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Savings Rate Policy and Nigeria Economy: The Central Bank of Nigeria Time Classification Analysis

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***Abstract*:** *This study examined the effect of Central Bank of Nigeria deposit rate policy on Nigeria economic growth. Time series data were sourced from Central Bank of Nigeria Statistical bulletin and publications of Nigeria Bureau of Statistics from 1987-2020. Five hypotheses were formulated in the study. Real gross domestic products were proxy for dependent variables while the independent variables, 3months deposit rate, 6months deposit rate, 12months deposit rate. Ordinary least square methods of cointegration, granger causality test, unit root test and Vector error correction model. The study found that 3 months and 6 months' savings have positive and significant effect on the growth of Nigeria economy while 12 months' savings rate have negative and no significant effect on Nigeria economic growth. From the findings, we conclude that savings rate have significant effect on Nigeria economic growth. the study recommend that government should set a sound and fertile environment such as further reforms in the banking sector and deregulations of savings and lending rates in order to foster domestic saving that enhances Nigeria economic growth. The federal government of Nigeria through its Central Bank should strengthen commercial banks to dispense more credits to private investors for sustained increase in economic activities and a robust monetary policy to check mate inflation. The regulatory authorities should be encouraged to direct their credit to priority sectors of the economy.*

Keywords: *Central Bank of Nigeria, Nigeria Economy, Savings Rate Policy, Time Classification Analysis.*

INTRODUCTION

The monetary transmission mechanism is one of the most studied areas of monetary economics for two reasons. First, understanding how monetary policy affects the economy is essential to evaluating what the stance of monetary policy is at a particular point in time. Even if a central bank's policy instrument, for example, the monetary policy rate in Nigeria is low, monetary policy is restrictive because of effects that monetary policy has had on other asset prices and quantities. Second, in order to decide on how to set policy instruments, monetary policymakers must have an accurate assessment of the timing and effect of their policies on the economy. To make this assessment, they need to understand the mechanisms through which monetary policy impacts real economic activity and inflation (Nwanyamou, 2011).

The channel's functionality is dependent on the central bank ability in credibly influencing either the short-term nominal interest rate or monetary base. John Maynard Keynes in his novel book, "The General Theory of Employment, Interest rate and Money" argued that; a policy induced increase in the short-term nominal rate leads first to an increase in longer term- nominal rates as investors act to arbitrage differences in risk adjusted expected

returns on debt instruments of various maturities (Nwanyamou, 2011). This is described by the expectations hypothesis of the interest rate term structure.
The interest channel posits that if the Central bank implements a contractionary monetary policy (either through change in outside money or short-term nominal rate), this will lead first to an increase in the longer term nominal interest rates. The increase in the long term real rates increases the cost of borrowing either in the money market or capital market. This leads to a decline in business fixed investment, residential housing investment, consumer durable expenditure, and inventory investment (i.e. a decline in aggregate demand). A concatenation of these, result in the reduction of aggregate output and employment.
Keynes (1936) defined savings as the excess of income over expenditure on consumption. Meaning that savings is that part of the disposable income of the period which has not passed into consumption (Umoh, 2003 and Uremadu, 2005). Given that income is equal to the value of current output; and that current investment (Gross Capital Formation) is equal to the value of that part of current output, which is not consumed, savings is equal to the excess of income over consumption.

Savings play a crucial role in the mobilization of internal resource and economic growth of developing countries (Lewis, 1954). But it is also important to mention that negative relationship between domestic savings and economic growth has been ascertained by some empirical studies (Joshi, Pradhan, & Bist, 2019). The saving-growth nexus plays a vital role in the neoclassical growth models of Solow (1956); Cass (1965); Ramsey (1928) and Koopmans (1965). According to all these growth models, higher saving rates should foster growth as higher savings imply higher capital investment. Saving positively associated with growth in the countries which are not too close to the technological frontier. But saving does not positively affect growth at all in those countries which are close to the technological frontier. Savings contribute to economic growth by the proper utilization of resources to enhance the productive capacity of the economy (Mason, 1988). Thus, real economic growth and development of any country requires adequate investment, which is a function of savings.
The multiplier impact of rise in investment positively influences economic growth (Keynes, 1936). When investment is poor, then economic growth would be slow. Thus, in each and every economic transaction investment is very crucial (Heijdra, 2017). Many scholars have identified a positive relationship between investment and economic growth across countries (Chatterjee, Sakoulis, & Turnovsky, 2003; Maki, Yotsuya, & Yagi, 2005). The effects of savings on investment are of two folds. Firstly, a rise in savings stimulates the investment which in turn leads to high economic growth and secondly, savings improves the investment which further makes the economy capable to produce more output and results in a faster economic growth. This study examined the effect Central Bank of Nigeria savings policy on economic growth.

