-294.

Twinoburyo, E. N. and Odhiambo, N. M. (2018). Monetary policy and economic growth: a review of international literature. *Journal of Central Banking Theory and Practice*, 7(2): 123-137.

Ubogu, R. E. (1985). *Monetary policy in Nigeria: 1970-1980*. Central Bank of Nigeria Economic and Financial Review.

Ufoeze, L. O., Odimgbe, S. O., Ezeabalisi, V. N. and Alajekwu, U. B. (2018). Effect of monetary policy on economic growth in Nigeria: An empirical investigation. *Annals of Spiru Haret University, Economic Series*, 9(1): 123-140.

Zhao, J., Chen, X., and Hao, Y. (2018). Monetary policy, government control and capital investment: Evidence from china. *China Journal of Accounting Research*, 11: 233-254.

UNDER PEER REVIEW