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Article

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RE-EXAMINING MONEY MARKET AND ECONOMIC GROWTH NEXUS IN NIGERIA: A SVAR MODEL APPROACH

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Abstract

Money market and economic growth nexus has been debated in the literature. This paper therefore re-examines money market impact on economic growth in Nigeria using quarterly data from 2000Q1 to 2018Q4. It utilised the structural vector autoregressive (SVAR) model framework to generate the impulse responses, and variance decomposition of economic growth in Nigeria, resulting from shocks to treasury bills, prime lending rate, maximum lending rate, and money supply growth rate. The findings from the structural VAR model suggest that, while shocks to money supply growth, prime- and maximum lending rates have negative instantaneous impacts on economic growth, shocks to treasury bills rate has a positive instantaneous impact on output growth. This evidence will be useful to the monetary authorities to allow policy decisions to run its course before pronouncing a fresh one on the same issue. The development will also help to avoid policy inconsistency.

Keywords: Money Market, Economic Growth, Nigeria

JEL Classification Codes: A1, D53, E12.

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1.0 INTRODUCTION

The money market plays an important role in the mobilisation of financial resources for short-term investment through financial intermediation. Money market provides instruments for effective liquidity management and acts as the core source of raising short-term funds for lubricating economic activities in any nation. The market serves as the transmission channel of monetary policy for short-term instruments and anchors the entire term structure of interest rates. The market is crucial to the allocation of funds and the effective distribution of liquidity among financial institutions in the banking industry as well as for hedging of short-term risks. It plays a critical function in the credit appraisal system and in the large-value payments systems where transactions and obligations are fully settled. It is indeed worthy to state that the money market is a sub-set of the financial market that manages short-term lending, borrowing, buying and selling of securities with initial maturities of one year or less.

Prior to Nigeria's independence in 1960, there was no organised money market, as whatever existed was linked to the London-based money market. Thus, there was an urgent need to develop the Nigerian money market to stop the outflow of surplus funds into investment outlets in the London money and capital markets. Other factors included the need to have an effective and efficient market that would enhance monetary policy management and promote deposit money banks' (DMBs) portfolio management, as well as facilitate short-term capital mobilisation.

Due to deficits usually experienced in economic units in terms of financing, the money market's role becomes imperative. Thus, the money market functions by channeling short-term funds from the surplus economic units to the deficit economic units. In this respect, economic units with surplus funds can keep money balances for transaction motives in the form of currency or demand deposits to ensure that planned expenditures are achieved independently of cash receipts. However, holding these balances, involves a cost in the form of foregone interest. To reduce this cost, the spending units prefer to hold the required money balances for their everyday businesses. In addition, they complement these balances with money market instruments holding that can be easily converted into cash and at a relatively low cost with minimal price risk attributable to their short maturities (Nwosu and Hamman, 2008).

The Nigerian money market continues to develop, as new sophisticated financial instruments are designed to meet the growing demand for credit by investors, firms and governments. The money market is classified into two categories: the primary and secondary markets. The primary market is for the issuance of new debt instruments while the secondary market caters for previously issued instruments. The secondary market facilitates the sale of market instruments to interested buyers before their maturities (Afiemo, 2013).

Money market transactions play important role in the economic growth and development of Nigeria. It has continued to draw the attention of some policy makers and scholars in recent times. This is due largely to the fact that most of the previous research had focused on developments in the capital market, and not so much on the money market impact on economic growth in Nigeria.

Eze and Nera (2017); Etale and Ayanku (2017); and Kizito (2013), using annual data applied the Johansen co-integration, error correction model, Granger causality, and vector error correction model to investigate the money market impact on economic growth in Nigeria. Findings revealed that certificates of deposits and bankers' acceptances have significant impact on economic growth while the result for Treasury bills was inconclusive. This evidence is surprising as the sale or purchase of Treasury bills is expected to withdraw or inject more liquidity to ensure the safety of investors to help fund economic growth. This development points to the fact that although the Nigerian money market has experienced significant growth, both in terms of breadth of securities as well as the volume of trading since the liberalisation of the financial system from 1986, it still requires to be deepened further to

achieve the required vibrancy that is expected of a money market to contribute positively to output growth.

Gaining further hindsight from Nnanna and Dogo (1998), Fakiyesi and Akano (2005), Akinlo and Olufisayo, (2007), Edo and Ikelegbe (2014), the Nigerian money market has not performed at its optimum compared to money markets of developed economies. The market still witnesses operational inefficiency, low capital base, non-existence of efficient and cost-effective system for transferring ownership of securities in a repurchase transaction of the secondary money market, as well as the delay of payment to owners of securities in the same market.

Available data on total money market assets outstanding at end-December 2018 stood at ₦11,893.14 billion, representing a decrease of 1.9 per cent from ₦12,122.02 billion at end-December 2017. The development was attributed to the decrease in the Bankers' Acceptances and Nigerian Treasury Bills (NTBs) outstanding, due to the lower yield in the market. Government securities constituted 99.8 per cent of the total money market assets outstanding, while private sector securities (Commercial Paper and Bankers' Acceptances) accounted for the balance, (CBN, 2018).

Thus, this paper seeks to contribute to the frontiers of knowledge by examining how the Nigerian money market has been able to impact economic growth through the depth and broadness of the size of its instruments, particularly the treasury bill and lending rates. Therefore, the aim of this paper is to examine the impact of selected monetary variables in the money market on economic growth in Nigeria. This study would be conducted using quarterly data and adopts the structural vector autoregressive (SVAR) modelling framework.

The article is structured into five sections. Section two highlights the theoretical and empirical literature review, while section three contains the methodology and techniques of analysis adopted. Section four presents the analysis of various empirical investigations. Section five provides conclusion and policy implications of the findings.

2.0 THEORETICAL REVIEW AND EMPIRICAL LITERATURE REVIEW

2.1 Theoretical Review

The money market, which is a subset of the financial markets, deals in short-term securities. Financial markets provide services that are essential to a modern economy by facilitating trade, production and ultimately growth. In the market, providing finance through the sale and purchase of financial assets and instruments such as Treasury bills, among others, becomes important. Money market play a crucial role in making finance available for economic growth. In addition, the money market represents one of the major channels for the execution and transmission of monetary policy by enabling central banks to affect and regulate availability of liquidity in the economy through intervention in the financial system. Thus, the operations of the money market, engenders a more effective implementation of monetary policy (Ugoloni 2001).

Both the Keynesian monetary growth models and the Mackinnon and Shaw models support the supply-leading hypothesis. However, they differ markedly in the role of government and interest rates in the financial market. Keynes affirmed that there is a historical and natural tendency for real interest rates to rise above its full employment equilibrium level and that this should necessitate government intervention to reduce it and stimulate output growth. Tobin (1969) in the model of money and economic growth supports the growth-enhancing implication of low and regulated interest rates. He noted that since households have two assets - money and productive capital, the higher is the return on capital relative to money, the more capital households will hold relative to money. This produces a

higher capital/labour ratio and a higher labour productivity culminating in a higher economic growth. Therefore, by following the interest rate channel of monetary policy transmission mechanism (MPTM), the pace of economic growth increases when interest rate, which is the return on money, reduces.

