



NEXUS OF MONETARY POLICY AND ECONOMIC GROWTH IN NIGERIA

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Abstract

This missing link in transmission mechanism calls for a system of equation which constitutes gap for proper model building. The study examines the nexus of monetary policy and economic growth in Nigeria using secondary data sourced from CBN statistical bulletin from 1981 to 2022. Two stage least square (2SLS) model was adopted to analyze the responses of monetary policy tools such as monetary policy rate, treasury bills exchange rate, cash reserve ratio, etc. The results of indicates that Monetary Policy Rate (MPR) exert inverse and insignificant effect on Real GDP, Cash Reserve Ratio (CRR), Treasury Bill Rate (TBR) and exchange rate as well are positive but insignificant to the real GDP of the economy. This study suggests a prudent management and administration instruments of monetary policy in order to impact significantly on the general interest rate which has inverse rate which has relationship on investment that positively impact significantly on the real growth of the economy.

Keywords: *Cash Reserve Ratio (CRR), Monetary Policy Rate (MPR), Real GDP, Transmission Mechanism, Treasury Bill Rate (TBR).*

1. INTRODUCTION

Government most important roles is regulating and ensuring the stability of the economy which entails high rate employment, inflation control, and equilibrium balance of payments and so on (Falade&Folorunso, 2015). The government has two major means of achieving these, namely through fiscal policy changes or through monetary policy changes. Fiscal policy is broadly defined as the relation between what the government spends and what it receives in tax revenues. Monetary policies on the other hand are measures or deliberate changes in government policy on money supply and credit instrument in response to changes in macroeconomic condition in order to stabilize the economy. Muhammad (2023) noted that monetary policy part of government conscious measure and strategies to welfare and create enabling environment for economic development. Monetary policy connects financial markets and credit supply, and other financial instruments. Economic theory suggests that Investment is based on the rate of interest (r), savings



(s) in a non-classical system and also on the income proxied by the real GDP which also is influenced by investment level as well. It consists credit and financial policy, use of money supply and rate of interest to manipulate the level of income, aggregate price level and, employment and balance of payments (Falade & Folorunso, 2015).

Monetary policy actually is an important tool in the hand of policy makers and monetary authority in ensuring stable domestic prices plus exchange rate stability. It remains a vital tool for achieving sustainable development vision of the country. Monetary policy has a major objective stabilization of economic variables and acceleration growth of the economy. The federal government has applied a variety of monetary policies via Central Bank of Nigeria since independence to enhance economic growth and sustain such growth. For instance, the Anchor Borrowers' Program was introduced in Nigeria by the Central Bank of Nigeria (CBN) in November 2015. This program was launched as a way to provide support to smallholder farmers by giving them access to credit facilities for agricultural production. The program aimed to improve agricultural productivity, reduce food imports, and promote economic growth in the agricultural sector. Under the Anchor Borrowers' Program, farmers were provided with inputs such as seeds, fertilizers, and other resources and they would repay the loans with their harvests. The focus of the program was initially on crops like rice and wheat. Also in September 15, 2015, Treasury Single Account (TSA) was introduced in Nigeria. The policy was implemented by the Nigerian government as a means to consolidate all government funds and resources into a single account maintained by the Central Bank of Nigeria (CBN). This initiative was intended to enhance transparency, improve financial management, and prevent leakages of government funds by ensuring that all government revenues and receipts were channeled through a unified system. The TSA was part of the government's efforts to promote fiscal discipline and accountability in public finance management.