LITERATURE REVIEW

Savings Rate

Keynes maintained that on the aggregate, the excess of income over consumption (otherwise called savings) cannot differ from the addition to capital equipment such as gross fixed capital formation or gross domestic investment. Savings is therefore a mere

residual and the decision to consume and the decision to invest between them determine volume of national income accumulated in a period. In the Keynesian view therefore secularly rising income would result in higher savings rates. As a matter of fact, savings is regarded as being complementary to the consumption function. In its simplest form, the savings function is derived from the linear consumption function when the autonomous consumption expenditure is separated off (Omoh, 2003).Keynes (1936), however, brought in the opportunity cost variable, the rate of interest; which the classical economists now regard as the major determinant of savings (Olusoji, 2003; Chete, 1999; McKinnon, 1973 and Shaw, 1973).

The determinants of investment are much clearer with the empirical literature than when theoretical arguments are postulated on investment in many countries including Nigeria. Nnanna *et al* (2004), authoritatively posit that the main determinants are in two forms: the finance and investment model. The finance model was however employed in the regression estimates carried out. The investment model starts with Cobb-Douglas production function measures capital or investment in physical assets first. Then it was specified to include the distortions and accompanying shocks, constraints and exogenous shocks in the macro economy as follows:

$$Y = f(A, K, L) = A, L \quad (2.1)$$

Where *Y* represents output, *K* is the capital stock, L labour supply and A the total factor productivity

$$K\ f\ (r\ psc\ ner\ Y): \quad (2.2)$$

Where *r, psc, ner* and *Y* represent prime lending rate, (PLR), credit to the private sector, nominal exchange rate and national income respectively. The finance model of determinants of investment in Nigeria could be seen to be mainly from debt and non-debt sources that could be domestic or foreign with the following model

$$PSC\ f\ (SAVS, INV), \quad (2.3)$$

Where, *PSC, SAVS* and *INV* represent private sector credit, National Savings, and Investment respectively (Investment is divided into two parts namely *PUV* Public and Private Investment)

Economic Growth

Todaro (1977) defined economic growth as the increase overtime of an economy's capacity to produce those goods and services needed to improve the wellbeing of the citizens in increasing numbers and diversity. It is the steady process by which the productive capacity of the economy is increased overtime to bring about rising levels of national income. Baumol and Blinder (1988) sees economic growth as occurring when an economy is able to produce more goods and services for each consumer, while Roger Miller (1991) defined economic growth as the expansion of the economy to produce more goods, jobs and wealth. Henderson and Poole (1991) defined economic growth as the increase in output and other measures of material progress at a certain period. It is also said to be either growth in national output as measured by GDP or GNP (which measures economic power), or growth in the national average standard of living as measured by the GNP per capita (which measures the well-being of citizens. This means that economic growth occurs when a nation's production possibility frontier shifts outward. Economic growth is a dynamic process in which the supply, demand and efficiency factor all interest. Economic growth generally, can be described as a positive change in the level of

production of goods and services by a country over a certain period of time. In accounting for an economy's growth, it is conventional to relate the level of output to its factor inputs. This permits us to write our production function as follows,

Y= f (K, L, D, E) (2.1)

This function states that the output(Y) is a function of capital (k), Labor (L), Land (D) and entrepreneurship (E). But because of the difficulty of tracking the contribution of D and E to overall output growth of an economy's production specified by ignoring the role of these factors. Hence, specification of production function more realistically takes the form.

Y= f (k, L). (2.2)

Thus an economy's level of output is a function of its labor and capital endowment. Output growth can be due to a growth in an economy's stock of capital overtime, assuming the labor force is constant. In other words, an economy can experience growth if it can accumulate capital overtime. Thus, we can write from our production function as follows.

dY/dt = f (dK/ dt) (2.3)

If the assumptions of a constant labor force were to hold, the capital accumulation would result to an increase in the capital- labor ratio since ache man would work with more capital, hence he can produce more. Growth can also result from an increase in labor force which again permits us to write from our production function

dY/dt = f(dL/dt) (2.4)

By adding up these two sources of growth, we can only partially account for an economy's growth overtime.

Keynesian Theory of Absolute Income Hypothesis

According to Froyen (1998), Keynes in his theory argues that consumption is a key element in income determination. Based on the fundamental psychological law, men are disposed to increase their consumption as their income increases but not as much as an increase in their income. According to his psychological law, the Keynesian consumption function equals:

$C = a + bY_{Da} > 0,\ 0 < b < 1$ (2.3)

C is real consumption and YD is real disposable income, which is equal to GNP minus taxes. The intercept is a, it measures the consumption at zero levels of income. The parameter b is the Marginal Propensity to Consume (MPC) which measures the increase in consumption per unit increase in the disposable income ($\Delta C/\Delta YD$). The ratio of consumption to income is termed as the Average Propensity to Consume, which is written as follows

$$APC = \frac{C}{Y_D} + \frac{a}{Y_D + b} \quad (2.4)$$

The APC is greater than the MPC, by the amount a/Y. Hence the APC declines as Income increases. This implies that as income of the households rises; they consume a small fraction of income, which means that their larger portion of income is saved. The Marginal Propensity to Save (APS) is a larger fraction of income equals (1-APC), or

$APS = 1 - a/Y_D - b = -a/Y + (1 - b)$ (2.5)

If the disposable income (Y_D) is equal to zero, saving is negative or very low, and generally, the income-savings relationship is not proportional. The theory assumes that rich people save more than poor people, other things hold constant (Froyen, 1998).