In addition to the issue of MPTM, monetary policy is one of the available tools for macroeconomic management. It aims at controlling the growth of monetary aggregates and assists other policy tools to achieve macroeconomic goals of low inflation, balance of payments viability and sustainable output growth. It is generally agreed that money supply can be controlled by applying monetary policy in concert with other policy tools to enhance the achievement of overall macroeconomic objectives. The interface between financial markets, economic growth, and monetary policy is an important issue for central bankers. The deepening and integration of financial markets are imperatives in ensuring a smooth transmission of monetary policy impulses to the economy. Furthermore, monetary policy promotes an orderly development of financial markets as well as shapes the behaviour of market participants. Thus, the financial markets provide a useful channel for the implementation of monetary policy. An efficient and well-organised market will, therefore, enhance the speed of monetary policy transmission (Masha *et al.*, 2004).

In the section that follows, the issue of the quantity theory of money (QTM) is discussed to explain the importance of money as one of the variables of concern in the study. The QTM was developed by 19th century scholar such as Fisher (1911). Bodin (1957), a mid-16th century French social philosopher was one of the first thinkers to look at how growth in the supply of money affected price levels proportionately. Although, he did not develop any mathematical description or fully describe the mechanism at work, he laid the foundation that later writers built upon (Fisher, 1911). The sub-sections that follow examine the other versions of the QTM: the Cash Transaction (Fisher Version) and the Cambridge Cash Balance Approach.

2.2 Cash Transaction (Fisher Version)

Fisher (1911) expounded his famous equation of exchange in his book “the purchasing power of money”. Accordingly, QTM is the main determining factor of price level response to changes in money supply. Fisher stated that “there is a proportional change in the price level caused by a change in the quantity of money”; “other things remaining the same, as the quantity of money in circulation increases, price also increases in direct proportion and the value of money decreases and vice versa”.

Fisher explained his theory using the equation of exchange below:

$$MV = PT \tag{2.1}$$

M= Money supply

V = Velocity of money in circulation

P =Average price level

T = Volume of transactions which take place within the given period Fisher’s identity was based on the following assumptions:

- i. That the quantity of money is determined independent of other variables.
- ii. That the velocity of circulation is taken as constant.
- iii. That the volume of transaction is also considered constant.

Given the above assumptions, Fisher proposed that any change in the money supply (M) will be accompanied by a proportionally equal change in price level (P) as follows:

$$MV = PT \quad (2.2)$$

$$P = \frac{V}{T} * M \quad (2.3)$$

$$\text{Let } \frac{V}{T} = b \quad (2.4)$$

$$\text{Then, } P = bM \quad (2.5)$$

$$\Delta P = b\Delta M \quad (2.6)$$

$$\frac{\Delta P}{P} = \frac{b\Delta M}{b} * M \quad (2.7)$$

$$\text{Because } P = b * M \quad (2.8)$$

$$\frac{\Delta P}{P} = \Delta M / M \quad (2.9)$$

The above gives the equi-proportionate relationship between changes in price to changes in money supply.

2.3 The Cambridge Cash Balances Approach

The Cambridge cash balances theory (Alfred Marshal, A. C. Pigou and D. H. Robertson and J. M. Keynes) represents an alternative approach to the classical QTM. The Cambridge equation emphasises money demand rather than money supply. In the classical version, money is useful as a medium of exchange. On the other hand, the Cambridge approach views money as a store of value. In the argument of the Cambridge economists, not all money supply will be used for transaction purposes, rather a part could be held for precautionary motive. The portion that is cash is represented by k. Therefore, the demand for money (MD) depends on the national income (y). There is a direct proportionality between MD and y. Money balances refer to the amount of money people feel they need to hold which obviously increases as people's income increase (Gonzalez, 2009).

The Cambridge version of the quantity equation is expressed as follows:

$$MD = kY_n \quad (2.10)$$

where k is the cash that people desire to hold and Y equals nominal income which is the money value of the nation's output (PQ), i.e. the physical level of national output (Q) multiplied by the average price level (P) of the output.

$$\text{Thus } MD = kPQ \quad (2.11)$$

Assuming flexible interest rates and that the money market will clear, the demand for money will equal the supply of money so that $M_d = M_s$.

$$\text{Thus } M_s = kPQ \quad (2.12)$$

$$\text{and } P = \frac{M_s}{kQ} \quad (2.13)$$

The classical position was that k and Q were determined exogenously. With k and Q constant, the Cambridge equation also reduces to proportionality, the relationship between the price level and money stock. However, in the Keynesian IS-LM framework, Q is endogenised, as reflected in Aleem (2010), to ensure the relevance and appropriateness to the study.

2.4 Empirical Literature Review

In reviewing previous studies on the subject of discussion, works that focus on Sub-Saharan African economies were examined, before examining literature on Nigeria. Ogbuji, Ekundayo and Yasiru (2020) investigated the dynamic linkage between money market, capital market and economic growth in Ghana. The study used an autoregressive distributed lag (ARDL) model, with the periods 1991 to 2017. Findings revealed that in the money market, a lower monetary policy rate significantly enhanced short-run growth whereas a lesser treasury bills rate significantly drove the country's long-run economic growth. Whereas capital market indicators, such as total stock traded and market capitalisation enhanced short-run output growth positively and significantly. This implied that capital market, had a short-run impact on the Ghanaian economy, while money market, enhanced growth both in the short- and in the long-run. The conclusion was that the money market had greater impact on growth in Ghana than the capital market.

In the study on the role of the money market in economic development of Uganda, Karungi (2016) showed that a long-run relationship exists between the effects of Treasury bills on economic development in Uganda. The study adopted a qualitative case study research design. It was revealed that the ratio of broad money supply to GDP has a negative and significant impact on economic growth both in the short-run and in the long-run. The study also found out that real interest rate has a positive and significant impact on economic growth. Finally, whether short-run or long-run, physical capital has a positive and statistically significant impact on growth. This means that an increase (decrease) in physical capital increases (decreases) economic growth.

Odunga and Ayoyi (2016), analysed the impact of financial markets on the magnitude and direction of economic growth within East Africa. The study examined how the money markets, corporate and Government Bond markets, the stock markets impact on the growth of the economy within East Africa. The study was a systematic review of literature papers in the field of financial markets in East Africa. The findings showed that with better managed financial markets, the spillovers from direct foreign investment can influence great economic development in host countries. It recommended that Governments especially in less developed countries need to enhance and develop robust financial markets to realise the full potential of foreign direct investment.

There are divergent views on the relationship between money market and economic growth in Nigeria. Mordi (2010) reveals that financial intermediation from the surplus unit to the deficit unit promotes economic growth. Ajakaiye (2002) and Adebisi (2005) shared the same conclusion. Among other studies on Nigerian money market and its role in the economy is the one by Owoye and Onafawora (2007). Even though not directly, but tangential, they investigated the relationship between money supply (M_2), real money demand stability and effects of deviation of Nigerian economy since the introduction of the Structural Adjustment Programme (SAP) in 1986. Employing cointegration and vector error correction analysis to test the stability of the demand for real broad money (M_2) in Nigeria, they found that long-run relationship exists between M_2 , real GDP, inflation, domestic interest rate, foreign interest rate, and exchange rate expectations.

