

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

Abstract This paper examined the relationship between monetary policy indicators and economic growth in Nigeria. Using an Autoregressive Distributed Lag (ARDL) bound co-integration approach, the study 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 serves as a key instrument in ensuring monetary and price stability. According to Dwivedi (2005), monetary policy encompasses actions taken by central banks to regulate money supply and credit flows to achieve predetermined economic goals. 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.

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) analyzed the impact of monetary policy on economic growth in Nigeria by developing a model that is able to investigate how monetary policy of the government has affected economic growth through the use of multi-variable regression analysis. They proxied the variables of monetary policy instruments to include: Money Supply (MS), Exchange Rate (ER), Interest Rate (IR), and Liquidity Ratio (LR). Economic growth was represented by Gross Domestic Product (income) at constant prices. Unit root test was conducted and all their estimating variables were stationary at first difference except the component of interest rate which shows that their model interpretation would not be spurious and a true representation of the relationships that exists between the explained and explanatory variables. Error Correction Model was introduced in their estimation in order to have a parsimonious model. From their result, two variables (money supply and exchange rate) had a positive but fairly insignificant impact on economic growth. Measures of interest rate and liquidity ratio on the other hand, had a negative but highly significant impact on economic growth. In addition, Engle-Granger cointegration test was done and showed the existence of a long run relationship between monetary policy and economic growth in Nigeria. Granger causality test was done on their variables and the results showed the existence of a uni-directional causality between money supply and economic growth, economic growth granger causing liquidity ratio and exchange rates while a bi-directional causality exists between interest and economic growth. Similar result has also been reported (Adegoriola, 2018; Ezeaku *et al.*, 2018; Ifeakachukwu and Alao, 2018; Ufoeze *et al.* 2018)

As maintained by Duskobilov (2017), monetary policy is an integral part of economic development strategy in any economy due to its significant impact on economic sustainability. The author investigates the impact of monetary policy tools on economic regulation in Uzbekistan by analysing the relationship between monetary policy tools and economic growth. Using cointegration and error correction model, results show that monetary policy tools influenced economic growth positively with a long-term relationship. Furthermore, Ahmad, Afzal and Ghani (2016) evaluate the significance of monetary policy in enhancing the economic growth of Pakistan using time series data spanning 1973 to 2014. By employing the Autoregressive Distribution Lag (ARDL) model to determine the robustness among the variables with specification of short-run and longrun relationship, findings show that monetary policy variables have a significant and positive impact 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, Leveigue and Popescu, 2018; Zhao, Chen and Hao, 2018; Junankar 2019)

Akinjare *et al* (2016) investigated monetary policy and its effectiveness on economic growth of Nigeria using ordinary least square method, the multiple linear regression analysis with GDP as dependent variable while inflation rate, exchange rate, interest rate and money supply are the explanatory variables. The result shows that while exchange rate, interest rate and money supply is significant in impacting the economy, inflation proves otherwise. Hence the study recommends amongst others that Monetary policies should be used to create a favorable movement investment climate by facilitating the emergency of market-based interest rate and exchange rate regimes that attract both domestic and foreign investments, create jobs, promote non-oil export and revive industries that are currently operation far below installed capacity

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 uses a bounds test approach based on unrestricted error correction model (UECM) was employed here to estimate the relationship between Future Financing and Investment in Nigeria

The major advantage of this approach is based on the fact that it can be applied irrespective of whether the variables are I (0) or I (1). This approach also allows for the model to take a sufficient number of lags to capture the data generating process in a general-to-specific modelling framework. Whereas a dynamic error correction model (ECM) can be derived from ARDL through a simple linear transformation, The bounds test procedure is merely based on an

estimate of unrestricted error correction model (UECM) using ordinary least squares estimator. Tang (2003) argues that the UECM is a simple re-parameterization of a general ARDL model. The ARDL model is stated as:

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

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

$$\Delta RGDP_t = \alpha_0 + \sum \gamma_i \Delta RGDP_{t-i} + \sum \gamma_i \Delta MS_{t-i} + \sum \beta_i \Delta INF_{t-i} + \sum \beta_i \Delta INTR_{t-i} + \theta_1 ECT_t + \mu_{it} \dots \dots (3.4)$$