Permanent income hypothesis

The permanent income hypothesis (PIH) is a post-Keynesian consumption theory, developed by Milton Freidman in the year 1957. The consumption is proportional to permanent income function: $C = kY^D$ (2.4). Here, Y^D is a permanent income, and *k* is the factor of proportionality (k > 0). Permanent income is an expected average long term income from both "human and non-human wealth", which is both expected labor income (human capital) and the expected earnings from assets holdings (non-human wealth). It assumes also a random element to consumption known as transitory consumption. The measured income can be written as $Y = Y^p + Y^t$ (2.6)

According to PIH, it is only the permanent income that influences consumption. Even though consumption is a transitory component of consumption, but it is independent of transitory income. According to him, individuals in each period adjust their estimates of permanent income by a fraction j of the discrepancy between actual income in the current period and the prior period's estimates of permanent income. It is shown by the following equation:

$$Y^p{}_t = Y^p{}_{t-1} + j\left(Yt - Y^p{}_{t-1}\right) \qquad (0 < j < 1) \qquad (2.7)$$

This equation confirms the backward-looking expectation theorem, which states that individuals revise their estimates of permanent income based on how the last periods' actual income differed from the last period's estimate of permanent income (Froyen, 1998).

The PIH can explain the confusion about the consumption-income relationship both in the short and long run. In short-run, years of high income will be the ones of positive transitory components of income. But in the long-run, this relation is approximately proportional, given equation (2.4), with a constant APC equal to *k*. Lastly, considering that consumption rises only with an increase in permanent income, in the high-income years the ratio of consumption to measured income will be low (Froyen, 1998).

The Life Cycle Theory of Consumption

According to Froyen (1998), the Life Cycle Hypothesis was developed by Albert Ando, Richard Brumberg, and Franco Modigliani in 1963. The main aim of saving in the LCH is to accumulate savings for retirement. Moreover, the LCH deals with consumption-saving decisions and suggests that economic agents consciously make a great effort to maximize their present value of lifetime utility, by distributing consumption over the lifetime. Hence, the following consumption equation simplifies the model:

$$Ct = 1/T\left[Y^1{}_t + (N-1)Y1e + A_t\right] \qquad (2.8)$$

LCH suggests also that the consumption would be quite unresponsive to change in current income ($Y^1{}_t$) that did not also change the average expected future income. From equation (2.7), the following expression is derived; $\Delta C_t / \Delta Y^1{}_t = 1/T$

(2.9)

Therefore, an income that was expected to persist through the working years would mean that the expected annual labor income (Y^{1e}) also rose and the effect of the consumption would be much greater as shown by the equation:

$$\Delta C_t / \Delta Y^1{}_t + \Delta C_t / \Delta Y^{1e} = \left[1/T + N - 1/T\right] = N/T \qquad (2.10)$$

The LCH accounts for the dependence of consumption and saving behavior of the individual's position in life. The young who enters the labor force have a relatively lower income and possibly a negative saving rate. Then, in middle age income may vary and

the saving level also increases. In retirement which the last stage of life causes income to fall and might call upon the period of the dissaving (negative rate of saving).

The Random Walk Theory of Consumption

The theories of PIH and LCH talked above assume that consumers have certainty about their future income. In practice, these two hypotheses are not predictable with a high degree of certainty. The utility maximization condition is equalizing the marginal utility gained in each time. It can be specified as follows:

$$MU(Ct-1)=MU(CT)=MU(Ct+1) \quad (2.11)$$

When introducing uncertainty in this equation of the consumer utility, this latter will be no longer be certain to maximize his or her lifetime utility. Robert Hall applied the rational expectations theory to explain the consumer under uncertainty. This theory is to equalize the marginal utility in period t with the expected marginal utility in period t+1. Thus, the modified rule for utility maximization is given as $E[MU(C_{t+1})]=MU(C_t)$, this implies that the reliable utility (U) depends on the total consumption. So, the rule of utility maximization will be written as: $E[(Ct+1)]=(Ct)$ (2.12)

However, the expected value of consumption $E[(Ct+1)]$ is not observable; Robert Hall applied the theory of rational expectations to the theory of consumption. According to him, the observed consumption behavior can be written: $Ct+1=Ct+\delta$ (2.13)

Where δ is expected consumption due to sudden or surprise rise is income. This theory states that there is uncertainty about future income, it may increase or decrease over time. When individuals get an unexpected rise in their income, their consumption also increases, and when income declines the consumption is reduced. This kind of change is unpredictable. Hence, the change in consumption in case of uncertainty is random (Dwivedi, 2010).