Agbada and Odejimi (2015) examine the relationship between money market operations and economic prospects in Nigeria, using multiple regression technique. Results suggest the existence of a significant linear connection between money market developments and growth in Nigeria.

Eze and Nera (2017) study the role of money market on economic development in Nigeria, by examining the link between different money market instruments and economic growth of the country. Treasury bills, treasury certificates, certificates of deposits and bankers' acceptance were used as proxies for money market instruments while GDP was used as a proxy for economic development using error correction model (ECM) technique. The results show that only certificates of deposits and bankers' acceptance have a significant impact on economic development and, thus, the authors suggest that treasury bills and treasury certificates should be "scrutinised and revitalized" in order to enhance the impact on economic growth. Etale and Ayunku (2017) found similar results, using ordinary least squares (OLS) and Granger causality test and recommends that the government should explore policies that would strengthen the market.

3.0 METHODOLOGY AND TECHNIQUES OF ANALYSIS

This paper utilises quarterly data on real gross domestic product (RGDP), government treasury bills (TBR), broad money supply (M2) and money market prime lending (PLR) and maximum lending (MLR) interest rates. The data for the variables were obtained from the database of the Central Bank of Nigeria (CBN), and sourced in their quarterly frequency, between 2000Q1 and 2018Q4. In addition, RGDP and M2 were transformed to their growth rates and renamed RGDPR and M2R, respectively. The choice of the variables used in the paper were in line with the works of Kizito (2013), Okpe (2013) and Ikpefan and Osabuohien (2012). Specifically, while RGDPR is used as a measure of economic growth, M2R, TBR, PLR, and MLR represent money market instruments. Accordingly, all five variables, RGDPR, M2R, TBR, PLR and MLR are measured in percentages.

3.1 Model Specification

3.1.1 *The Structural Vector Autoregression (SVAR) Model*

This study utilises the framework of a four-variable Structural Vector Autoregression (SVAR) in evaluating the relationship between money market instruments and economic growth in Nigeria. The SVAR model remains one of the most useful and flexible models for multivariate time series analysis. It is a system of equation, in which all its variables are endogenous. The SVAR is more applicable for analysing the dynamic behavior of economic and financial time series, as well as forecasting (Mordi, 2016). In this SVAR or a primitive system, all the variables in the model could have contemporaneous impacts on each other.

Equation 3.1 is an SVAR with four (4) endogenous variables: RGDPR, M2R, TBR and PLR.

$$A_0 Y_t = G_0 + \sum_{i=1}^p B_i Y_{t-i} + \varepsilon_t \quad (3.1)$$

Where Y_t is a 4x1 vector of endogenous variables, which includes the DRDPGR, M2R, DTBR and DPLR, A_0 is a 4x4 matrix of contemporaneous effects; G_0 is a 4x1 vector of constants; B_i is a 4x4 matrix of coefficients for lagged variables; and ε_t is a 4x1 vector of error terms. The vector of errors ε_t can be described as a structural innovation or structural shock with mean zero and serially uncorrelated. The optimal lag p is obtained using the Akaike Information Criterion (AIC).

Equation 3.1 cannot be estimated by ordinary least squares (OLS) technique due to simultaneity bias resulting from the presence of contemporaneous coefficients in the system. However, this problem can be circumvented with the transformation of Equation 3.1 into a VAR in standard (reduced) form, as presented by Equation 3.2.

$$Y_t = \sum_{i=1}^k A_i Y_{t-i} + \varepsilon_t \quad (3.2)$$

where:

Y_t is a $n \times 1$ column vector of observations at time t on all the variables in the model: DRDPGR, M2R, DTBR and DPLR. ε_t is a $n \times 1$ column vector of random disturbance values (or innovations), which may be contemporaneously correlated with one another but assumed to be non-autocorrelated over time. The A_i 's are $n \times n$ matrices of parameters, which are non-zero.

The first step to estimating the contemporaneous relationships among the variables in the SVAR model, therefore, is to first estimate the standard (or reduced form) VAR model (Equation 3.2), and imposing restrictions on the matrix of contemporaneous parameters A_0 , based on the $[n(n-1)/2]$ condition, and in line with a non-recursive approach to identification of the structural parameters in the VAR system.

The interest rate channel of monetary policy transmission mechanism focuses on how changes in short-term interest rates impacts on the real sector through its impact on the level of money supply. According to CBN (2011), a policy-induced increase in the short-term nominal interest rate leads first to an increase in long-term nominal interest rates, as investors act to arbitrage away differences in risk adjusted expected returns on debt instruments of various maturities. With a slow adjustment in nominal prices, real interest rates would rise, and this would reduce money supply. The implication would be a fall in aggregate output and employment. This idea forms the basis for the restrictions imposed on the matrix of contemporaneous parameters A_0 , which is of the form:

$$A_0 Y_t = \begin{bmatrix} 1 & NA & NA & NA \\ 0 & 1 & 0 & 0 \\ 0 & NA & 1 & NA \\ 0 & NA & 0 & 1 \end{bmatrix} \begin{bmatrix} DRGDPR \\ M2R \\ DTBR \\ DPLR \end{bmatrix} \quad (3.3)$$

The restriction imposed on the A_0 matrix in Equation 3.3 are informed by the following theoretical underpinnings:

- Real output growth is assumed to be influenced by broad money stock, treasury bill rate and prime lending rate. This intuition stems from the interest rate of monetary policy transmission mechanism which focuses on how changes in short-term interest rates impacts on the real sector through its impact on long-term interest rates as well as the level of money supply;
- Broad money is modelled to be contemporaneously exogenous, that is, broad money stock does not respond contemporaneously to disturbances in other macroeconomic variables in line with the Fisher's equation of exchange;
- In line with the credit channel of monetary policy transmission mechanism, broad money stock has contemporaneous impact on treasury bill rate and the prime lending rate;

- M2R and DPLR have contemporaneous impact on DTBR; and
- Only M2R has contemporaneous impact on DPLR.

Following the estimation of the specified model, the coefficients of the matrix of contemporaneous parameters were extracted and analysed to measure the relationship between money market rates and real economic growth in Nigeria.

3.1.2 Impulse Response and variance Decomposition Functions

The Impulse Response (IR) and Variance Decompositions (VD) of RGDP to shocks from the other endogenous variables were used, in this study, to evaluate the impact of PLR, TBR, and M2R on the growth of real GDP over a ten-period forecast horizon. This was done following a non-recurve ordering for identification of the structural parameters. Specifically, while the IR traced out the effect of the structural VAR shocks of the key money market instruments on economic growth over time, the VD helped to account for the relative importance of the structural VAR shocks of the money market instruments in the total variations in economic growth across the ten-period forecast horizon.

