

THE IMPACT OF MONETARY POLICY RATE ON SAVINGS AND INVESTMENT IN THE NIGERIAN ECONOMY

Tubo P. Okumoko

Department of Economics,
Niger Delta University, Wilberforce Island,
Baylesa State, Nigeria

Ebierinyo A. Akarara

Department of Economics,
Niger Delta University, Wilberforce Island,
Baylesa State, Nigeria

Abstract

This paper, investigated the impact of monetary policy rate on savings and investment in the Nigerian economy for the period 1960 – 2016, sourced from the Central Bank of Nigeria Statistical Bulletin, 2016 edition and World Bank Data 2017. The analytical framework covers variables such as Monetary Policy Rate (MPR), Savings Rate (SAVR), Total investment (INVR) and Gross Domestic Product growth (GDPR) proxy for economic growth. The Vector Autoregressive (VAR) approach was adopted for the analysis of the data. The results revealed that shocks such as increase in MPR increases both SAVR and INVR in the short-run but retards both in the long-run. This shows that increase in MPR only drive increases in aggregate investment and savings rate only in the short-run but causes a decrease in both variables in the long-run. Also, MPR showed positive response to shock in GDPR only in the 1st and 2nd horizon, meaning that, increase in MPR only have a positive impact on the growth of the economy in the short-run but a sustained increase in MPR is inimical to the growth of the economy in the long-run. Finally, there exists contemporaneous feedback relationship between GDPR, MPR, SAVR and INVR in Nigeria. Therefore, it is recommended that for a short term economic growth target, a high MPR should be used. However, to achieve economic growth in the long-run, MPR should be low (preferable one digit).

Key words: Investment rate, Savings Rate, Monetary Policy Rate, Gross Domestic Product, VAR

I. Introduction

In the World all over, monetary policy rate (interest rate policy) is a major instrument of monetary policy with regards to the role it plays in the mobilization of financial resources aimed at stimulating and promoting economic growth and development. Interest rate is the price paid for the use of money; it is an important economic price and the opportunity cost of borrowing money from a lender. It is seen as the return to the provider of financial resources (lender). In Nigeria the interest rate policy is one of the most controversial of all financial policies. The reason for this may not be farfetched because interest rate policy has direct link to many other macroeconomic variables most especially investment decisions. Interest rates play a crucial role in the efficient allocation of resources, directing financial resources first, from the surplus units to the deficit units and to investment outlays where they are more productive. The aim is to facilitate growth.

Interest can be defined as the return or yield on equity or opportunity cost of deferring current consumption into the future (Uchendu, 1993:35). This definition clearly shows that interest is a concept which can mean different things depending from the perspective it is viewed. Interest rate can therefore be seen as a nebulous concept, a position affirmed by the availability of different types of this rate. Some of which are; savings rate, discount rate, lending rate and Treasury bill rate. The large heterogeneity in savings behavior is associated to country and time differences in levels of development, growth performance, and fiscal and financial policies. The interest rate reform policy under financial sector liberalization was also to achieve efficiency in the financial sector and engendering financial deepening. Interest rate policy is among the emerging issues in current economic policy in Nigeria in view of the role it is expected to play in the deregulated economy in inducing savings which can be channeled to investment and thereby increasing employment,

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

output and efficient financial resource utilization (Uchendu 1993). Also, interest rates can have a substantial influence on the rate and pattern of economic growth by influencing the volume and disposition of saving as well as the volume and productivity of investment (Leahy, 1993).

Saving is that aspect of income which is not instantly utilized or consumed, rather kept aside for future consumption, investment or for unforeseen situations, and it is considered as a veritable tool for economic growth and development. It aids capital formation by raising the stock of capital and its effect promotes earning of more income. The development or growth of a country requires investment which depends on saving (Uremadu, 2006; Temidayo and Taiwo 2011). During the Structural Adjustment Program (SAP) Interest rate policy in Nigeria lacked consistency as periods of liberalization were intertwined with impositions of some credit controls (IMF, 1997). Personal saving is one of the major sources of investment fund in Nigeria. But private investment is taken to relate positively with accumulated real money balances. Accumulation of personal saving has witnessed great difficulty owing to the low level of employment of human capital and inadequate infrastructure. In this regard, to encourage and stimulate investment in the developing countries, such as Nigeria requires raising real money balances prior to commencement of investment projects due to the constraint of access to credit and equity markets as an alternative. So, insufficient saving usually compels the governments of Nigeria into foreign debt financing (Okpara, 2010). Investment can be referred to as expenditure channeled to raising or maintaining the stock of capital. The stock of capital includes tangible assets or products, plants and machines and so on which aid production (Dornbusch and Fischer, 1980). The availability of investible funds is therefore regarded as a necessary starting point for all investments in the economy which will eventually translate into economic growth and development because whether seen from the point of view of cost of capital or from the perspective of opportunity cost of funds, interest rate has fundamental implications for the economy either impacting on the cost of capital

or influencing the availability of credit, by increasing savings (Acha and Acha 2011). According to Bakare (2011) investment is categorized into private investment, the public domestic investment, the foreign direct investment and the portfolio investment. Private domestic investment refers to individuals or organizations investments which is an aspect of gross fixed capital formation. Government and public enterprises capital expenditure on social and economic assets are referred to as public investment. Really, gross fixed capital formation is a combination of private and public investments when compared with foreign investment. Foreign tangible asset is known as foreign direct investment while portfolio investment is when foreign assets are in the form of shares, bonds, securities and so on.

Manpower training and provision of infrastructure which are relevant factors needed for encouraging economic activity depend on investment. The business environment, in general, is very risky and uncertain so firms may not be able to service debt. Also, the judicial system is reportedly inefficient and banks cannot easily enforce contracts, consequently, banks charge high interest rates and request for high levels of collateral. Addition to the above, high interest rate in the Nigerian financial system is a reflection of the extremely poor infrastructural facilities and inefficient institutional framework necessary to bring about substantial reduction in the risk associated with financing an extremely traumatized economy (World Bank, 2002). The administration of low interest rate which was intended to encourage investment before the SAP era and during SAP era of 1986 ushered in a dynamic interest rate regime where rates were more influenced by market forces

To date, Nigeria has pursued two-interest rate regime. The 1960s to mid-1980s with the administration of low interest rates which was intended to encourage investment. However, the advent of the Structural Adjustment Programme (SAP) in the third quarter of 1986 ushered in an era when fixed and low interest rates were gradually replaced by a dynamic interest rate regime, where rates were more influenced by market forces and it failed to yield desired result

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

of stimulating investment growth in Nigeria. Hence, the pursuit of the two interest rate regime in Nigeria.