Empirical Review

Rahman and Ferdaus (2021) ascertained the dynamic impacts of domestic savings and domestic investment on economic growth of Pakistan by using annual data spanning from 1973 to 2018. After being confirmed that all the variables are stationary at first difference and have long-run cointegrating association, this study employed Dynamic Ordinary Least Squares (DOLS) approach to estimate long-run elasticities. The empirical findings reveal that domestic savings are negatively and domestic investment is positively associated with economic growth in Pakistan. In a nutshell, the results convey that domestic savings are dampening the economic growth figures and domestic investment is contributing to economic growth figures of Pakistan. The results of causality analyses report bidirectional causal link between domestic savings and economic growth and a unidirectional causal association between economic growth and domestic investment. Based on these empirical findings some policies are recommended to accelerate economic growth and for the long term sustainability of economic growth in Pakistan.

Ismael and Rashid (2013) conducted a study on the relationship between household saving and various socio-economic and demographic variables in Pakistan by applying the Johansen cointegration procedures. Furthermore, Error Correction Model is also estimated to find out the convergence of the model towards equilibrium. The results show that there exists a long-run relationship between household saving and the variables used

in the study, while the result of the Error Correction Model reveals that about 45% convergence towards equilibrium takes place every year.

Kudaisi (2013) investigated the determinants of domestic savings in West Africa using panel data collected from 1980-2006. The theoretical foundation for this study is a random walk Hypothesis, generalized ordinary squares, and fixed-effect model, used as econometric tools. The results showed that the dependency ratio, the interest rate is negative and insignificant on domestic savings. But the growth of GDP is positive and statistically insignificant. Moreover, the government budget surplus and inflation rate are found to be statistically significant and the development of the West Africa financial market has a positive effect on savings. The real interest rate and terms of trade have an insignificant impact.

Ahmad and Mahmood (2013) worked on macroeconomic determinants of domestic Savings in Pakistan. The co-integration using Autoregressive Distributed Lag Model (ARDL) bound testing approach for co-integration techniques to check the robustness for long-run relationship and error correction Mechanism. They found that per capita income inversely related to domestic savings rate, both in the long-run and as well in the short-run significantly. The exchange rate and inflation rate harm savings. Moreover, trade openness is positively associated with national savings in Pakistan.
Ogbokor (2014) the purpose of this study was to empirically establish the determinants of savings in Namibia through the use of co-integration and error correction mechanisms for the period stretches from 1991 to 2012. Here, macroeconomic quarterly data sets were used. The results of the co-integration tests suggest that there is a long-run relationship between savings and the explanatory variables used in the study. Thus, inflation and income have a positive impact on savings, while the population growth rate has negative effects on savings. Further, deposit rate and financial deepening have no significant effect on savings. Finally, the need to achieve a higher rate of savings in Namibia implying income levels cannot be overstretched.

Elias and Worku (2015) analyzed the causal relationship between economic growth and savings in two East African countries Uganda and Ethiopia using time series data (1981-2014), using VECM and Johansen's Co-integration approach. The results confirmed that there is a significant relationship between domestic savings and economic growth in the case of Ethiopia and Uganda. The results of Granger Causality showed the presence of unidirectional causality between economic growth and gross domestic savings in Ethiopia and Uganda. The gross domestic product does Granger cause gross domestic savings in both countries.

Olesia (2015) intended to indicate the causal relationship that exists between savings and economic growth in Albania on time series collected from 1992- 2012. Johansen Co-integration Test and VECM were used. The results showed a positive relationship between savings and economic growth in conjunction with the corresponding role of FDI toward growth. He suggested to the government to pay special attention to FDI policies to make positively affect the economic growth of the country. Adelakun (2015) used time-series data within twenty-nine years in Nigeria to examine the relationship between savings, investment, and economic growth using co-integration and VECM. The result

exhibited a positive relationship between savings, investment, and economic growth. The inflation rate contributed negatively to saving, while interest rate positively affects saving.

Iragena (2015) investigated the relationship between savings and its determinants in Rwanda, using VECM and Granger causality testing approaches to check the robustness for long-run relationship and Error Correction Model (ECM) for short-run dynamics during 1978-2012. The findings revealed that the per capita income inversely related to national saving in the short-run and positively related in the long-run. Capital formation has a positive effect on national saving both in the short and long-run. The consumption and interest rate have an inverse relation with savings in the short and long-run, however, inflation has a positive influence on savings both in the long and short-run in Rwanda.

Moussavou(2017) analyzed the determinants of the domestic savings in Congo-Brazzaville. The results obtained from the VECM show that in the long term, the terms of the exchange, the rate of inflation, the real interest rates, the gross domestic product per capita and the financial deepening moved of a period, explain the domestic savings. On one hand, terms of the exchange, per capita GDP, and the financial deepening moved of two periods, affect the domestic savings. On the other hand in the long-run, these results show that the terms of the exchange, the inflation rate, and the real interest rates influence the domestic savings in Congo-Brazzaville.

Beshir (2017) used the co-integration and vector error correction model (VECM) to examine the factors affecting savings, real GDS, and the causal relationship between the Gross Domestic Savings (GDS) for Ethiopia of time series data. Results showed that gross domestic savings in Ethiopia are affected by age dependency ratio, real exchange rate, real interest rate, real gross domestic product, foreign capital inflow, and money supply both in the short and long run. The elasticity of the exchange rate concerning domestic savings is high and significant in the long run. This implied that continuous depreciation of the real exchange rate has a direct impact on domestic savings encouragement.