In response to the economic challenges posed by the COVID-19 pandemic, the CBN introduced various measures, including loan moratoriums, regulatory forbearance, and stimulus packages to support businesses and individuals. In March 2019, the Monetary Policy Committee (MPC) of the CBN announced a reduction in the Monetary Policy Rate (MPR) from 14.00% to 13.50%. The MPR is the benchmark interest rate that influences lending and borrowing rates in the economy. In January 2020, the CBN reduced the MPR further from 13.50% to 12.50%. This move was made before the full impact of the COVID-19 pandemic was felt. In response to the economic challenges posed by the COVID-19 pandemic, the CBN reduced the MPR from 12.50% to 11.50% in March till March 2020. The goal was to stimulate economic activity and provide support to businesses and households affected by the pandemic. It maintained 11.5% till July 19th 2022 when it was increase to 14.0%.it was further increased to 15.5 and 17.5 in September and November respectively. In May 2023, MPR was raise to 18.5% (CBN, monetary policy decisions,2023).

Most specified economy growth models assert that monetary policy is capable of pushing the interest rates higher or lower through the interaction of supply and demand in the capital market. Also from economic theory, investment is a function of rate interest (r), savings (s) in a non-classical system and also on the level of income proxied by real GDP which is also influenced by investment as well. Most studies like (Vinayagathan, 2013; Ayodeji & Oluwele, 2018; Idris, 2019) modeled economic growth as a direct function of monetary policy variables notwithstanding their transmission channels. Thereby ignoring the proper channels that form a system of equation through which monetary policy transmits to impact growth of the economy. This neglect of the



right transmission mechanism has generated biased results because monetary policy can not affect economic growth without passing through investment which is influenced by the interest rate.

This missing link in transmission mechanism calls for a system of equation which constitutes gap for proper model building. The filling of this gap using a system of equation incites this study. Thus, the study examines the nexus of monetary policy and economic growth in Nigeria using secondary data sourced from CBN statistical bulletin from 1981 to 2022.

2. LITERATURE REVIEW

2.1 The Keynesian Framework and Analysis (Keynes, 1936)

Monetary policy performs crucial functions in stimulating economic activity according to Keynesian analysis. It argues that money supply variations might constantly change variables like aggregate demand, real interest rate, employment, income and output. Keynes upholds the reality of equilibrium in unemployment. This suggests a condition where increase in money supply brings about constant and sustained increase in output level (Jhingan, 1997). According to Keynes, money is non-neutral because in the presence of unemployment, variations in money supply can cause alterations in the real macroeconomic variables of the economy. Keynes disagreed with quantity theorists fronted a direct link between quantity of money and prices. Keynes proposed that the reverse is the case in such that there exist non-proportional effect of a change in the quantity of money on prices.

Keynes observed that theory of value and the theory of money and prices divided economics into two sections that has no link to each other. The dichotomy stuck between the relative price level (as obtained through goods demand and supply) as well as the absolute price level (as obtained through money demand and supply) occurs due to classical monetary economists' failure to combine value theory with monetary theory. As a result, money supply changes influence only the absolute price level and exert no effect on the price of goods and services (Okpara, 2010).

Keynes rejects the postulation of perfect competition in the labour market and believes that monopolistic tendencies in the labour market reduce flexibility as proposed by the classical school of thought. The theory maintained that the wage rate is rigid downwards. Workers are not interested on the money value of the wage they received but on what the wage can purchase in the market. This is because the market price level is determined in various labour markets; therefore, it is impossible for workers to bargain the price level but can only bargain for money wage. In the fixed explanation of this Keynesian model, money wage is fixed and exogenous to the model. It gives explanation of the institutional dynamics and history. Thus, the supply of labour is within limits, absolutely elastic through current money wage rate (Levacic & Rebman, 1982).

In the classical system, saving and consumption are determined by interest rate, Keynes argues that the role of interest rate is to allocate savings between idle balances and loanable funds; tie recognizes the theoretical value of the theory of loanable funds but pointed out that extension of the theory to saving-investment equality is a fallacy. It is not necessarily true that all saving will be directly invested or placed in the market and does not imply equilibrium of savings and investment. In the absence of the rate of interest, individuals will hold their savings in the most liquid form. Hence the interest rate is the best offered to individuals to part with their liquidity



(Ajayi&Ojo, 1981). To Keynes, the supply of and demand for money collectively determines the nominal interest rate. Goods and money markets are linked together by the rate of interest.