The gradual deregulation of the Nigerian economy between 1986 and 1992 affected these key economic variables interest rates and investment. In the Nigerian context, interest rates were extensively regulated prior to the adoption of SAP in 1986. But the economic rationale behind this control of interest rates and other elements of financial markets has been motivated by a variety of factors including the desire to influence the flow of credit to preferred sectors of the economy and the concern that market determined interest rate could result in serious imperfection in the market. The long run objective of deregulating the interest rate to promote investment in the agricultural and manufacturing sector of Nigeria was to achieve positive linkage between interest rate and investment in Nigeria in order to foster economic growth and development.

2. Literature Review

2.1 Theoretical Framework

The classical theory of interest otherwise called the demand and supply theory of interest, maintained that the rate of interest is determined by the demand for and the supply of funds by businessmen and households respectively. The supply of funds is governed by the time preference and the demand for capital by the expected productivity of capital. The classical theory fails to proffer solution hence indeterminate. Meanwhile, the Keynesian liquidity preference theory is a stock theory. The theory determines the interest rate by the demand for and supply of money. It emphasizes that the rate of interest is purely a monetary phenomenon as distinct from the real theory of the classical. It is a stock analysis because it takes the supply of money as given in the short run and determines the interest rate by liquidity preference or demand for money. In discussing the modern theory of interest, the Hicks-Hansen IS-LM model evidently shows that no single theory of interest rate is adequate and determinate. An adequate theory to determine interest rate must take into consideration both

the real and monetary factor that influences the interest rate. Recall that $M_d = M_s(i) + M_t(Y)$.

Thus, money demand is also a function of output Y . When output rises, the money demand curve will also rise and therefore the equilibrium level of interest rate (r^*) rises as well. In like manner, the McKinnon-Shaw Hypothesis expressed in McKinnon and Shaw (1973) argued that financial repression and indiscriminate distortions of financial prices including interest rates reduces real rate of growth. One of the basic tenets of McKinnon-Shaw model is that investment function responds negatively to the effective real loan rate and interest, and positive to the growth rate. McKinnon-Shaw school expects financial liberalization to exert a positive effect on the rate of economic growth in both the short and long run. In addition to the classical theory of interest rate, the study also reviews the loanable funds theory to provide the theoretical justification for the relationship between real interest rate and savings mobilization. The concept of loanable funds in economics is central to the theory of interest rate. It explains how the demand for and supply of credit decides the financial market interest rate. Bannocks, et al (1998) defined loanable funds as money available for lending to individuals, government and institutions in the financial markets. It comprises the current savings of private individuals and firms, as well as any increase in money supply made available by the actions of depository institutions, governments and monetary authorities in the financial markets. Thus, loanable funds represent a flow of money into the financial markets for loans of all kinds. According to Pearce (1992), loanable funds or credit is strictly the term used for funds that are available for lending in the money and capital market, and is usually considered within the context of the theory of interest rate. According to Uremadu (2006), loanable funds results out of planned and mobilized savings. Accumulated savings when invested translate into capital formation which is a stock of real productive asset.

Irvin Fisher categorized interest as nominal or real and tries to accommodate the moderating influence of inflation on interest rate. Nominal

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

interest rate is the observed rate of interest incorporating monetary effects while real interest rate is arrived at by considering the implications of inflation on nominal interest rate (Uchendu, 1993:35; Essia, 2005; 82). The importance of interest rate is hinged on its equilibrating influence on supply and demand in the financial sector. Colander (2001:649) and Ojo (1993; 10) confirmed this by saying that the channeling of savings into financial assets and the willingness of individuals to incur financial liabilities is strongly influenced by interest rates on those financial assets and liabilities.

The developmental role of interest rate is possible because of the interlocking linkage existing between the financial and real sectors of economies; through this linkage that the effect of interest rate on the financial sector is transmitted to the real sector. Considering the lending rate which translates into the cost of capital has direct implications for investment. High lending rate discourages investment borrowing and vice versa. Savings rates, on the other hand, when high encourages savings which ultimately translates into increased availability of loanable funds. The snag here is that the high savings rate is also bound to translate into high lending rates with attendant negative consequences on investment (Chizea, 1993:6). In the view of classical economists, level of savings is determined by savings rate of interest (Olusoji, 2003:86). This view holds that increase in this interest rate will lead to increased savings and hence a positive relationship. It is this view that must have encouraged the Nigerian authorities to abandon administratively fixed interest rates for market determined ones. Also, it has been established that high lending rates discourage borrowing for investment and vice versa (Anyanwu and Oaikhenan, 1995:35).

Since economists hold that investment plays a fundamental role in capital formation, and hence on economic growth and developments, it becomes obvious that lending rates through perceived influence on investment plays a developmental role. That is, a decrease in lending rate is theorized to cause investment borrowing to rise which leads to increased

capital formation and eventually to economic growth (Onoh, 2007).

To achieve the desired level of interest rate, the Central Bank of Nigeria (CBN) adopts various monetary policy tools, key among which is the Monetary Policy Rate (MPR). This rate, which until 2006 was known as the Minimum Rediscount rate (MRR), is the rate at which the CBN is willing to rediscount first class bills of exchange before maturity (Onoh 2007:117). He further opined that by raising or lowering this rate the CBN is able to influence market cost of funds. If the CBN increases MPR, banks' lending rates are expected to increase with it, showing a positive relationship. In recent past, the need to possess certain class of assets as collateral to assess the CBN's discount window was dispensed with due to global crisis (Business Day, 2009). This is why monetary authorities in their pursuit of monetary policies try to influence level of savings and availability of credit by directly, in the case of administratively fixed rates or indirectly during deregulated era, influencing the rate of interest (Ogwuma, 1996:5; Ojo, 1993:288). In the same vein, also in the earlier work of Agu (1988), He pointed out that the central bank is faster than its shadow in its aim to induce the achievement of its objectives through the Structural Adjustment Programme (SAP) which gave birth to the recommendation of deregulation of the economy.