Byiringiro and Yu (2017) analyzed the Responsiveness of National Savings to the Monetary Policy and Economic Growth Strategies in Rwanda, where they used Keynesian Economic Model, Johansen co-integration test, the Dynamic Error Correlation Model, and Vector autoregressive estimates, on the time series data collected (1980-2015). Findings revealed that economic growth strategies increase national savings, through Foreign Direct Investment as it is significant in the short and long run while the other two variables (Exports and Deposits Interest rate) are only significant in the long-run.

Asghar and Nadeem (2015) examined both short-run and long-run causal relationship between national savings and its selected determinants in Pakistan for the period 1984-2014. Using the Johansen cointegration and Vector Error Correction Model (VECM), the results of the study indicate that foreign remittances, economic stability, and population have a positive impact on savings while government stability and income inequality affect negatively savings. Using the Toda Yamamoto Causality test the study indicates that there is bidirectional causality between income inequality and foreign remittances, income

inequality and population size, government stability and population size, savings, and income inequality.

Ogren (2018) examined the determinants of the saving behavior in 15 OECD countries, using panel data from 1995-2016. The findings showed that factors such as uncertainty unemployment as precautionary savings and the intensity of fiscal policy are found to have a significant effect on the level of total household income. There are other determinants, like demographic factors which contribute less to the explanation of unemployment but not inflation of the level of saving.

An overview of the above studies shows that different variables and estimation techniques had been used to investigate the relationship between factors that determine savings in different economies. Additionally, after their findings, they recommended future researches to use econometric analysis by using appropriate variables, data, and the latest estimation techniques. The results of this study may be helpful for policymakers to design and implement policies consistent with the economic conditions established also in Rwanda. Hence, this study tried to analyze the short-run and long-run saving behavior in Rwanda using recent advances in dynamic modeling and software packages.

Ramesh (2011) used granger causality test, Johansen co-integration test and vector error correction model to examine the direction of relationship between saving, investment and economic growth in India at both aggregate level and sectoral level for the period 1951 to 2008. The co-integration test result suggests that there exist co-integration relationship among all series with GDP except private corporate savings. The study also found that the direction of causality runs from savings and investment to economic growth collectively as well as individually and there is no causality from economic growth to savings and (or) investment. Sultan and Haque (2011) investigated the estimation of the relationship between domestic investment, export and economic growth in India using Johnson's co-integration methodology, the result showed that there is presence of a long run relationship between investment, export and economic growth in India. The study also shows that only domestic investment significantly contributes to economic growth both in long run and short run, while export has positive and insignificant impact on economic growth in India. This means that India should continue to focus on domestic investment while diversifying investment towards promoting export sector through investment in infrastructure.

Turan and Olesia (2014) investigated the impact of savings on economic growth in Albania over the period of 1992 to 2012 using Johansen co-integration test and error correction model. The result revealed that savings and economic growth are co-integrated, therefore showing the existence of a stable long-run equilibrium relationship.

Based on the literature reviewed, there are mixed modelling in the studies revealed and there are inconsistences in the choice of variables, the geographical area of the study and the scope are also inconsistence, the extent to which savings and investment affects economic growth has remained uncertain and undetermined in Nigeria. This has been identified as the existing gap of knowledge in literature.

Literature Gap

Budha (2012) employed the Autoregressive Distributed Lag (ARDL) approach to test for Cointegration, error correction and granger causality analysis in examining the relationship between the gross domestic savings, investment and growth in Nepal for the

period of 1975 to 2010. Mohamed (2014) examined the causal relationship among savings, investment and economic growth in Ethiopia using annual time series data from 1970-2011 in a multivariate framework. Turan and Olesia (2014) investigated the impact of savings on economic growth in Albania over the period of 1992 to 2012 using Johansen co-integration test and error correction model. Most of the studies examined above are foreign while this study examined the effect of saving rate on Nigeria economic growth.

METHODOLOGY

This study is designed to examine the impact of savings rate on Nigeria economic growth. The research design adopted in this study is the descriptive research method which is largely quasi-experimental. The data that used in this study will be collected from secondary sources. The instrument utilize for the collection of secondary data is documentation. Documentary data were collected via the Nigerian Stock Exchange bulletin (NSE), Security and Exchange Commission (SEC) bulletin and Central Bank of Nigeria (CBN) Statistical bulletin. The study utilized the secondary source because it provided a basis for purposeful research work and also gives a direction for the research work.

Data Analysis Procedure

The main tool of analysis is the Ordinary Least Squares (OLS) using the multiple regression method for a period of 34 years, annual data covering 1987– 2020. Statistical evaluation of the global utility of the analytical model, so as to determine the reliability of the results obtained were carried out using the coefficient of correlation (r) of the regression, the coefficient of determination (r^2), the student T-test and F-test.