Assumption of price rigidity is the base of Keynesian theory; it also assumes that velocity of money is unstable over time and that the quantity of money adjusts speedily. In Keynesian Liquidity preference theory, inserts income and interest rates as independent variables while money demand is dependent variable (Belke&Polleit, 2009). This is shown below:

$$M = k_1(Y) + k_2(i) \dots\dots\dots (1)$$

Where M = quantity of money demanded, Y= income while i is interest rate. k_1 mean transactional and precautionary motive of holding money while k_2 conveys the speculative motive of holding money (Keynes, 1936). The three motives simultaneously, mutually and independently influence liquidity preference of households. He concluded that demand for money has positive relationship with income (y) and negative with interest rate(i).

3.2 Keynesian Monetary Analysis: Transmission Mechanism

The transmission mechanism links monetary forces and real expenditure flows. It works from a variation in bond prices and rate of interest, to variation in investment expenditure, to movement in the aggregate demand curve. Keynes having established less than full employment equilibrium is able to pull together some macro-models to advance his monetary analysis.

The increase in supply of money creates surplus money which invariably leads to excess or surplus affinity for bonds. A rise in the bond prices leads to a fall interest rates (Okpara, 2010). In the Keynesians views, interest rate stimulates rise in the short-term nominal interest as individual investors take actions that arbitrages away high in risk adjusted and expected returns on debt instruments with several maturities, which is explained by the prospect hypothesis of the structure. When nominal prices are sluggish to amend, these changes in nominal interest rates transforms to changes in real interest rates as well. Firms real cost of acquiring loans has increased, red on their investment spending. Also households that faces high real borrowing costs reduce purchase, total output or production and employment falls. This mechanism is the base of the early IS-LM model as originally proposed by Hicks (1980). The IS curve is the locus point showing the various combinations of interest rates and incomes at which savings is equal to investment and equality of aggregate supply and aggregate demand (Ohale & Onyema, 2002).

Taylor (1995) conducted studies on interest rate conduits or channels; the study observed a strong indication of significant interest rate impacts on consumption and investment spending. A decrease in rate Interest exerts three effects; capital cost effect, wealth effect and credit rationing effect. The wealth effect show that a decline in interest rate enhances the market value of individual wealth and stimulates consumption and multiplier effect increases investment and output. The cost of capital effect shows that given the negative relationship between rate of interest and investment, rise in investment leads to excess demand for goods to rise, then a rise in the general level of price, this increase general price level lowers the real wage which stimulates the demand for labour to increase. Increase in demand for labour which is tantamount to increase in employment on resources triggers increase in real output. This is the core of Keynesian transmission mechanism.



Monetary policy mechanism of transmission operates via effects of exchange rate on net exports. It gives serious concern for central banks in a country that is export-oriented. This mechanism works aggregate demand and aggregate supply effects on exchange rate. Taking the demand side, an expansion of monetary facilities lowers the internal real interest rate, which via the external interest parity condition yields real reduction of the home country's currency. This sequentially triggers net exports to increase further and more increase in aggregate demand (Obsterfeld&Rogoff, 1995). Taking the supply side, depreciation resulting from increase in monetary facilities causes domestic prices of goods imported to increase, and directly increasing inflation.

On equity price channel, Tobin's q Theory gives the process which monetary policy influences economies via affecting the value of equities (Tobin, 1965). Tobin's q is the market value of enterprises divided by the substitution capital cost. The core of this dialogue is that there is a link between Tobin's q and Investment expenditure. Then how can monetary policy influence stock prices? Somewhat simple, expansionary monetary policy raises the quantity of money available to the public which actually increase spending. Such public spending includes the stock market, thus increasing stock market demand and accordingly increasing stock price. This invariably results to a decrease in interest rates making bonds less attractive in relation to equities, since it increases equities. Joining this with the reality that increase in stock price (P) will lead to an increase equities (q) thus increase in investment expenditure (I) which leads to increase in output(Y).