2.2 Analytical Framework

Recent advances in econometrics (e.g. unit roots and co-integration methods) and wider recognition that many macro variables are jointly determined (i.e. endogenous) have made widespread use of VAR models. This is particularly true for the recent studies on the impact of interest rate either on savings, investment or on output (e.g Olubanjo, et al 2007; Leahy, 1993). Nevertheless, it remains extremely important to use a sound theoretical framework to explicitly understand the underlying mechanism through which the variables of interest influence any particular outcome. It can also help determine the most appropriate relationships amongst a set of

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

possible interactions often reported by a theoretical VAR analyses.

Amongst others, Edwards (1994) while analyzing the effects of stabilization programmes on aggregate production in developing countries develops a useful model linking exchange rate and overall output. This became one of the most influential analytical tools in guiding the empirical analysis on the effects of devaluation on output. Based on a simple three-market Keynesian model, another useful framework is due to Rhodd (1993), which this paper makes use of to derive a reduced form equation for empirical estimation. Anchored on Rhodd's model, the goods market is represented thus:

$$Y = C + I + G + X - M \dots\dots\dots (2.1)$$

$$M/P = L(Y, r) \dots\dots\dots (2.2)$$

$$Y = L(r, M/P) \dots\dots\dots (2.3)$$

$$S = I_d + I_f \dots\dots\dots (2.4)$$

$$S = S(Y, r); \frac{\partial S}{\partial Y} > 0, \frac{\partial S}{\partial r} > 0 \dots\dots\dots (2.5)$$

$$I = I(Y, r); \frac{\partial I}{\partial Y} > 0, \frac{\partial I}{\partial r} < 0 \quad I_{fY} > 0, I_{fr} > 0 \dots\dots (2.6)$$

Where, total expenditure, consumption expenditure, domestic investment expenditure, savings, government spending, net exports or foreign investment (I_f), domestic interest rate and exchange rate are represented respectively by $Y, C, I, S, G, X-M, r,$ and e . Equation (4) shows the equilibrium between aggregate demand and aggregate supply. Equations (2.4), (2.5) and (2.6) show how S, I_d and I_f are determined in the model. Foreign investment (I_f); which defines the net build-up of claims on the rest of the world or ($X-M$) is expected to vary inversely with domestic income, Y , and directly with the exchange rate (e); As Y increases, imports increase and $X-M$ worsens. An increase in e or nominal devaluation causes the trade balance to increase.

Considering the money market, the equilibrium requires the balancing of money demand and

money supply. Money supply is to be determined by monetary policy, while money demand is determined by income and interest rate.

$$M_{s0} = M_d \dots\dots\dots (2.7)$$

$$M_d = L(Y, r); L_Y = \frac{\partial M_d}{\partial Y} > 0 \quad \frac{\partial M_d}{\partial r} < 0 \dots\dots (2.8)$$

The balance of payments is to be influenced by trade flows and financial flows where the former are determined by Y while the latter by r . The greater the level of income the worse the trade balance. Although capital flows can improve trade balance in the short-run, the long run effect is not known due to loan repayment and repatriation of dividends and interest. (Rhodd 1993).

2.3 Empirical Review

Fatoumata (2017) studied the impact of Interest rate on economic growth in Nigeria for the period 1990 -2003. The study adopted the multiple regression analysis technique and found that interest rate has a slight impact on economic growth but however suggested that economic growth can be improved by reducing the interest which would increase investment. Contrary to Fatoumata's submission, Udude (2015) opined that interest rate does not have any significant impact on savings in Nigeria. Adesoye and Maku (2015) studied determinants of financial savings in Nigeria while analyzing monetary policy stability for the period 1980 to 2008. The paper found interest rate spread to enhance financial savings in Nigeria positively.

A similar view is also maintained by Emmanuel and Osmond (2015) who showed in their study on the interest rate determinants in a deregulated Nigerian economy that there is a significant relationship between interest and money supply in Nigeria. While Osundina and Osundina (2014) concluded in their paper "Interest rate as a link to investment decision in Nigeria" argued that there is no strong empirical argument showing a link between interest rate and investment decision in Nigeria.

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

Reinhart (1995), in a study of personal savings in developing countries argued that high real interest rate increased savings while Okpara (2010) employed factor analysis method and the multiple regression analysis and found that saving and private sector credits are the most crucial sources of investment finance in Nigeria. Unfortunately, the level of saving has not been adequate and this has retarded sufficient investment. Carroll and Weil (1994), also confirmed that lagged values of income growth seem to explain higher saving rates; they argue that the usual consumption models with either uncertainty or liquidity constraints are not sufficient to explain this result and advance instead the hypothesis of habit persistence, according to which higher income takes some time to be reduced when income falls back. Kalu, *et al* (2014), while investigating the effect of investment and savings on the Nigerian economy found that savings and investment have a long-run positive impact on the Nigerian economy. Their study also revealed that the response of GDP to savings has no definite pattern in Nigeria.

Bosworth (1993) found a positive interest rate coefficient in time-series estimation for individual countries, but a negative coefficient in a panel (cross-country) estimation for developing countries. The World Bank reports, cited in Oosterbaan *et al.* (2000), show a positive and significant cross-section relationship between average growth and real interest rates over the period 1965 to 1985. While From the study of Grilli and Milesi-Ferretti (1995), Rodrick (1998) and Kraay (2000), on the effect of financial liberalization on savings and growth, it was discovered that financial liberalization does not affect savings and growth, but Bekaert *et al.* (2003) and Bonfiglioli and Mendicino (2004), found that the effect was positive. Also, in a similar study, Eichengreen and Leblang (2003), found the effect to be negative while Bakaert *et al.* (2003), Chinn and Ito (2003) and Edwards (1994), discovered those effects to be heterogeneous across countries at different macroeconomic frameworks. Modigliani (1988), argues that a higher income raises aggregate savings because it would increase the aggregate income of those working relative to those not

earning labour income (i.e. retired persons living off their accumulated assets). Ndekwe (1991) investigation using monthly data discovered that interest rate deregulation in Nigeria have a positive impact on financial savings between 1986 and 1988 and in Ghana between 1976 and 1980. Consequently, negative real interest rates resulted in decline of financial savings in real terms. But on the contrary, the Malaysian economy witnessed a steady policy of positive inflation-adjusted interest rates which led to growth in real term savings deposits. Also in Turkey, the deregulation of interest rate in 1981 resulted in a substantial increase in time and savings deposits in real terms (Ndekwe, 1991).