(i) **Coefficient of Determination (r^2) Test:** This measure the explanatory power of the independent variables on the dependent variables.R^2 gives the proportion or percentage of the total variation in the dependent variable Y that is accounted for by the single explanatory variable X. The higher the R^2 value the better. For example, to determine the proportion of monetary policy to private sector funding in our model, we used the coefficient of determination. The coefficient of determination varies between 0.0 and 1.0. A coefficient of determination says 0.20 means that 20% of changes in the dependent variable is explained by the independent variable(s). Therefore, we shall use the R^2 to determine the extent to which variation in monetary policy variables are explained by variations in private sector funding variables over the periods covered in this study.

(ii) **Correlation Co-Efficient (R):** This measures the degree of the relationship between two variables x and y in a regression equation. That is, it tries to establish the nature and magnitude of the relationship when two variables are been analyzed. Thus correlation co-efficient show whether two variables are positively or negatively correlated. That is, it takes the value ranging from – 1, to + 1.

(iii) **F-Test:** This measures the overall significance. The extent to which the statistic of the coefficient of determination is statistically significant is measured by the F-test. The F-test can be done using the F-statistic or by the probability estimate. We use the F-statistic estimate for this analysis.

(iv) **Student T-test:** measures the individual statistical significance of the estimated independent variables. This is a test of significance used to test the significance of regression coefficients (Gujurati, 2003). Generally speaking, the test of significance approach is one of the methods used to test statistical hypothesis. A test of significance is a procedure by sample results are used to verify the truth or falsity of a null hypothesis (Ho) at 5% level of significance.

(v) **Durbin Watson Statistics:** This measures the colinearity and autocorrelation between the variables in the time series. It is expected that a ratio of close to 2.00 is not auto correlated while ratio above 2.00 assumed the presence of autocorrelation.

(vi) **Regression coefficient:** This measures the extent in which the independent variables affect the dependent variables in the study.

Model Specification

RGDP = f(3month, 6month, 12month) 1

Transforming equation 3.3 to econometrics form

$$RGDP = \alpha + \beta_1 3MONTHS + \beta_2 + 6MONTHS + \beta_3 12MONTHS + e_i \quad 2$$

Where;

RGDP = Real gross Domestic Product

3months = 3months deposit rate

6months = 6months deposit rate

12months = 12months deposit rate

$\phi_0\ \alpha_0$ = Constant

β_1 - β_5 = Coefficients of independent variables

ε = Error Term

Estimation Methods

Dickey-Fuller Test

Generally, time-series data are not stationary which means that they usually exhibit unit root which can be removed by differencing. When variables exhibit a unit root, it indicates that the expected value is non-constant or that the variance is changing over time, either increasing or decreasing (Studenmund, 2014). This causes the regression model to be incorrect while the R2 and t scores show the opposite, leading to spurious results of the regression (Khamsi, 2016). A series that contains stochastic trends is non-stationary and violates OLS assumptions (Stock &Watson, 2012). This study used the Augmented Dickey-Fuller (ADF) test, which follows the same features as the Dickey-Fuller statistic, by adding the lagged value of the dependent variables (Gujarati & Porter, 2009). ADF test aims at checking for the presence of a unit root in a time series. .

Lag-Order Selection model

In economics, the dependence of a variable Y (response variable) on another X (predictor variable) is rarely instantaneous. Very often Y responds to X with a lapse of time. Such a lapse of time is called a lag (Stock & Watson, 2012). Therefore, the researcher must be careful when choosing the lag length in a model considering the types of data used. When determining the optimal lag length, this is done by considering the relevant information criteria such as Akaike's information criteria (AIC) or Schwarz's Bayesian information

criteria (SBIC). By using information criteria, the empirical issue is somewhat resolved since the information criteria with the lowest value are the ones preferred (Stock & Watson, 2012).

Johansen Cointegrating Test

Two economic series are co-integrated if they have a long-run relationship or equilibrium relationship between them (Gujarati & Porter, 2009). Regarding the need to test for cointegration among the time series variables, two approaches can be used viz: Engle-Granger approach which is useful in a simple model with two variables and Johansen's co-integration approach which is suitable for a multivariate series (Wakyereza, 2019). Since the Engle-Granger approach is a single-equation-model-based approach and our model uses more than two variables, the Johansen co-integration methodology becomes convenient to this study.

Granger Causality

VECM is a special case of the VAR model that uses applications that increase the possibility of measuring the interaction between variables known as Granger causality. The latter is used to determine the direction of causality -the unidirectional, bidirectional relationship-or independence between variables. This model aims to decide whether the past value of independent variables, helps to predict the value of the explanatory variable. For instance, A granger causes B, otherwise, it can be called A non-granger causes (Ahmad, 2015).

Vector Error Correction Model (VECM)

It is recommended to use an ordinary VAR in the first difference if variables in a data set are not cointegrated (Anoruo and Ahmad, 2001). But if they are co-integrated, then a VECM, which combines levels and differences, can be estimated instead of a VAR in levels (Maitra, 2019). Therefore, VECM allows analyzing the short-run dynamics and long-run equilibrium relationships in a data set (Khamsi, 2016). A VECM is an augmented version of a vector autoregressive model (VAR) which includes a lagged error correction term for the sake of measuring the long-run relationship (Khamsi, 2016).