3.4 Review of Empirical Literature

There is plethora of empirical studies on monetary policy and economic growth although these studies have mixed findings. A number of these studies are country-specific and others are cross-country. Literatures in emerging economies prove that monetary policy has little or no significant effects on economic variables. Ganey *et al.* (2002) applied granger causality to study the monetary shock effects in ten selected Central and Eastern European (CEE) countries. They further applied generalized Impulse Responses which revealed no evidence that fluctuation in exchange rates affect output while interest rate shows no significant effect on monetary policy. Likewise, Starr (2005) used structural VAR and observed inconsistent result with experimental findings from various data in different countries. Hameed *et al* (2012) presented how monetary authorities affect macro-indicators like inflation, money supply, interest rates exchange rate and GDP through OLS method. He revealed that a tight monetary policy impact significantly and negatively on output, implying that money supply increase exerts positive effects on inflation and negative on productivity.

Davoodi *et al.* (2013) adopted monthly data in their analysis which were based on three alternate Structural VARs within the East African Community. Observations of the study when standard statistical inferences were used, MTM have a propensity to be weak. However, it was found to be stronger after non-standard inference technique was employed. Specifically, positive shock increases productivity extensively in Uganda, Burundi and Rwanda. They further revealed that negative shock to monetary policy rate also increases output in Kenya and Rwanda. Vinayagathan (2013) adopted data from 1978 to 2011 in Sri Lanka; he employed a seven-variable structural VAR model to analyze the impacts monetary policy impact on real economy. The study revealed that in line with theory, shocks in interest rate shows significant impact on



productivity or output. It was also observed that positive money shock has significant impact on the output although the results were inconsistent. There was decline in output instead of increasing

In the same spirit, Ayodeji and Oluwele (2018) developed a model how monetary policy can affect economic growth in Nigeria through a multiple regression. They conducted stationarity test and employed error correction so as to have a parsimonious result. Their analysis revealed that exchange rate and M2 have positive but influence on economic growth but the result was statistically insignificant, although liquidity ratio shows negative and significant influence on economic growth.

Idris (2019) used time series data covering the period of 1980 to 2017 and established the connection existing between monetary policy and economic growth in Nigeria. The study applied static model which indicate existence of long run relationship between variables of monetary policy and economic growth. Additional findings revealed that money supply exerts increasing effect on economic growth, while interest rate, exchange rate both has negative effects on real GDP. As such, monetary authorities in Nigeria have to manage and monitored rate of growth of money supply adequately so as to realize the desired growth level. Interestingly, Okey, Rimamtanung, Malachy and Ifere (2022) employed two stage least square to empirically evaluate the impact of monetary policy on economic growth, the monetary policy, variables used include broad money supply, cash reserve ratio, credit to private sector, and interest rate, real exchange rate, inflation rate. Data source from national statistical bulletin from 2006 to 2021. The result proved that monetary policy negatively affect economic growth significantly, Real Exchange Rate showed inverse relationship with on economic growth they concluded that monetary policy significantly affects economic growth in Nigeria.

Muhammad (2023) used credit to private sector represent monetary policy in exploring the impact of monetary policy on economic growth in 186 countries of the world. The main purpose of the study was to examine state intervention on fund accessibility after the Covid-19. Data collected were subjected panel least square and the findings of the study reveal that credit to private sector and foreign debt increased the infrastructural investment, which invariably influenced growth of gross domestic product.