Luca and Spatafora (2012), focused on the developing countries in the examination of the determinants of, and interaction between, capital inflows, financial development, and domestic investment using cross sectional and panel analyses. The study reveals among others that the reductions in the global price of risk and in domestic borrowing costs were the major contributors to the rise in net capital inflows and domestic credit. Besides, the variations in cross countries domestic and international finance are accounted for by basic factors like institutional quality, access to international export markets, and inappropriate macroeconomic policy. Private capital inflows and domestic credit impact desirably on investment.

Ologunde *et al* (2006) examined the relationships between stock market capitalization rate and interest rate in Nigeria. They used the ordinary least-square (OLS) regression method and they found that the prevailing interest rate exerts positive influence on stock market capitalization rate. Part of their findings also, is that Government development stock rate exerts negative influence on stock market capitalization rate and prevailing interest rate exerts negative influence on government development stock rate. In contrast to the above opinion, Williams (2009), in its findings stipulates that real interest rates were generally negative as a result of the repressed regime prior to 1986, when the rates were fixed and as such, brought about financial disintermediation which led to low savings, low investment and low growth in the economy.

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

Eregha (2010) examined variations in interest rate and investment determination in Nigeria and deduced that investment has an indirect relationship with interest rate variation and other variables that were used. Ekwenem (2005), studied interest rate and investment behavior in Nigeria from the period 1976- 2006 using time series data, he found out that the behavior for investment have significant influence on interest rate and inflation rate. Majed and Ahmad (2010) investigated the impact of interest rate on investment in Jordan between 1990 and 2005 using co-integration technique. The study found that real interest rate has a negative impact on investment. Greene and Villanueva (1990) studied the determinants of private investment in less developing countries for 23 countries between 1975-1987 periods, and found that the real deposit interest rate has a negative impact on private investment.

Hyder and Ahmad (2003) investigated the slowdown in private investment in Pakistan. They found that higher real interest rate reduces private investment. Mahmudul and Gazi (2009) in their study in Jordan on stock investment (based on the monthly data from January 1988 to March 2003) found that interest rate exerts significant negative relationship with share price for markets of Australia, Bangladesh, Canada, Chile, Colombia, Germany, Italy, Jamaica, Japan, Malaysia, Mexico, Phillipine, South Africa, Spain, and Venezuela. For six countries from this sample, they argued on the availability of significant negative relationship between changes of interest rate and changes of share price.

Sunday (2012), studied the impact of interests rates on savings and investment in Nigeria for the period 1970 to 2008. The study adopted the simple linear regression technique and found that interest rate has a positive significant impact on aggregate savings and a negative significant impact on investment in Nigeria. The study concludes that high interest rates favour savers and vice versa.

The body of literature reviewed indicates a research gap, in that; a lot of works have been done in the area of interest rate and investment

within the economy. Most of these studies concentrated on interest rate as it impacts on savings, on the behaviour of the naira, investment and economic growth separately. But not much has been done in trying to investigate the impact of monetary policy rate on savings and investment in the Nigerian economy.

3. Methodology and Data

The Vector Auto Regressive Analysis (VAR) was employed in this study. Different techniques have been adopted to capture the impact of various macro-economic indicators on particular variables. The vector auto regression technique (VAR) is adopted in this study in its superiority over the Ordinary Least Square technique as opined by Gujarati (2007). The Ordinary Least Square (OLS) assumes a particular variable to be endogenous while the rest are exogenous. Vector Autoregression (VAR) is a statistical model used to capture the linear interdependencies among multiple time series. All variables in a VAR model are treated symmetrically in a structural sense; (although the estimated quantitative response coefficients will not in general be the same) each variable has an equation explaining its evolution based on its own lags and the lags of the other model variables.

3.1 Model Specification

This study specifically employs a VAR model, the VAR which in addition to forecasting have been used to serve two primary functions: testing causality (weak exogeneity) and; studying the effects of policy shocks through impulse response characterization and forecast error variance decomposition. The VAR econometric technique for data analysis is used to empirically verify whether a significant relationship exists among the variable (Gross Domestic Product, Monetary Policy Rate, Total Investment and Total Savings) in the Nigerian economy.

The model for this study is anchored on the classical theory of interest otherwise called the demand and supply theory of interest, maintained that the rate of interest is determined by the demand for and the supply of funds by businessmen and households respectively. Model which specifies that there exists a

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

relationship among economic growth (GDP) interest rate, Monetary Policy Rate (MPR), Total Investment (INV) and Total Savings (SAV). Therefore, the model specified for this study is explained functionally as follows;

$$GDPR = f(MPR, SAVR, INVR) \dots \dots (3.1)$$

$$MPR = f(GDPR, SAVR, INVR) \dots \dots (3.2)$$

$$GDPR_t = \delta_1 + \sum_{i=1}^{1p} \alpha_{1i} GDPR_{t-i} + \sum_{i=1}^{1p} b_{1i} MPR_{t-i} + \sum_{i=1}^{1p} c_{1i} SAVR_{t-i} + \sum_{i=1}^{1p} d_{1i} INVR_{t-i} + \alpha_1 RGDPR_t + b_1 MPR_t + c_1 SAVR_t + d_1 INVR_t + \mu_t^{GDPR} \dots \dots \dots (3.5)$$