For robustness, DPLR was replaced with change in the maximum lending rate, and the impulse response and variance decomposition functions of DRGDPR, resulting from the structural VAR shocks of the money market instruments, were re-estimated and analysed. The goal was to assess the sensitivity of the relationship between DRGDPR and the selected money market instruments, to the choice of money market lending rate.

3.1.3 Pre-estimation and Diagnostic Tests

The estimation of most time series models requires that the variables of the models are stationary. Where the variables are not stationary, but are all integrated of order one, it is also important to verify whether there is a long-run relationship among the variables. This can be done using the Johansen test for co-integration. The absence of co-integration means the relationship can only be evaluated in the short-run. This would require estimating an unrestricted VAR model of the form specified in equation 3.2. The unit root tests were done in this study, using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests.

In addition, diagnostic tests, such as the Breusch-Godfrey autocorrelation LM and the Residual Heteroskedasticity tests, were conducted on the estimated model (Equation 3.2). Also, the characteristic roots of the model were confirmed to lie within the unit circle. These were done to enhance the reliability and confirm the stability of the model, and thereby show that appropriate and correct inferences can be drawn from the model.

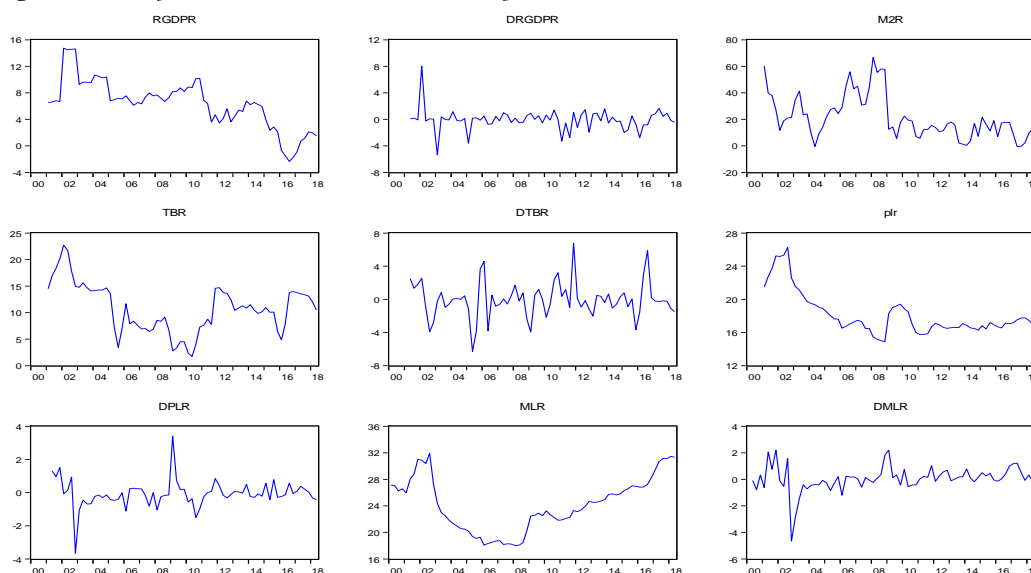
4.0 RESULTS AND ANALYSIS

4.1 Preliminary analysis

Figure 1.0 is the graphical presentation of the variables of the model. The result reveals a downward but gradual trend in the RGDP over the scope of the data. For most of the period, the economy maintained a positive but low growth, except during the period: 2016Q1 to 2017Q1, when the country entered a recession, thereby observing negative growth rates. The growth of money supply (M2R), which has experienced high fluctuations between 2001 and 2009, became relatively stable beyond 2009. In addition, M2R observed a growth during the period under review, except in 2017Q2 and 2017Q3 when it grew at -0.44 and -0.27, respectively. The chart of PLR reveals a downward trend up to 2011, beyond which it became relatively stable for the rest of the scope of the data. MLR appears to mimic movements in PLR up to 2011, beyond which it began a steady upward trend, as against the relative stability observed in PLR during the same period.

In terms of their unit root properties, while RGDP, TBR, PLR and MLR appear to be nonstationary, as they seem to deviate from their central path, M2R appears to be stationary. However, the respective first differences of RGDP, TBR, PLR and MLR, labelled as DRGDPR, DTBR, DPLR and DMLR, respectively, appear to be stationary around constant means.

Figure 1.0: Plot of Macroeconomic Variables used in the study



Source: Author's computation.

4.2 Unit Root Tests

Table 1.0 presents the results of the unit root tests of the variables included in the study using the ADF and PP tests. This result supports the findings from the trend analysis, as it shows that, while M2R is stationary at level $I(0)$, RGDP growth, TBR, PLR and MLR are not stationary at levels but became stationary after first differencing, which implies that they are integrated of order one, $I(1)$. For this reason, the RGDP, TBR, PLR and MLR were transformed into their first differences and renamed DRGDPR, DTBR, DPLR and DMLR, respectively.

Table 1.0: Result of the Unit Root Tests

Variables	ADF		PP		Order of Integration
	Level	First Difference	Level	First Difference	
RGDPR	-1.5188	-8.3114	-1.6823	-8.3124*	I(1)
M2R	-3.3418**		-3.466**		I(0)
TBR	-2.803***	-6.9962*	-2.0690	-6.8871*	I(1)
PLR	-2.2215	-6.7019*	-1.8297	-6.7211*	I(1)
MLR	-0.9556	-6.0381	-0.9349	-6.1419*	I(1)

Note: *significant at 1%, **significant at 5%, ***significant at 10%,

Definitions of variables

RGDPR = Growth of real gross domestic product

TBR = Government treasury bills

M2R = Growth of broad money supply

PLR = Money market prime lending rate

MLR = Maximum lending rate

Source: Authors' Estimates

4.3 The Estimated Model

4.3.1 The Unrestricted VAR Model (Equation 3.2)

Equation 3.2 was estimated and evaluated for its stability before attempting to recover the structural parameters using the restrictions imposed on the matrix of contemporaneous parameters. The optimal lag length of one (1) was selected for the specified VAR, using the AIC, SIC and HQ criteria (see Table 1.1).