3.5 Research Gap

Following the literatures reviewed on the monetary policy and economic growth, it is clear that the link is still ambiguous, and seems to be unique to specific country under investigation, the methodology applied and monetary policy variables adopted. The majority of studies relied on ordinary least square or Vector Auto Regressive (VAR) as analytical framework but the challenge with these methods is there are some imposed results restrictions, and this may impede good inference mostly for developing economies. It is also observable that most of these studies employed the ordinary least square technique and error correction model. It is also evident that most of the studies reviewed made use of interest rate, inflation rate, money supply and exchange rate as monetary policy instruments. This is quite misleading because the above variables are target variables of monetary policy and should not be used as monetary policy instruments. Although Okey *et al.* (2022) employed two stage least square, yet the study adopted money supply, inflation rate, interest rate as part of monetary policy variables.

This present study makes three significant contributions: firstly, employing the advanced technique; Two Stage Least Squared Method (2SLS) approaches in an effort to ascertain the influences of monetary policy variables on economic growth in Nigeria. (ii) To the best of our knowledge, this study may be one of the scholarly masterpiece to study in detail the transmission channel between monetary policy and economic growth of Nigeria which used this appropriate methodology (iii) adopting key monetary policy instruments which include Reserve requirement (RR), Treasury Bills (TBR), monetary policy rate (MPR) and Exchange Rate (EXR) in a bid to achieve the set out objectives of the study.

3. METHODOLOGY

3.1 Sources of Data

This study use time series secondary data sourced from Central Bank of Nigeria statistical bulletin (2022). The study span from 1981 to 2022, covering forty-one years.

3.2 Specification of the Model

Monetary policy serves as a guide to the apex bank in her effort to achieve the macroeconomic objectives such as low rate of inflation, stability in prices of goods and services, sustained increase in aggregate income and full employment. On considering the channels or mechanisms by which monetary policy operates, it observable that monetary policy is a vital tool that influences the entire economy through interest rates which directly affect the forces of supply and demand in the specific markets for lending and borrowing, and the nature of this interaction will determine the level of investment which now have direct impact on economic growth.

This link is specified in a functional relationship as follows.

$$r = f(CRR, TBR, MPR, EXR) \quad (2)$$

Explicitly, Equation (1) is expressed as:

$$r = \alpha_0 + \alpha_1 CRR + \alpha_2 TBR + \alpha_3 MPR + \alpha_4 EXR + \mu_{1t} \dots \dots \dots (3)$$

We know from the economic theory that Investment is a function of the rate of interest (r), and savings (S) in a non-classical system and also on the level of income proxied by the real GDP which on the other hand is influenced by investment level as well. Thus, the investment function is stated as followed.

$$I = f(r, S, RGDP) \dots \dots \dots (4)$$

This can be explicitly expressed as:

$$I = \beta_0 + \beta_1 r + \beta_2 S + \beta_3 RGDP + \mu_{2t} \dots \dots \dots (5)$$

While the real GDP is not truly exogenous as it is by itself determined by investment. In view of this, the real GDP-Investment model is stated as follows:

$$RGDP = f(I) \dots \dots \dots (6)$$

This can be expressed explicitly as:

$$RGDP = \lambda_0 + \lambda_1 I + \mu_{3t} \dots \dots \dots (7)$$

The three equations indicating that monetary policies have an effect on the larger economy, by impacting interest rate while changes in interest rate leads to changes in investment which further leads to variation in real Gross Domestic Product, form a system of structural equation which

cannot be solved as a single equation model but can be solved using simultaneous equation Technique.

The systems of the equations are stated in explicit form as follows.

$$r = \alpha_0 + \alpha_1 CRR + \alpha_2 TBR + \alpha_3 MPR + \alpha_4 EXR + \mu_{1t} \dots\dots\dots (8)$$

$$I = \beta_0 + \beta_1 r + \beta_2 S + \beta_3 RGDP + \mu_{2t} \dots\dots\dots (9)$$

$$RGDP = \lambda_0 + \lambda_1 I + \mu_{3t} \dots\dots\dots (10)$$

To evaluate the system, we first of all examine the identification condition of the models using the rank condition for identification so as to be guided on the most appropriate econometric estimation technique to be used for the estimation and evaluation of the system of the simultaneous equation. Identification determines basically the choice techniques by which the model will be econometrically determined.