$$MPR_t = \delta_2 + \sum_{i=1}^{1p} a_{2i} MPR_{t-i} + \sum_{i=1}^{1p} b_{2i} GDPR_{t-i} + \sum_{i=1}^{1p} c_{2i} SAVR_{t-i} + \sum_{i=1}^{1p} d_{2i} INVR_{t-i} + \alpha_2 MPR_t + b_2 GDPR_t + c_2 SAVR_t + d_2 INVR_t + \mu_t^{MPR} \dots \dots \dots (3.6)$$

$$SAVR_t = \delta_3 + \sum_{i=1}^{1p} \alpha_{3i} SAVR_{t-i} + \sum_{i=1}^{1p} b_{3i} GDPR_{t-i} + \sum_{i=1}^{1p} c_{3i} MPR_{t-i} + \sum_{i=1}^{1p} d_{3i} INVR_{t-i} + \alpha_3 SAVR_t + b_3 GDPR_t + c_3 MPR_t + d_3 INVR_t + \mu_t^{SAVR} \dots \dots \dots (3.7)$$

$$INVR_t = \delta_4 + \sum_{i=1}^{1p} \alpha_{4i} INVR_{t-i} + \sum_{i=1}^{1p} b_{4i} GDPR_{t-i} + \sum_{i=1}^{1p} c_{4i} MPR_{t-i} + \sum_{i=1}^{1p} d_{4i} SAVR_{t-i} + \alpha_4 INVR_t + b_4 GDPR_t + c_4 MPR_t + d_4 SAVR_t + \mu_t^{INVR} \dots \dots \dots (3.8)$$

Where: GDPR = Gross Domestic Product Growth Rate, MPR= Monetary Policy Rate, INVR = Growth Rate in Investment, SAVR = Savings Rate, t = current time period; t-i = i(1,2...p) number of lags length to be determined empirically and $\delta_{1,2,3,4}$ = intercepts, $a_{1,2,3,4}$, $b_{1,2,3,4}$, $c_{1,2,3,4}$, $d_{1,2,3,4}$ are parameters to be estimated.

$$SAVR = f(GDPR, MPR, INVR) \dots \dots (3.3)$$

$$INVR = f(GDPR, MPR, SAVR) \dots \dots (3.4)$$

For the purpose of empirical verification, equations (3.1), (3.2), (3.3) and (3.4) were transformed into the following structural equations:

Equations 3.5 – 3.8 are used for forecasting and also to serve two primary functions: testing $X_t = A_0 + A_1 X_{t-1} + A_2 X_{t-2} + \dots + A_p X_{t-p} + \epsilon_t$ ----- (3.9)

causality and studying the effects of policy shocks through impulse response characterization and forecast error variance decomposition. This study therefore estimated a vector autoregressive (VAR) model to trace the impact of interest rate policy on savings and investment in the Nigeria economy. The generalized VAR model of order P, VAR (P) is specified as:

Where the $\epsilon_t = (\epsilon_{1t}, \dots, \epsilon_{nt})$ form a sequence of independently identically distributed random K-vector with zero mean vector. Thus equation 3.9 can be arranged to obtain;

$$X_t = \mu + \sum_{i=1}^{1p} A_i X_{t-i} + \epsilon_t \dots \dots \dots (3.10)$$

Where X_t is a column vector of four (4) variables, that is $X_t = [GDPR, MPR, SAVR, INVR]$ modeled in terms of its past values. X_i are k x k matrix of coefficients to be estimated, μ is a k x 1 vector of constants and ϵ_t is a vector of white noise processes with the following properties $E(\epsilon_t) = 0$ for all t $E(\epsilon_t \epsilon_s')$

$$= E(\epsilon_t \epsilon_s') = \begin{cases} \Omega & s = t \\ 0 & s \neq t \end{cases}$$

3.2 Data and Sources

This study employed time series secondary data spanning from 1960 to 2016. This period is chosen due to the availability of data; its observations are large enough for the use of VAR and cover the two interest rate policy regimes in Nigeria. The relevant data were collected from the Central Bank of Nigeria Statistical Bulletin, 2016 edition and World Bank Data 2017. Data collected include

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

aggregate Output (GDP), Monetary Policy Rate (MPR), Total Investment (INV) and Total Savings (SAV). Total Investment (INV) as used in this paper is the combination of domestic and foreign investment. It is pertinent to note that analysis was done using the computed growth rates of these variables, except for MPR which is already in rate.

4. Result and Discussion

The descriptive statistics in table 4.2 below shows that GDPR, SAVR, INVR and MPR have a skewedness of -0.805024, 1.311346, 0.730650 and 0.741148 respectively. This is a

clear indication that real GDP growth rate is negatively skewed while SAVR and VATR are positively skewed. All the variables used for analysis are Lepto-Kurtic except INVR. The Jarque-Bera statistic values for the variables shows that SAVR and VATR are normally distributed but RGDPG is not normally distributed. This is also captured by their probability values. Table 4.1 reveals that the variables exhibit a deterministic trend, thus, making it justifiable to estimate the Augmented Dickey-Fuller (ADF) unit root test to normalize the trend in the data. The ADF result is presented in table 4.2 below.

Table 4.1: Descriptive Statistics

Description	GDPR	SAVR	INVR	MPR
Mean	4.105882	9.172857	270.7376	12.99265
Median	4.600000	8.185625	163.3000	13.00000
Maximum	10.00000	24.00625	807.3000	26.00000
Minimum	-5.400000	3.156250	5.218750	6.000000
Std. Dev.	3.689949	4.743108	261.0689	4.149770
Skewedness	-0.805024	1.311346	0.730650	0.741148
Kurtosis	3.575874	4.783231	2.061898	4.251552
Jarque-Bera	4.142166	3.610226	5.277011	5.331739
Probability	0.126049	0.056151	0.071468	0.069539
Sum	139.6000	385.2600	11370.98	441.7500
Sum Sq. Dev.	449.3188	922.3800	2794435.	568.2795

Source: Authors' computation

Table 4.2: Augmented Dickey-Fuller Unit Root Test Results

Variables	Level	1 st Diff	Lag(s)	Model	Order of integration
GDPR	-0.804991	-5.956511**	1	Trend & Drift	1(1)
INVR	-0.471325	-4.734019**	1	Trend & Drift	1(1)
SAVR	-1.268028	-5.597839**	1	Trend & Drift	1(1)
MPR	-2.102316	-5.265896**	1	Trend & Drift	1(1)
Critical Value 5%	-3.552973	-3.557759			

Note: *(**) ***denotes statistically significant at 1%; 5% and 10% level respectively.