Sims (1980) proposed the VAR model framework as the standard tool in macroeconomic modeling. In this application, VARs are used to model the underlying structure of the economy (Stock and Watson, 2012).VAR (p) is represented as follows:

$$Yt = c + \sum_{i=1}^{p} \rho_i y_t - 1 + \varphi y_{t-1} + U_t, \quad t = 1,...,T \qquad (3.3)$$

Where y_t is a k × 1 vector of variables, c is a k × 1 vector of parameters, φ" is k × k coefficients matrices containing the short-run dynamic parameters and u_t is a k × 1 vector of white noise disturbances, or the residual or stochastic error. The u_t has mean zero, covariance matrix Ω and i.i.d. normal over time. Since all the variables have a unit root and there is cointegration, the best alternative is to choose VECM.

The latter is a restricted VAR model with cointegration restrictions built into the specification that restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationship by an ECT (Stock &Watson, 2011; Gujarati & Porter, 2006). By not considering the deterministic trend terms, the multivariate VECM can be written as follows:

$$\Delta Yt = c + \sum_{i=1}^{p-1} \rho_i \Delta y_{t-1} + \varphi E_{t-1} + U_t, \; t = 1, \; .....T \qquad (3.4)$$

The ECT is represented by $\Delta Yt = yt - yt,\ Et-1$, and φ is the speed of adjustment coefficient of the correction. The dependent variable is a function of its lag, function of the lagged values of the other regressor in the model, an error correction term, and a stochastic error (Stock and Watson, 2012). The ECT (Et-1) is what contains the long-run information that is derived from the cointegrating relationship using OLS regression. The ECT is defined by the following equation: $E_{t-1} = Y_{t-1}a - \delta X_{t-1}$. Where the long-run cointegrating relationship between *x* and *y* is shown by the parameters a and δ.

Table 1: Variables and A-priori Expectations

Variable	Measurement	Notation	Expected Relationship
Gross Domestic Products	Changes in Monetary value of GDP	RGDP	Dependent variable
3months	Rate	3months	+/-
6months	Rate	6months	+/-
12months	Rate	12months	+/-

Source: Authors Research Desk 2022

RESULTS AND DISCUSSION OF FINDINGS

Table 1: Testing for Unit Root (Stationarity Test

Variable	ADF	Critical value 1%	Critical value 5%	Critical value 10%	Order of Integration	Conclusion
At level						
RGDP	-2.887150	-3.646342	-2.954021	-2.615817	Not stationary	Accept null hypothesis
3months	-2.087934	-3.646342	-2.954021	-2.615817	Not stationary	Accept null hypothesis
6months	-2.243725	-3.646342	-2.954021	-2.615817	Not stationary	Accept null hypothesis
12months	-4.932974	-3.689194	-2.971853	-2.625121	stationary	Reject null hypothesis
At difference						
RGDP	-7.707518	-3.653730	-2.957110	-2.617434	stationary	Reject null hypothesis
3months	-4.033337	-3.689194	-2.971853	-2.625121	stationary	Reject null hypothesis
6months	-6.784068	-3.653730	-2.957110	-2.617434	stationary	Reject null hypothesis
12months	-10.41382	-3.670170	-2.963972	-2.621007	stationary	Reject null hypothesis

Source: Computed from E-View 9.0

The ADF unit root test indicates that all the variables were stationary, at first difference. However, following Harris (1995) and Gujarrati (2003), both I(1) and I(0) variables could be carried forward to test for co-integration which forms the basis of the next section. The Johansen co-integration test was used to test for the existence or not of a long run relationship among the variables. The Johansen methodology was preferable for the study because it has the advantage amongst others of allowing for more than one co-integration vector. The result of the Johansen co-integration test is shown in the table below:

Table 3: Johansen Co-Integration Test Results

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.594591	50.69025	47.85613	0.0264
At most 1*	0.405943	31.79879	29.79707	0.0498
At most 2	0.091088	5.133805	15.49471	0.7945
At most 3	0.062862	2.077578	3.841466	0.1495
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.594591	28.89146	27.58434	0.0338
At most 1*	0.405943	26.66498	21.13162	0.0484
At most 2	0.091088	3.056227	14.26460	0.9429
At most 3	0.062862	2.077578	3.841466	0.1495
Normalized cointegrating coefficients (standard error in parentheses)				
RGDP	_3_MONTHS	_6MONTHS	_12MONTHS	
1.000000	-7.875080	11.79248	-4.333772	
	(1.17074)	(1.78322)	(1.42824)	

Source: Computed from E-View 9.0

The trace statistics from model indicate no co-integrating equation from the model I co-integrating equation from hypothesis IV. In conclusion, there is long run relationship between money market rate and Nigeria real gross domestic products.