3.3 Order Condition for Identification.

Let Q be the total number of endogenous variables

K = the total number of the Model variables

W = numeral of variables, (both endogenous and exogenous) in a particular equation.

We can write the order condition for identification symbolically thus;

$$K - W \geq Q - 1$$

This in other words could be said that the excluded variables should be equal or greater than the total number of equations less one.

$$\text{Thus, } 9 - 5 > 3 - 1 \quad \text{or} \quad 4 > 2$$

$$9 - 4 > 3 - 1 \quad 5 > 2$$

$$9 - 2 > 3 - 1 \quad 7 > 2$$

By the order condition for identification the system of the equations are over-identified and estimation can be done through Two Stage Least Squared Method (2SLS). The values of interest rate were substituted for investment and then perform the RGDP reduced form regression.

$$I = \beta_0 + \beta_1 (\alpha_0 + \alpha_1 CRR + \alpha_2 TBR + \alpha_3 MPR + \alpha_4 EXR + \mu_{1t}) + \beta_2 S + \beta_3 RGDP + \mu_{2t} \dots\dots\dots (11)$$

We can now obtain the reduced form value of the endogenous variable of RGDP as follows:

$$RGDP = \lambda_0 + \lambda_1 \{ \beta_0 + \beta_1 (\alpha_0 + \alpha_1 CRR + \alpha_2 TBR + \alpha_3 MPR + \alpha_4 EXR + \mu_{1t}) + \beta_2 S + \beta_3 RGDP + \mu_{2t} \} + \mu_{3t} \dots\dots\dots (12a)$$

$$RGDP = \lambda_0 + \lambda_1 \beta_0 + \lambda_1 \beta_1 \alpha_0 + \lambda_1 \beta_1 \alpha_1 CRR + \lambda_1 \beta_1 \alpha_2 TBR + \lambda_1 \beta_1 \alpha_3 MPR + \lambda_1 \beta_1 \alpha_4 EXR + \lambda_1 \beta_1 \mu_{1t} + \lambda_1 \beta_2 S + \lambda_1 \beta_3 RGDP + \lambda_1 \mu_{2t} + \mu_{3t} \dots\dots\dots (12b)$$

$$(RGDP - \lambda_1 \beta_3 RGDP) = \lambda_0 + \lambda_1 \beta_0 + \lambda_1 \beta_1 \alpha_0 + \lambda_1 \beta_1 \alpha_1 CRR + \lambda_1 \beta_1 \alpha_2 TBR + \lambda_1 \beta_1 \alpha_3 MPR + \lambda_1 \beta_1 \alpha_4 EXR + \lambda_1 \beta_1 \mu_{1t} + \lambda_1 \beta_2 S + \lambda_1 \mu_{2t} + \mu_{3t} \dots\dots\dots (12c)$$

$$RGDP = \frac{\lambda_0 + \lambda_1 \beta_0 + \lambda_1 \beta_1 \alpha_0}{1 - \lambda_1 \beta_3} + \frac{\lambda_1 \beta_1 \alpha_1 CRR}{1 - \lambda_1 \beta_3} + \frac{\lambda_1 \beta_1 \alpha_2 TBR}{1 - \lambda_1 \beta_3} + \frac{\lambda_1 \beta_1 \alpha_3 MPR}{1 - \lambda_1 \beta_3} + \frac{\lambda_1 \beta_1 \alpha_4 EXR}{1 - \lambda_1 \beta_3} + \frac{\lambda_1 \beta_2 S}{1 - \lambda_1 \beta_3} + \frac{\lambda_1 \beta_1 \mu_{1t} + \lambda_1 \mu_{2t} + \mu_{3t}}{1 - \lambda_1 \beta_3} \dots\dots\dots (12d)$$

Thus, the reduced-form is

$$RGDP = \pi_0 + \pi_1 CRR + \pi_2 TBR + \pi_3 MPR + \pi_4 EXR + \pi_5 S + v_t \dots\dots\dots (13)$$

This reduced-form parameters measure the total effect, direct effect and indirect effect of a variations in the independent variables on the endogenous variables considering the joint interdependences of the endogenous variables. On the other hands, structural coefficients show only the direct effect within a single part of the endogenous variable. It is important to state clear that savings is added in the model as a control variable so as to avoid error omission.