Source: Authors' Computation

The result in table 4.2 above shows that all the series (GDPR, INVR, SAVR, and MPR) became stationary after differencing once, that is of order one. This is a sufficient condition to test for the

existence of a long-run relationship between the variables using the Johansen co-integration test. The result of the Johansen co-integration test is presented below.

**Table 4.3: Johansen co-integration test result
Series: D(GDPR) D(INVR) D(SAVR)**

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

D(MPR)

Unrestricted Co-integration Rank Test (Trace)

Hypothesized	Trace		0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.353947	21.43646	29.86578	0.1107
At most 1	0.272192	11.75654	15.42567	0.1962
At most 2	0.158614	7.817767	9.67907	0.1044
At most 2	0.027751	1.125718	3.841466	0.2887

Trace test indicates no co-integrating equation(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 Source: Authors' Computation

The Johansen's co-integration rank test results showed the presence of no co-integrating equations (see Table 4.3), indicating that there is no common mean governing the long-run joint evolution of GDP, INVR, SAVR and

MPR. In other words, GDP, INVR, SAVR and MPR do not share a long-run relationship. The VAR models specified in section 3.2 of this paper were estimated (see Table 4.7 in appendix for the result).

Table 4.4: Accumulated Responses

Response of MPR:				
Period	GDP	SAVR	INVR	MPR
1	1.568631	0.000000	0.000000	2.868559
2	2.605441	0.100923	0.641011	4.405054
3	-3.193718	-0.342035	1.347739	5.752153
4	-3.511944	-0.724116	1.877943	8.129874
5	-3.713604	-1.185711	-2.199966	10.35717
6	-3.893794	-1.639837	-2.363481	12.00944
7	-4.091065	-2.016068	-2.423675	13.64901
8	-4.298213	-2.281291	-2.413142	15.34676
9	-4.474150	-2.437098	-2.339072	16.95450
10	-4.555988	-2.503690	-2.188902	18.44431

Source: Authors' Computation

The accumulated impulse response function revealed a positive response of MPR to one standard deviation shock in SAVR, and did not die out up until the 2nd horizon. Between the 3rd and 10th horizon MPR's response to shocks in SAVR became negative. Meaning that if there are positive shocks such as increase in total savings (SAVR) the level of savings also increases in the short-run but this increase would fade out in the 3rd horizon. This is an indication that a continuous increase in MPR would result to a decline in SAVR in the long-run. The same

is true of MPR to one standard deviation shock in INVR. This shows that increase in MPR only drive increased in aggregate investment only in the short-run but causes a decrease in aggregate investment in the long-run. Also, MPR showed positive response to shock in GDP only in the 1st and 2nd horizon. It also goes to show that increase in MPR only have a positive impact on the growth of the economy in the short-run but a sustained increase in MPR is inimical to the growth of the economy in the long-run.

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

Table 4.5: Variance Decomposition

Variance Decomposition of MPR:					
Period	S.E.	GDPR	MPR	SAVR	INVR
1	1.568631	100.0000	94.10312	0.000000	0.000000
2	3.109663	95.64550	93.44726	0.105331	4.249167
3	4.669393	89.20129	83.65594	0.583279	10.21544
4	6.179644	83.22645	77.43914	1.706079	15.06747
5	7.630505	78.27165	77.89609	3.533605	18.19474
6	9.036667	74.37422	76.93829	5.812411	19.81336
7	10.40850	71.51009	75.84913	8.132983	20.35692
8	11.74049	69.60758	75.37625	10.16788	20.22454
9	13.01030	68.50947	75.24518	11.78887	19.70166
10	14.18043	67.99203	75.12055	13.04089	18.96708

Source: Authors' Computation

The Variance Decomposition showed that MPR explained more of the variability in SAVR (13.04%) in the 10th horizon relative to INVR which explained 18.967 percent. It also shows that MPR explained more of the volatility in GDPR in the first four horizons (100%, 95.65%, 89.20% and 83.23% respectively). Indicating that, increase in MPR is effective in contributing

to increased output (GDPR) in the short – run, and its prolonged increase would amount to decline in aggregate output (GDPR). Table 4.6 also shows that MPR explained more of the variability in INVR (20.36%) in the 7th horizon, meaning that the impact of MPR on INVR is felt more in the 7th horizon.

Table 4.6: VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: GDPR			
Excluded	Chi-sq	df	Prob.
MPR	8.967660	3	0.0291
SAVR	8.320771	3	0.0310
INVR	14.69897	3	0.0006
All	15.03211	9	0.0046

Source: Authors' Computation

The VEC granger-causality results showed a unidirectional causality running from MPR to GDPR at the 5 percent level, and also a unidirectional causality running from SAVR and INVR to GDPR. This implies instantaneous (contemporaneous or short-run) feedback relationship between GDPR, MPR, SAVR and INVR.

5. Conclusion and Recommendations

This paper concludes that Monetary Policy Rate impacts on savings and investment in Nigeria. The impact of MPR on both savings and investment is positive in the short-run but negative in the long-run. Meaning that as monetary policy rate increases, it would attract increase in both savings and investment on the aggregate. A further increase in monetary policy rate in the long-run would amount to a retardation of both savings and investment which in turn leads to reduction in aggregate output or

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

economic growth (GDPR). Also, there is an instantaneous short-run feedback relationship between GDPR, MPR, SAVR and INVR. It is therefore recommended that high MPR should only be adopted to achieve a contemporaneous or short-run economic growth target as increase in MPR in the short-run spurs aggregate savings and investment, which in turn leads to growth in the economy in the short-run. However, to achieve economic growth in the long-run, MPR should be low (preferable one digit).