Table 1.1: Lag length selection criteria and Stability of the VAR

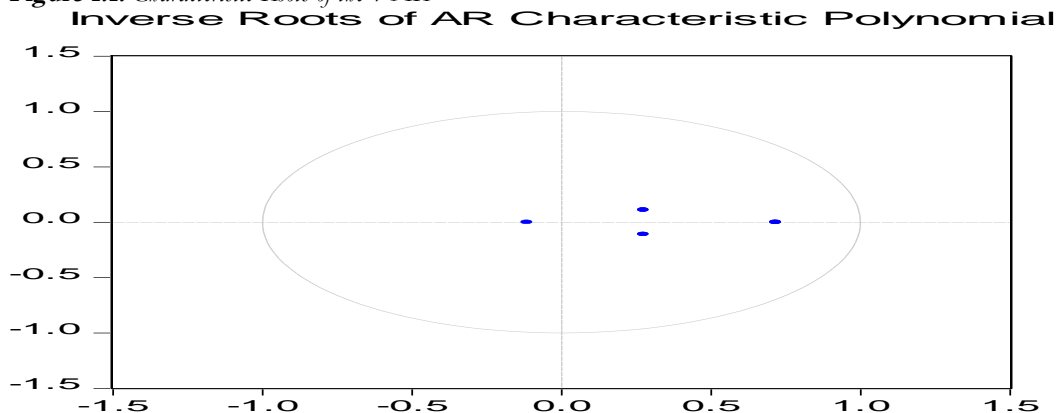
Lag	LogL	LR	FPE	AIC	SC	HQ
0	2.666024	NA	1.23e-05	0.042348	0.178420	0.095866
1	49.98715	87.13096*	4.54e-06*	-0.951973*	-0.271613*	-0.684384*
2	58.92834	15.32776	5.72e-06	-0.727884	0.496765	-0.246224
3	71.84066	20.49575	6.41e-06	-0.629862	1.139074	0.065869
4	86.26176	21.05938	6.95e-06	-0.579738	1.733486	0.330064
5	93.43431	9.563405	9.68e-06	-0.299502	2.558011	0.824372
6	106.2005	15.40053	1.16e-05	-0.196843	3.204959	1.141102

* indicates lag order selected by the criterion;

LR: sequential modified LR test statistic (each test at 5% level)

Source: Authors' Estimates

In addition, the estimated VAR model was stable, as its characteristic roots are found to lie within the unit circle (Figure 1.1).

Figure 1.1: Characteristic Roots of the VAR

Source: Authors' Estimates

4.3.2 Contemporaneous Coefficients from the SVAR

The result of the estimated structural parameters is presented in Table 1.2. This result reveals a negative and statistically significant relationship between money supply growth (M2R) and changes in economic growth. Here, a rise in M2R by one percentage point is expected to reduce DRGDPR by 0.05 percentage point. While the contemporaneous impact of changes in treasury bills rate (DTBR) on DRGDPR is positive, with a coefficient of 0.09. This result differs from Eze and Nera (2017); Etale and Ayanku (2017); and Kizito (2013) that are inconclusive. This is one of the main contributions to knowledge. Also, the impact of changes in prime lending rate (DPLR) on DRGDPR is negative, with a coefficient

of -0.21. However, the impacts of DTBR and DPLR on DRGDPR are both statistically insignificant as their respective p-values both lie above 0.05. Regardless of the insignificant coefficients, the negative impact of DPLR is suggestive of the growth inhibiting role of high cost of borrowing on investment growth, and, consequently, economic growth in Nigeria.

Furthermore, the impacts of M2R and DPLR on DTBR are both negative but statistically insignificant. The impact of M2R on DPLR is negative, with a coefficient of -0.34, and statistically significant. This is in line with expectations, as the increase in money supply growth would reduce the demand for loanable funds, leading to a fall in cost of borrowing.

The key findings from this result are that money supply growth appears to negatively impact economic growth in Nigeria. This result confirms the positions of Nnanna and Dogo (1998), Fakiyesi and Akano (2005), Akinlo and Olufisayo, (2007), Edo and Ikelegbe (2014). The result is counter-intuitive, as increase in money supply supposed to culminate into higher growth through increase in investment. However, it is an established fact that economic growth is not only driven by money supply but depends on other structural factors such as the level of infrastructural development of the country, investment climate, enabling macroeconomic policy and environment, among others. Increase in money supply growth is not translating to higher economic growth due to inhibitions caused by the huge infrastructural gaps (like roads, potable water, electricity, modern day security, among others). These conditions continue to undermine the role of money supply in achieving higher economic growth in the country.

Table 1.2: Results of the Contemporaneous Impacts in matrix form

$$A_0 Y_t = \begin{bmatrix} 1 & NA & NA & NA \\ 0 & 1 & 0 & 0 \\ 0 & NA & 1 & NA \\ 0 & NA & 0 & 1 \end{bmatrix} \begin{bmatrix} DRGDPR \\ M2R \\ DTBR \\ DPLR \end{bmatrix} = \begin{bmatrix} 1 & -0.05 & 0.09 & -0.21 \\ (0.02) & (0.08) & (0.22) \\ [-2.56] & [1.13] & [-0.94] \\ \{0.01\} & \{0.26\} & \{0.34\} \\ 1 & 0 & 0 \\ -0.002 & 1 & -0.01 \\ (0.03) & (0.35) \\ [-0.07] & [-0.04] \\ \{0.94\} & \{0.97\} \\ 0 & -0.34 & 0 & 1 \\ (0.01) \\ [-2.66] \\ \{0.01\} \end{bmatrix} \begin{bmatrix} DRGDPR \\ M2R \\ DTBR \\ DPLR \end{bmatrix}$$

Figures in parenthesis are the associated standard errors of the parameter estimates; figures in square brackets are the t-statistic; figures in curly brackets are the p-values.

Source: Authors' Estimates

Definitions of variables

RGDPR = Growth of real gross domestic product

TBR = Government treasury bills

M2R = Growth of broad money supply

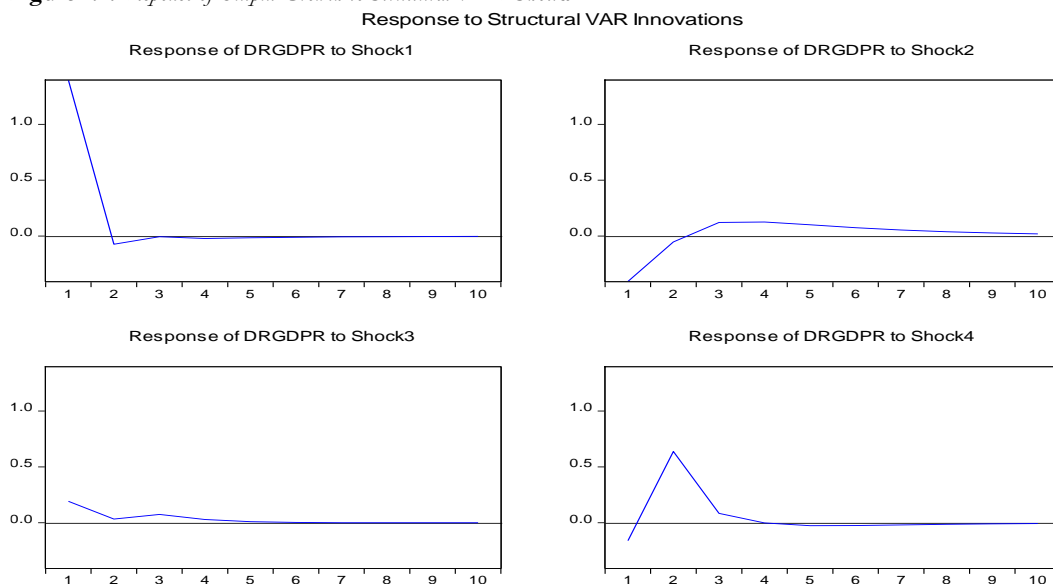
PLR = Money market prime lending rate

MLR = Maximum lending rate

4.3.3 Impulse Response Function

Figure 1.2 shows the impulse responses of DRGDPR to the structural shocks from the estimated VAR model. As already suggested by the results of the structural parameters in Table 1.2, M2R shock (shock 2) is expected to have a negative impact on DRGDPR in the first quarter. However, the impact is temporary. In the third quarter, the impact becomes positive but declining as the time horizon increases and reverting to equilibrium in the tenth quarter. Similarly, the response of DRGDPR to DPLR shock (shock 4) is negative in the first quarter but temporary. It becomes positive in the second quarter before returning to equilibrium in the fourth quarter. Finally, the response of DRGDPR to DTBR shocks (shock 3) is positive and temporary, reaching equilibrium in the fifth quarter.