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

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 approach relies on I(0),I(1) or a combination of both, it is important to first determine the time-series properties of individual variable that enter equation (3.3). This is done to know whether the variables are integrated of order zero or one or even more. Given that unit root testing procedures have their own limitations. Two unit root tests were considered for this research. These are the non-parametric Philip-Perron (PP) test proposed by Phillips and Perron (1988) and the popular Augmented Dickey-Fuller (ADF) unit root test. Both the ADF and the PP test the null hypothesis that the series have unit root (variables not 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 growth of the economy proxied by Real GDP and monetary policy variables in table 1 are tested for stationarity so as to avert inconsistencies which could have arisen owing to spurious results emanating from non-stationary data used for regression. The result shows that all the variables are integrated of order one, I (1) implying that all the variables are stationary at first difference, The summary of these results is shown in table 2

From table 2, the ADF statistic of all the series are more negative than their 5 percent critical values at first difference and are therefore said to be integrated of order one. The researchers therefore tests for cointegration of the variables in each of the models in the system of the equations. According to Engel and Granger, if a linear combination of the series is integrated of order zero, we say that the model is cointegrated. Thus, we subject U_{ts} to unit root analysis for all the models and found it is stationary at the level. The result of the cointegration test for interest rate model is therefore presented in table 3 while that of other models of the system of the equations are presented in the appendix.

Having found that all the models are cointegrated, we resort to employing error correction model for assessing the system of equations under the Two Stage Least Square Method. The interest model is presented in table 4.

Table 4 shows that cash reserve ratio and monetary policy ratio exert negative and insignificant impact on interest rate while exchange rate and treasury bill rate are positively and insignificantly related to interest rate. The results suggest that cash reserve ratio and monetary policy rate can be used to engender a fall in the general interest rate to increase the volume of investment. While exchange rate and treasury bill rates can be used for increasing the general interest rate and mopping-up liquidity and consequently pruning the level of investment. However, the rate at which the monetary policy operation exerts on the general interest rate is insignificant. The researcher examined the second equation, where investment is a function of interest rate, savings and real GDP and presented the result.

Table 5 shows that investment reinforces itself and that the higher the interest rate, the lower the investment. In other words, interest rate has an inverse relationship with investment. That is to say that investment is a negative function of interest rate. Real GDP and Savings are positively related to investment. However, the rate at which each of these variables exert impact on investment is insignificant.

However, since the real GDP is not a truly exogenous variable, to avert a simultaneous equation bias, the real GDP as function of investment is determined and presented.

Table 6 shows that Real GDP significantly reinforces itself. While investment, savings and interest rate are positively and insignificantly related to Real GDP. Thus, Real GDP is a positive and insignificant function of investment in Nigeria. Having determine the inter relationship of monetary policy instruments, general interest rate, investment and the Real GDP, the researcher stated and estimated the reduced-form equation specified earlier 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	2.484906665	8.85332537	3.727022	2.251292	10.66715	1.93296964	2.827314	4.834956	7.898615
2008	2.484906665	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(LOGINRATE(-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(LOGINRATE(-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 reduced-form equation analyzed and presented in table 5 suggests that cash reserve ratio (CRR) and monetary policy rate (MPR) exert insignificant effect on Real GDP. Treasury bill rate (TBR) and exchange rate as well are positive but insignificant to the real growth of the economy.

Cash reserve ratio and monetary policy ratio exert negative and insignificant impact on interest rate which is found to have an inverse relationship with investment. The results suggest that cash reserve ratio and monetary policy rate can be used to engender a fall in the general interest rate to increase the volume of investment which is synonymous with increase in the real growth of the economy (RGDP). The growth of the economy, is found to be a positive function of savings and investment meaning that the higher the investment and savings, the higher the growth of the economy.

On the other hand, exchange rate and treasury bill rate are positively and insignificantly related to interest rate suggesting that exchange rate and treasury bill rates can be used for increasing the general interest rate and mopping-up liquidity and consequently pruning the level of investment and the growth of the economy.

These pairs of policy options can be used to fine-tune the growth of Nigerian economy if their active potency can be assured and intensified.

5. Conclusion

This paper revealed that cash reserve ratio and monetary policy rate were found to have an insignificant impact on real GDP. Although treasury bills rate and exchange rate displayed positive influences on economic growth, these were also insignificant. cash reserve ratio and

monetary policy rate negatively impacted interest rates, revealing an inverse relationship with investment levels. The results indicate that cash reserve ratio and monetary policy rate could potentially lower general interest rates, thereby boosting investment and enhancing Real GDP growth. Economic growth was shown to be positively correlated with savings and investment, suggesting that higher levels of both drive growth. Conversely, the exchange rate and treasury bill rate were positively but insignificantly related to 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

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