References

- Acha, I.A and Acha, C. K (2011). Interest Rates in Nigeria: An Analytical Perspective. *Research Journal of Finance and Accounting*, 3(2), pp. 71-81
- Adesoye, A.B and Maku, O.E (2015). Determinants of Financial Savings in Nigeria: An Empirical Analysis of Monetary Policy Stability. *Developing Countries Studies*, Vol.5(13), pp 37 – 41
- Agu, C.C (1988). Interest Rate Policy in Nigeria and its attendant Distortions. In Arnaldo Mauri, Oscar Garavello and Masini(eds), *Savings and Development Quarterly Review* Vol.1(12).
- Ahmed U. (2003). Interest Rate and Savings Mobilization in Nigeria. retrieved from www.eajournals.org
- Anyanwu J.C and Oaikhenam (1995). *Modern Macroeconomics: Theory and Application in Nigeria*. joanee Educational Publishers Ltd.
- Bakaert, G., Campbelrh,R., & Christian, L. (2003). Does Financial Liberalization Spur Growth? *Journal of Financial Economics*, 77, pp. 3–55
- Bakare, A. S (2011). A Theoretical Analysis of Capital Formation and Growth in Nigeria. *Far East Journal of Psychology and Business* Vol 3 No 1 April 2011
- Bannock, G., Baxter, R. and Davis, E (1998). *Dictionary of Economics*, London: Penguin.
- Bonfiglioli, A. and Mendicino,C. (2004). Financial Liberalization, Banking Crisis and Growth: Assessing the Links, *SSE/EFI Working Paper* No 567
- Bosworth, B. (1993). *Savings and Investment in a Global Economy*. Washington D.C: the Brookings Institute.
- Carroll, C. D., and D. N. Weil (1994). Saving and Growth: A Reinterpretation. *Carnegie-Rochester Conference Series on Public Policy*, 40, pp. 133–192.
- Chinn, M. and Ito, H. (2005). What Matters for Financial Development? Capital Controls, Institutions and Interactions. *Journal of Development Economics*.
- Chizea, B. (1993). Commercial Banks and Recent Challenges. *The Nigerian Banker*, pp 16-18.
- Chizea, B. (1993, Sept- Dec.). Commercial Banks and Recent Challenges. *The Nigerian Banker*, pp 16-18.
- Colander, D.C (2001). *Economics*, McGraw – Hill Publishers, 4th Edition.
- Dornbusch, R. & Fisher, S. (1980). Exchange rates and the current account. *American Economic Review*, Vol. 70, pp. 960-971.
- Edwards S. (1994). Why are the Latin America's Savings Rate so Low? *Manuscript Presented at the Conference on growth prospects in Latin America, Bogota (Columbia), June*.
- Eichengreen, B. and Leblang, D. (2003). Capital Account Liberalization and Growth: Was Mr Mahathir Right? *International Journal of Finance and Economics*, 8: 205-224.
- Ekwenem (2005). Interest Rate and Investment behavior in Nigeria. Extracted from www.iiste.org
- Emmanuel, I.A and Osmond, N.O (2015). Interest rate determinants in a deregulated Nigerian Economy. *International Journal of Business & Law Research*, Vol. 3(1), pp. 81 – 88

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

- Eregha, P.B (2010). Interest Rate Variation and Investment Determination in Nigeria. *International Business Management Medwell Journals*, Vol. 4(2), pp. 41-46
- Essian, U., (2005). *Issues in Modern Macroeconomic Thought: The Evolution of Economic Facts (3)*. Fictions Seaspring Publishers, Calabar.
- Fatoumata, K.M (2017). Impact of Interest Rate on Economic Growth in Nigeria. *Pyrex Journal of Business and Finance Management Research*, Vol. 3(3), pp. 98 – 111
- Greene, J. and Villanueva, D. (1990). Determinants of private investment in LDCs, *Finance and Development*.
- Grilli, V. and Milesi-Ferretti, (1995). Economics Effect and Structural Determinants of Capital Controls, *IMF Staff papers*, 42:3.
- Gujarati, D.M. (2007). *Basic Econometrics*; Third Edition New York McGraw Hill.
- Hyder, K. and Ahmad, G.M. (2003). Why private investment in Pakistan has collapsed and how can it be restored? Extracted from <http://economics.cal/2003/papers/0454.pdf>
- Kalu, E.U., Joseph, C.O., Hyacinth, N.A, and Ezeoke, C.O (2014). An Investigation of the effects of Investment and Savings in Nigeria Economy. *Proceedings of International Conference on Social Science and Humanities*, 8 – 10 September, 2014, Istanbul, Turkey.
- Kraay, A. (2000). In search of the Macroeconomic Effects of Capital Account Liberalization. *World Bank, Mimeo*.
- Leahy J.V (1993). Investment in Competitive Equilibrium: The Optimality of Myopic Behaviour. *The Quarterly Journal of Economics*, Vol.108(4), pp. 1105-1133
- Luca, O. and Spatafora, N. (2012). Capital inflows, Financial Development, and Domestic Investment: Determinants and Inter-Relationships. *IMF Working Paper*, WP/34 1342
- Mahmudul, A., Gazi Salah, U., (2009). The relationship between interest rate and stock price: Empirical evidence from developed and developing countries. *International journal of business and management*, Vol.4, No3, pp.43-51.
- Majed, B. and Ahmed, I.M. (2010). The impact of interest rate on investment in Jordan: A cointegration analysis. *JKAU: Econ. and Adm.*, Vol. 24(1), pp. 199-209
- Mckinnon, R. I. (1973). *Money and Banking in Economic Development. An empirical Examination*: Washington D.C. The Brookings Institute.
- Modigliani, F. (1988). The role of intergenerational transfers and the life-cycle saving in the accumulation of wealth. *Journal of Economic Perspective*, (2), 68-72.
- Ndukwe E. (1991). An Analytical Review of Nigeria's Tax System and Administration. A Paper Presented at the National Workshop on Tax Structure and Administration, Lagos.
- Ogwuma, P.A.(1996); "Money supply, inflation and Nigerian Economy" *Quarterly CBN Bullion*, vol 20. No 3.
- Ojo M .O (1993). A Review and Appraisal of Nigeria's Experience with Financial Sector Reform. CBN Research Department, Occasional Paper No. 8, Lagos.
- Ojo M O (1993). A Review and Appraisal of Nigeria's Experience with Financial Sector Reform. *CBN Research Department, Occasional Paper No. 8, Lagos*.
- Okpara, G.C. (2010). Monetary Policy and Stock Market Returns: Evidence from Nigeria. *Journal of Economics* 1(1), pp 13 – 21
- Ologunde, A., Elumilade, D., Saolu, T., (2006). Stock market capitalization and interest