Figure 1.2: Response of Output Growth to Structural VAR Shocks



Source: Authors' Estimates

4.3.4 The variance Decomposition (VD)

The variance decomposition of DRGDPR resulting from the structural VAR shocks is presented in Table 1.3. This result reveals that own-shocks account for most of the variations in changes in real output growth over the ten-period forecast horizon. Here, in the first quarter, own-shocks account for about 90.0 per cent of total variations in DRGDPR, before reducing to 75.0 per cent in the second quarter. The contributions of own shock to the variations in DRGDPR, average around 73.0 per cent for the remaining part of the forecast period. In the first quarter, while shocks to changes in the prime lending rate (DPLR) and treasury bills rate (DTBR) account for only about 1.2 and 1.7 per cent of total variations in changes in output growth, respectively, M2R shocks accounts for about 7.6 per cent. However, beyond the first quarter, the proportion of variations in DRGDPR being accounted for M2R, DTBR and DPLR shocks, changed in favor of DPLR. Specifically, while DPLR shock accounts for an average of about 16.0 per cent of the variations in DRGDPR, M2R and DTBR shocks account for an average of 8.0 and 1.6 per cent of the variations in DRGDPR from the second to the tenth quarters. The implication of this finding indicates that as the time horizon extends further into the future, the

prime lending rate became relatively a more important variable in influencing real output growth relative to money supply growth and treasury bills rate.

Table 1.3: *VD of Output Growth to Structural VAR Shocks*

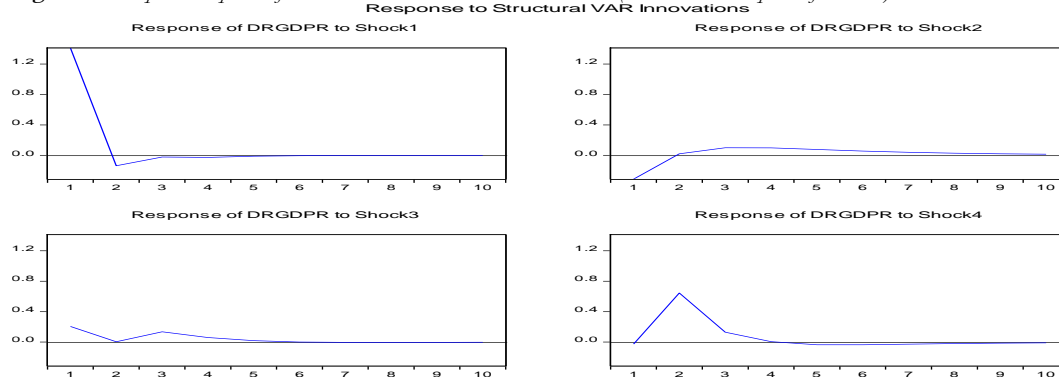
Period	DRGDPR	M2R	DTBR	DPLR
1	89.56111	7.561077	1.690900	1.186915
2	75.34162	6.450634	1.462837	16.74491
3	74.54910	6.948842	1.658015	16.84404
4	74.08297	7.503427	1.679170	16.73443
5	73.77957	7.854496	1.675755	16.69018
6	73.61018	8.043843	1.672024	16.67395
7	73.52117	8.141909	1.669962	16.66696
8	73.47529	8.192291	1.668904	16.66352
9	73.45170	8.218197	1.668364	16.66174
10	73.43955	8.231546	1.668086	16.66082

Source: Authors' Estimates

4.4 Robustness Check

As stated earlier, for robustness check, the change in prime lending rate (DPLR) was replaced with the change in maximum lending rate (DMLR) in order to verify the sensitivity of the findings of the study to the choice of money market interest rate. This was done, and the impulse response and variance decomposition functions resulting from the structural VAR, in line the structural decomposition presented in Equation 3.3, are presented in Figure 1.3 and Table 1.4, respectively.

Interestingly, the outcomes of the impulse responses of DRGDPR to M2R, DTBR and DMLR shocks are like those arrived at in Figure 1.2. Here, as in the “baseline case” (Figure 1.2), the response of DRGDPR to M2R shocks (shock 2) is negative in the first quarter and temporary. It became positive in the second quarter, declining gradually towards equilibrium by the tenth quarter. The response of DRGDPR to DTBR shock (shock 3) is positive and temporary. It reduced to zero by the second quarter but rose slightly in the third quarter before returning to equilibrium by the sixth quarter. Finally, the response of DRGDPR to DMLR shock (shock 4), is slightly negative in the first quarter but temporary. It turned positive in the second and third quarter, declining gradually to its equilibrium in the fourth quarter.

Figure 1.3: Impulse Response of DRGDPR to Structural VAR Shocks (with DMLR in place of DPLR)

Source: Authors' Estimates

The variance decomposition function of DRGDPR resulting from the structural VAR shocks is presented in Table 1.4. The result reveals that, in the first quarter, own shocks account for about 93.0 per cent of the total variations in DRGDPR. However, the contribution of own shocks to variations in DRGDPR reduced to about 78.0 per cent between the second and tenth quarter.

While the contribution of M2R shocks to variations in DRGDPR is relatively stable at about 4.0-5.0 per cent, that of DTBR shocks rises slightly from about 2.0 per cent in the first quarter to about 2.4 per cent from the third to the tenth quarters. Finally, the contribution of DMLR shocks to the variation in DRGDPR is less than 1.0 per cent in the first quarter. However, by the second quarter, the contribution of DMLR shocks to variations in DRGDPR rises to about 16.0 per cent and remained stable at about 6.5 per cent for the remaining forecast horizon. The contribution of DMLR shocks to DRGDPR mimics that of DPLR. This further shows that the impact of money market rates on economic growth in Nigeria is less sensitive to the choice of money market rate utilised in the model.

Table 1.4: *VD of Output Growth to Structural VAR Shocks (with DMLR in place of DPLR)*

Period	DRGDPR	M2R	DTBR	DMLR
1	93.40126	4.586126	1.981469	0.031145
2	78.25999	3.821763	1.645498	16.27275
3	76.91926	4.132426	2.314007	16.63431
4	76.53534	4.480966	2.437751	16.54595
5	76.31705	4.693320	2.444111	16.54552
6	76.18896	4.804129	2.440003	16.56691
7	76.11980	4.860064	2.438467	16.58167
8	76.08414	4.888484	2.438098	16.58928
9	76.06589	4.903120	2.437996	16.59299
10	76.05650	4.910735	2.437948	16.59482

Source: Authors' Estimates.