4. RESULTS AND DISCUSSIONS

4.1 The Unit Root Test Result

In the direction of avoiding inconsistencies of regression results, we relied on Augmented Dickey Fuller (ADF) unit root test to establish the stationarity properties of the variables included in the models. The summary of unit root tests results is below.

Table 1. Augmented Dickey-Fuller Unit Root Test

| | Lag | ADFTest Statistic | | Critical Values | | Remarks |
|-----------|-----|-------------------|---------------|-----------------|---------------|------------|
| Variables | SCI | Level | 1st diff | 1% | 5% | |
| LOGRGDP | 2 | 0.284366 | - 3.437906 | -3.615588 | - 2.941145 | Stationary |
| LOGINVMT | 2 | 1.990376 | - 3.869537 | -3.615588 | - 2.941145 | Stationary |
| LOGMPR | 2 | -2.675586 | - 7.598097 | -3.615588 | - 2.941145 | Stationary |
| LOGCRR | 2 | 2.036578 | - 7.233896 | -3.615588 | - 2.941145 | Stationary |
| LOGLIQR | 2 | -1.986438 | - 7.030270 | -3.615588 | - 2.941145 | Stationary |
| LOGTRB | 2 | 0.517681 | -5.38545 | -3.615588 | - 2.941145 | Stationary |
| LOGINTR | 2 | 2.123876 | - 8.636867 | -3.615588 | - 2.941145 | Stationary |
| LOGEXR | 2 | -0.765490 | - 5.319718 | -3.615588 | - 2.941145 | Stationary |
| LOGSAV | 2 | -1.865435 | - 4.425479 | -3.615588 | - 2.941145 | Stationary |

Author's computation using eviews

From Table 1, the ADF statistic series are more negative than their 5 percent critical values at first difference and are said to be integrated of order one. The study therefore proceeds to test for long run relationship of the variables in each model in the system of the equations. The result of the cointegration test is therefore presented in Table 2 below. Having found that all the models are cointegrated, error correction model was employed for assessing the system of equations under the Two Stage Least Square Method. The interest model is shown in Table 3 as follows.



Table 2 Engle and Granger Test for cointegration

| SIC, maxlag Lag Length | Test critical values: | t-Statistic | Prob.* |
|------------------------|--|-------------|--------|
| 2 | 1% level-3.610453 5% level-2.938987 10% level-2.607932 | -4.767664 | 0.0004 |

Author's computation using eviews

Table 3: Dependent Variable: D(LOGINTR)

| 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 | 0.111315 | 0.880858 | 0.3852 |
| D(LOGMPR(-1)) | -0.344818 | 0.130740 | 1.378395 | 0.1200 |
| D(LOGTRB(-1)) | 0.180211 | 0.228878 | 1.378395 | 0.1779 |
| ECT(-1) | -0.539108 | 0.228878 | -2.355439 | 0.0250 |
| C | 0.002841 | 0.037750 | 0.075265 | 0.9405 |

Author's computation using eviews

Table 3 shows that cash reserve ratio and monetary policy ratio exert inverse and insignificant impact on interest rate while Treasury bill rate and exchange rate are positively and insignificantly related to interest rate; the error correction term (ect) is signed appropriately and significant indication that about 59% of movement into disequilibrium is corrected every period. We proceed to examine the second model, where investment influences interest rate, savings and real GDP and presented the result as follows.