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

- rate in Nigeria: A time series analysis. *International Research Journal of Finance and Economics*, Issue 4, pp.154-67.
- Olusoji, M. (2003). Determinants of private savings in Nigeria. *NDIC Quarterly*, 45-49.
- Olusoji, M. (2003). Determinants of private savings in Nigeria. *NDIC Quarterly*, 45-49.
- Onoh J. K. (2007). *Dimensions of Nigeria's Monetary and Fiscal Policies - Domestic and External*. Aba: Astra Meridian.
- Oosterban, M.S, Der Windt N.V, Steveninck T.R.V., Oosterbaan M.S. (2000). Determination of Growth. (Ed). <http://books.google.co.uk/books>
- Osundina, J.A and Osundina, C.K (2014). Interest Rate as a link to Investment decision in Nigeria: (Mudell-Flemming Model). *IOSR Journal of Economics and Finance*, Vol.2(4), pp. 8 - 14
- Pearce D. (1992). Green Economics. *Environmental Values*, Vol. 1(1), pp. 1 – 13
- Reinhart T. (1995). Interface Strategies. *OTS Working Paper*.
- Rhodd, R.G. (1993). The effect of real Exchange Rate Changes on Output: Jamaica's Devaluation Experience. *Journal of International Development*, Vol. 5(3), pp. 291-303.
- Rodrik, D. (1998). Who needs Capital-Account Convertibility. *Harvard University, Mimeo*. (Ed).
- Sunday, K. U (2012). *The impact of interest rates on savings and investment in Nigeria*. An unpublished thesis presented to the Department of Banking and Finance, Faculty of Business Administration, University of Nigeria, Enugu Campus.
- Temidayo, A. & Taiwo, I (2011). Descriptive Analysis of Savings and Growth in Nigeria Economy. *Journal of Economics and Sustainable Development*, 2(7), pp. 46 – 60.
- Uchendu, O. (1993) Interest rate Policy, Savings and Investment in Nigeria. *CBN Quarterly Review* 31(1), 34-52.
- Udude, C.C (2015). Impact of Interest Rate on Savings on the Nigeria's Economy (1981-2013). *Journal of Policy and Development Studies*, Vol.9(3), pp. 73 – 82
- Uremadu, S.O. (2006a). The Impact of Real Interest Rate on Savings Mobilization in Nigeria: An Error Correction Approach, An Unpublished Project Proposal to CBN's Application for Diaspora Collaborative Research Program (DCRP)/Visiting Research Scholars Program (VRSP), 2006.

Appendix

Table 4.7: Vector Autoregression Estimates
Standard errors in () & t-statistics in []

	GDPR	SAVR	INTR	MPR
GDPR(-1)	1.226239 (0.23970) [5.11564]	0.262201 (0.28495) [0.92017]	1.652746 (3.48379) [0.47441]	-0.452888 (0.34709) [-1.30483]
GDPR(-2)	-0.431537 (0.23280) [-1.85372]	0.322238 (0.27674) [1.16443]	0.654176 (3.38338) [0.19335]	-0.388598 (3.06499) [-0.12679]
SAVR(-1)	0.015204 (0.12179)	1.253364 (0.14478)	0.174643 (1.77003)	-7.221342 (2.97085)

The Impact of Monetary Policy Rate on Savings and Investment in the Nigerian Economy

	[0.12484]	[8.65731]	[0.09867]	[-2.43073]
SAVR(-2)	0.057737 (0.12529)	0.532898 (0.14894)	1.305985 (1.82094)	-4.795518 (3.23186)
	[0.46082]	[3.57795]	[0.71720]	[-1.48383]
INVR(-1)	0.041333 (0.01544)	0.018278 (0.01835)	1.974464 (0.22441)	-0.803930 (0.33093)
	[2.67688]	[0.99583]	[8.79852]	[-2.42928]
INVR(-2)	0.045669 (0.01554)	-0.016292 (0.01848)	-1.042671 (0.22592)	-0.649821 (0.26380)
	[2.93787]	[-0.88165]	[-4.61515]	[-2.46330]
MPR(-1)	-0.041589 (0.01238)	-0.803930 (0.33093)	-0.111964 (0.13135)	-0.145255 (0.21979)
	[-3.36058]	[-2.42928]	[-0.85241]	[-0.66089]
MPR(-2)	-0.023573 (0.00987)	-0.649821 (0.26380)	-0.055340 (0.10470)	-0.145255 (0.21979)
	[-2.38955]	[-2.46330]	[-0.52853]	[-0.66089]
C	0.501277 (0.78293)	1.540746 (0.93071)	-11.62446 (11.3790)	-0.145255 (0.21979)
	[0.64025]	[1.65545]	[-1.02157]	[-0.66089]
R-squared	0.840310	0.874523	0.793527	0.588790
Adj. R-squared	0.811276	0.851709	0.762350	0.528028
Sum sq. resids	81.19989	114.7458	17151.80	253.5838
S.E. equation	1.568631	1.864711	22.79806	2.957071
F-statistic	28.94178	38.33275	844.1600	1.844686
Log likelihood	-70.91823	-77.83434	-177.9771	-93.69384
Akaike AIC	3.895912	4.241717	9.248856	5.234692
Schwarz SC	4.191465	4.537271	9.544410	5.699134
Mean dependent	4.883715	9.235000	283.8645	0.187500
S.D. dependent	3.610828	4.842327	260.6537	3.261618
Determinant resid covariance (dof adj.)		1996.731		
Determinant resid covariance		1121.195		
Log likelihood		-310.7156		
Akaike information criterion		16.58578		
Schwarz criterion		17.47244		

Source: Authors' Computation