Definitions of variables

RGDPR = Growth of real gross domestic product

TBR = Government treasury bills

M2R = Growth of broad money supply

PLR = Money market prime lending rate

MLR = Maximum lending rate

4.5 Diagnostic Tests

The results of the Breusch-Godfrey Serial Correlation LM and VAR Residual Heteroskedasticity tests are reported in Table 1.5. Here, the F-statistics of both tests, which are 14.29 and 89.66, are statistically insignificant with p-values of 0.58 and 0.22, respectively. This indicates that the estimated VAR model is free of serial correlation and heteroskedasticity. Consequently, inferences drawn from its estimates are reflective of the true behaviour of the relationship under investigation.

Table 1.5: Residual-Based Diagnostic Result

Breusch-Godfrey Serial Correlation LM Test	
F-statistic	14.29
p-values	0.58
VAR Residual Heteroskedasticity Tests	
F-statistic	89.66
p-values	0.22

Source: Authors' Estimation.

5.0 CONCLUSION AND POLICY IMPLICATIONS

This paper investigated the money market impact on economic growth in Nigeria from 2000Q1 – 2018Q4, utilising the impulse responses and variance decomposition, within the framework of a structural VAR model. To do this, the impulse responses and variance decomposition of output growth resulting from shocks to the treasury bills, prime (and maximum) lending rate and money supply growth, were estimated and evaluated across a ten-period forecast horizon following a non-recursive approach to the decomposition of the structural parameters.

The implications of these findings are that, while financial variables do not have instantaneous impacts on output growth, money supply does, but only becomes visible and effective in the third quarter. The impacts of other endogenous variables' shocks can only be felt from the second quarter, which indicates some delays in the time it takes for them to impact policy. This finding reinforces the fact that monetary variables impact growth with some lags.

The findings, based on the impulse responses of economic growth to the structural shocks of the selected money market instruments in Nigeria, supports the results of the structural parameters. The result appears to suggest that monetary variables have instantaneous impacts on economic growth in Nigeria. Specifically, the result reveals that money supply growth has a negative impact on economic growth in the first quarter. However, this impact is temporary, as it dies-off by the tenth quarter. In addition, the result reveals a negative impact of prime lending rate on economic growth in the first quarter. Also, this impact is temporary, as it returns to equilibrium by the fourth quarter. This finding is like the case of the impact of maximum lending rate on economic growth in Nigeria. In the latter case, also, the response of economic growth to maximum lending rate shock, is slightly negative in the first quarter but temporary, declining gradually to its equilibrium by the fourth quarter. This shows that the impact of money market lending rates on economic growth in Nigeria is negative and invariant to the choice of money market lending rate being investigated. The positive impact of changes in treasury bills rate (DTBR) on DRGDPR is indicative of how the sale or purchase of Treasury bills is expected to withdraw or inject more liquidity to ensure the safety of investors to help induce economic growth in Nigeria.

The findings of this study will be useful and serve as a signal to the monetary authorities to allow policy to run its course, due to the lag effects, before pronouncing a fresh one on the same issue. This result is also a pointer for avoiding policy inconsistency, which may result from the implementation of a new policy even before an earlier policy framework runs its full course.

REFERENCES

- Adebisi, M. A. (2005). "Savings-Growth Relationship in Nigeria: An Empirical Evidence", *African Review of Money, Finance and Banking*, 29, 159-178.
- Adenuga, A. O. (2010). "Stock Market Development Indicators and Economic Growth in Nigeria (1990-2009): Empirical Investigations", *Central Bank of Nigeria Economic and Financial Review (EFR)*, Volume 48, Number 1, March.
- Afiemo, Oghenekaro O., (2013), "The Nigerian Money Market", *Understanding Monetary Policy Series, No. 27*, 10th Anniversary Commemorative Edition of the Monetary Policy Department, Central Bank of Nigeria, Abuja, p.10.
- Agbada, A. O., and Odejimi, D. O. (2015). Developments in Money Market Operations and Economic Viability in Nigeria: An Empirical Analysis. *European Journal of Business and Management*, 7(18), 42-52.
- Ajakaiye, Olu. (2002). *Banking sector reforms and economic performance in Nigeria*, In Howard Stein, Olu. Ajakaiye and Peter Lewis (Ed.) *Deregulation and Banking Crisis in Nigeria: A Comparative Study* (Palgrave, New York).
- Akinlo, O. and Olufisayo M. (2005). "Bank Credit and Economic Development: A Case Study of Deposit Money Banks", University of Jos. Jos.
- Aleem, A. (2010). "Transmission Mechanism of Monetary Policy in India", *Journal of Asian Economics*, 21, 186-197, April.
- Alfred Marshall A. (2017). *Economics*.illinoisstate.edu. Archived from the original on 7 November 2016. Retrieved 1 June.
- Bodin, J. (1957). *A History of Political Thought in the Sixteenth Century*, In chapter One, in J. W. Allen and Julian H. Franklin. Cornell University Press, Ithaca and London.
- Central Bank of Nigeria (2018). Annual Report.
- CBN (2011). What is Monetary Policy? Understanding Monetary Policy Series No 1. 2011 Central Bank of Nigeria
- Dickey, D. A. and Fuller, W. A. (1979). "Distribution of the estimators for autoregressive time series with a unit root", *Journal of the American Statistical Association*, 74(366a), 427-431.
- Ebhodaghe, J.U. (1996) "Competition and consolidation in the Nigerian banking sector: A Regulator's perspective". *Paper presented at the 1996 Budget Seminar organized by the Arthur Anderson*, Lagos.
- Edo, S. and Ikelegbe, A. (2014). "The Nigerian Economy: Reforms, Emerging Trends and Prospects", *Centre for Population and Environmental Development*, Benin City.
- Etale, L. M., and Ayunku, P. E. (2017, December). Does Money Market Spur Economic Growth in Nigeria? Granger Causality Approach. *International Journal of Development and Economic Sustainability*, 5(7), 28-37.
- Eze, G. P., and Nera, M. (2017). Money Market and Economic Growth in Nigeria: A Causality Analysis. *Online Journal of Arts, Management and Social Sciences*, 2(1), 140 - 163.