4.2 Investment Function

Table 4: Dependent Variable: D(LOGINVESTMT)

| 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 |

Author's computation

Table 4 illustrates that investment strengthens itself and that higher interest rate, lowers investment. Real GDP and Savings are positively related to investment, the error correction term is appropriately signed and significant indication that about 16.8% of movement into disequilibrium is corrected every period. However, the rate at which each of these variables exerts impact on investment is insignificant. Since the real GDP is not truly exogenous, to avert a simultaneous equation bias, the real GDP as function of investment is determined as presented in Table 5 below.



4.3 Real GDP

Table 5: Dependent Variable: D(LOGRGDP)

| 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 |

Author's computation

Table 5 shows that Real GDP significantly reinforces itself. Also investment, savings and interest rate have positive relationship with Real GDP although the result is statistically insignificant. This implies that, 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, we stated and estimated the reduced-form equation specified earlier in table 6 below.

The reduced-form equation analyzed and presented in table 6 suggests that Cash Reserve Ratio (CRR), Treasury Bill Rate (TBR), monetary policy rate (MPR), exchange rate all exert positive but insignificant effect to the real growth of the economy.

Table 6: Dependent Variable: D(LOGRGDP)

| 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 |

Author's computation

4.4 Discussion of Findings

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 building liquidity and accordingly accelerating the level of investment.

However, the rate at which the monetary policy operation exerts on the general interest rate is insignificant. Also, Cash Reserve Ratio (CRR) and Monetary Policy Rate (MPR) exert positive and insignificant effect on Real GDP. This finding is in line with the study by Okey, Rimamtanung, Malachy and Ifere (2022) who observed that monetary policy negatively affect economic growth significantly. Treasury Bill Rate (TBR) and exchange rate as well are positive but insignificant to the real growth of the economy. With regards to the observation made on exchange rate, our



finding agrees with the work of Idris (2019) who found that exchange rate has negative effects on real GDP of the economy. The study further found a positive function of savings and investment implying that the higher the savings and investment, the higher the growth of the economy. These findings reveal that cash reserve ratio and monetary policy rate can be used to fine-tune the growth of Nigerian economy if their active potency can be prudently exploited, exchange rate and Treasury bill rate if well managed can be used to build excess liquidity in the economy.

5 CONCLUSIONS AND RECOMMENDATIONS

This study examined the nexus of monetary policy instruments and economic growth in Nigeria. Specifically, the study investigated the impact of Reserve requirement (RR), Treasury Bills (TBR), Monetary Policy Rate (TBR) and Exchange Rate (EXR) on real Gross Domestic Product in Nigeria and to find out if monetary policy is effective in driving economic growth using secondary data from 1981 to 2020. Findings of this includes Cash Reserve Ratio (CRR) and Monetary Policy Rate (MPR) exert inverse and insignificant effect on real GDP, Cash Reserve Ratio (CRR) and Treasury Bill Rate (TBR) and exchange rate as well are positive but insignificant to the real GDP of the economy, this implies that cash reserve ratio and monetary policy rate can engender a fall in the general interest rate to push up the volume of investment which is synonymous with increase in the real growth of the economy.

The study therefore, recommend that monetary authorities should prudently manage policy administration of the cash reserve ratio and monetary policy rate so as to make their impact significant on the general interest rate which has inverse rate which has relationship on investment that positively impact significantly on the real growth of the economy.

5.1 Contribution to Knowledge

This study contributes to economic knowledge and policy understanding in several important ways:

- i. Monetary Policy Implications:** It provides insight into the efficacy of monetary policy tools, specifically the cash reserve ratio and the monetary policy rate, in influencing interest rates. The finding suggests that by adjusting these policy instruments, central banks can influence interest rates, which, in turn, can impact investment and real economic growth.
- ii. Economic Growth and Investment:** The finding highlights the role of investment in driving economic growth (RGDP). It emphasizes that increasing investment is closely linked to economic expansion. Policymakers and economists can use this insight to focus on policies that stimulate investment for overall economic development.

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