- Fakiyesi, O. O. and Akano, S. O. (2005). "Issues in Money, Finance and Economic Management in Nigeria", *University of Lagos Press*, Lagos.
- Fisher, I. (1911). "The Purchasing Power of Money, its Determination and Relation to Credit, Interest and Crises", *The Online Library of Liberty: A Project Of Liberty Fund, Inc.* United State of America.
- Gonzalez, F. (2009). "Determinants of Bank-Market Structure: Efficiency and Political Economy Variables", *Journal of Money, Credit and Banking*, Wiley Online Library, May 13.
- Ibrahim, S. J., Ogunde, O. O. and Saheed, B. (2015). "The Impact of Money Market Operations on Economic Growth in Nigeria", *African scholars publications.com*
- Ikechukwu, O. I. (2013). Money Market on the Nigerian Economic Development. *Journal of Economics and Sustainable Development*, 4(5), 5-11.
- Ikpefan, O. A., and Osabuohien, E. (2012). Discount Houses, Money Market and Economic Growth in Nigeria (1992-2007). *Economic Insights – Trends and Challenges*, LXIV(3), 19-30.
- Karungi, R. (2016). "The Role of the Money Market in Economic Development of Uganda", A Dissertation submitted to the School of Management Science as a partial fulfillment of the requirement for the award of a Master's Degree In Management Studies (Financial Management Option) of Uganda Management Institute, January.
- Kizito, E. U. (2013). "The Link between Money Market and Economic Growth in Nigeria: Vector Error Correction Model Approach", *International Journal of Economics and Management Engineering*, Volume 7, No. 12, World Academy of Science, Engineering and Technology.
- Keynes, J. M. (1923). *A tract on monetary reform*. In Keynes (1971–1989), Vol. 4. Kolawole, B. O. (2012, December). Open Markets, Financial Sector Development and Economic Growth in Nigeria. *European Scientific Journal*, 8(28), 283-300.
- Marshall, A. (1923). *Money, credit and commerce*. London: Macmillan.
- Masha, I., Essien, S. N., Musa, M. L., Akpan, D. B. and Abeng, M. O. (2004). "Theoretical Issues in Financial Intermediation, Financial Markets, Macroeconomic Management and Monetary Policy", Chapter 2, *Financial Markets in Nigeria*, (eds.) O. J. Nnanna, A. Englama and F. O. Odoko, Central Bank of Nigeria, Abuja, Printed by Kas Arts Service.
- McKinnon, R. (1973). Money and Capital in Economic Development. *The Brookings Institute*, Washington.
- Mordi C. N. O. (2010). "The Link between the financial (banking) Sector and the real economy," *Central Bank of Nigeria Economic and Financial Review*, 48(4).
- Mordi, C. N. O. (2016). "Multivariate Models: Vector Autoregression (VAR) Models", *Lecture presented at the West African Institute for Financial and Economic Management (WAIFEM)*, Regional Course on Basic Econometric Methods for Policy Analysis, Lagos, May, p. 5.
- Nnanna, O. J. and Dogo, M. (1998). "Structural reform, monetary policy and financial deepening: The Nigerian experience", *Economic and financial review*, Vol. 36 No.2: pp. 1-29.
- Nwosu, C. P. and Hamman, H. M. (2008). "The Nigerian Money Market: Issues and Challenges", *Central Bank of Nigeria Bullion*, Volume 32, Number 2, Abuja, Nigeria, p. 110.

- Odunga, R. and I. R. Ayoyi (2016). "Impact of Financial Markets on the Economic Growth of East Africa", *European Journal of Logistics, Purchasing and Supply Chain Management* Vol.4, Issue 5, pp.25-33.
- Ogbuji, I. A., Ekundayo, P. M. and Yasiru, O. A. (2020). "The Dynamic Linkage between Money Market, Capital Market and Economic Growth in Ghana: New Lessons Relearned", *Econometric Research in Finance* _ Vol. 5.
- Okpe, I. I. (2013). Money Market on the Nigerian Economic Development, *Journal of Economic and Sustainable Development*, 4(5), 5-11
- Onwukwe, C. E. and Samson, T. K. (2014). "On Predicting the Long Run Behaviour of Nigerian Bank Stocks Prices: a Markov Chain Approach", *American Journal of Applied Mathematics and Statistics*, 2014, Vol. 2, No. 4, 212-215, July 27.
- Owoye, O. and Onafowora, O. (2007). "M2 Targeting, Money Demand, and Real GDP Growth in Nigeria: Do Rules Apply?", *Journal of Business and Public Affairs*, Volume 1, Issue 2.
- Patrick, H. T. (1966). "Financial Development and Economic Growth in underdeveloped countries", *Economic Development and Cultural Change*, 14.2:174-189. The University of Chicago Press.
- Phillips, P. C., and Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75(2), 335-346.
- Pigou, A. C. (1917). The Value of Money, *The Quarterly Journal of Economics*, Volume 32, issue 1, 38-65
- Robertson, D. H. (1922). Money, Cambridge: Cambridge Economic Handbooks.
- Robinson, J. (1952). The Generalisation of the General Theory and Other Essays. St. Martins Press, New York, pp. 20.
- Schumpeter, Joseph (1912). The Theory of Economic Development, Cambridge, Mass, Harvard University Press.
- Shaw, E. S. (1973). Financial Deepening in Economic Development, Oxford University Press, New York.
- Sobodu, O. and Sobodu, A. (1999). "Effects of stabilisation securities policy on Banking portfolio Behaviour in Nigeria," *Development Policy Centre Research Paper*, Nigeria.
- Tobin, J. (1969). "A General Equilibrium Approach to Monetary Theory", *Journal of Money, Credit and Banking*.
- Ugolini, P. (2001). News Brief: International Monetary Fund and World Bank Publish Public Debt Management Guidelines, *News Brief*, No. 1/36: IMF.

Appendix 1

Vector Autoregression Estimates

	DRGDPR	M2R	DTBR	DPLR
DRGDPR (-1)	-0.051888 (0.11515) [-0.45062]	-0.726808 (0.75207) [-0.96640]	-17.66075 (16.8320) [-1.04924]	0.874506 (6.20841) [0.14086]
M2R (-1)	0.013522 (0.01146) [1.17994]	0.772012 (0.07485) [10.3141]	-1.027839 (1.67520) [0.61356]	0.704442 (0.61789) [1.14007]
DTBR (-1)	0.000203 (0.00083) [0.24355]	0.002171 (0.00545) [0.39830]	0.225232 (0.12197) [1.84664]	0.033953 (0.04499) [0.75471]
DPLR (-1)	0.008336 (0.00222) [3.75518]	-0.019716 (0.01450) [-1.35974]	0.117034 (0.32451) [0.36064]	0.215337 (0.11970) [1.79904]
C	-0.003125 (0.00299) [-1.04615]	0.042346 (0.01951) [2.17047]	0.123648 (0.43665) [0.28317]	-0.217644 (0.16106) [-1.35134]
R-squared	0.193519	0.646334	0.067571	0.073231
Adj. R-squared	0.142314	0.623879	0.008369	0.014388
Sum sq. resids	0.013683	0.583686	292.3658	39.77570
S.E. equation	0.014737	0.096254	2.154235	0.794582
F-statistic	3.779284	28.78353	1.141360	1.244521
Log likelihood	192.8910	65.28075	-146.0768	-78.25527
Akaike AIC	-5.526206	-1.772963	4.443434	2.448684
Schwarz SC	-5.363006	-1.609764	4.606633	2.611883
Log likelihood		40.96120		
Akaike information criterion		-0.616506		
Schwarz criterion		0.036290		

Source: Authors' estimation.