Table 4:Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
_3_MONTHS does not Granger Cause RGDP	32	0.03650	0.9642
RGDP does not Granger Cause _3_MONTHS		0.20250	0.8179
_6MONTHS does not Granger Cause RGDP	32	0.03690	0.9638
RGDP does not Granger Cause _6MONTHS		0.36531	0.6974
_12MONTHS does not Granger Cause RGDP	32	0.03739	0.9634
RGDP does not Granger Cause _12MONTHS		0.41092	0.6671

From model the study found no causal relationship among the variables, we accept the null hypothesis

Table 4: VAR Lag selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-236.7478	NA	65.41142	15.53212	15.71715	15.59243
1	-209.2496	46.12594	31.50536*	14.79030*	15.71545*	15.09188*
2	-201.3087	11.27105	56.12018	15.31024	16.97551	15.85307
3	-177.5079	27.63954*	39.48373	14.80696	17.21236	15.59106

The optimum lag is determined by the AIC, SC and HQ criteria. Table 4.9 indicates that AIC indicates the lowest optimal lag length of 1. Therefore, estimating the VAR model uses 1lags, including stability and diagnostics test in the regression results.

Table 5: Parsimonious Error Correction Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1))	0.012226	0.303433	0.040291	0.9684
D(RGDP(-2))	0.013772	0.322381	0.042720	0.9665
D(RGDP(-3))	-0.356182	0.274952	-1.295432	0.2136
D(_3_MONTHS(-1))	0.865015	1.807028	2.478695	0.0386
D(_3_MONTHS(-2))	0.867422	1.393098	0.622657	0.5423
D(_3_MONTHS(-3))	1.845852	1.328582	1.389340	0.1838
D(_6MONTHS(-1))	0.780428	2.221076	3.351374	0.0039
D(_6MONTHS(-2))	-0.998794	1.460894	-0.683687	0.5040
D(_6MONTHS(-3))	-1.176902	1.561489	-0.753705	0.4620

D(_12MONTHS(-1))	-0.102366	1.326484	-0.077171	0.9394
D(_12MONTHS(-2))	0.143580	0.997437	0.143949	0.8873
D(_12MONTHS(-3))	-0.353336	1.216512	-0.290450	0.7752
ECM(-1)	-0.551975	0.390754	-1.412589	0.1769
C	-0.291450	0.620567	-0.469651	0.6449
R-squared	0.525098	Mean dependent var		-0.451667
Adjusted R-squared	0.439240	S.D. dependent var		3.583719
S.E. of regression	3.324873	Akaike info criterion		5.545465
Sum squared resid	176.8765	Schwarz criterion		6.199357
Log likelihood	-69.18197	Hannan-Quinn criter.		5.754651
F-statistic	1.360857	Durbin-Watson stat		1.492100
Prob(F-statistic)	0.276331			

Source: Computed from E-View 9.0

The Parsimonious ECM result highlighted the significance of the effect of savings rate on Nigeria real gross domestic products. The result indicates that the relationship between savings rate and Nigeria real gross domestic products has mixed result, while some of the variables have positive impact at lag I it will record a negative impact at lag II. However, the variables are statistically significant. Also the ECM (-1) coefficient shows that 55.1 percent of the error produced in the previous period are corrected in the current period. The error term however is not statistically significant ECM (-1) is speed of adjustment towards equilibrium or error correction term.

Discussion of Findings

In the second hypothesis, real gross domestic product was formulated as the function of money market rates. The study found that 3 months and 6 months savings have positive and significant effect on the growth of Nigeria economy while 12 months savings rate have negative and no significant effect. The positive effect of the variables confirms the expectations of the study and justifies the objectives of establishing the money market for investment and sources of short funds. Fredrick (1986) explained that high liquidity preference requirement encourage the crowding out effect of the private sector and provides the government with the buffer of resources to finance her deficits. This leads to under-development of the economy. Fredrick (1986), contends that high interest rate is an effective tool for curbing high inflation. Giovanni (2012) argued that small economies are affected by conditions in large countries) that is high large country's interest rate have the concretionary effect on annual real GDP /growth in the domestic economy. But this effect is centered in countries with fixed exchange rates, the effects on interest rate in small countries are through direct monetary policy channel and general capital market or a trade effect, a demand shock leads to a short term rise in the real interest rate.

The negative effect of the 12 months savings rate on economic growth could be traced to negative effect of the yield curve and underdeveloped nature of the money market. Theoretically, the findings is in line with the liquidity preference theory of Keynes, the findings is also in compliance with classical theory of monetary policy. Empirically, the findings confirm the findings of Obuteet al (2012) that real deposit rate has no significant impact on saving before and after deregulation (liberalization); and also, real lending rate has no significant impact on investment before and after liberalization but that investment has a positive and significant impact on economic growth. Onwumere, Okore& Imo (2012) that interest rate liberalization has a negative significant impact on investment in Nigeria; only real lending rate was use in the estimation of investment. Akiri & Adofu (2007)

identified other factors which impede investment in Nigeria namely, political instability, exchange rate inflation rate, unawareness of investment opportunities and corruption in other to bring out the level of influence of exchange rate and inflation rate into investment and the findings of Chuba (2005) that real lending rate have a negative but insignificant impact on gross domestic investment (GDI) and that interest rate liberalization does not have negative impact on GDI as usually claimed.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study examined the effect Central Bank of Nigeria savings policy on Nigeria economic growth. The ECM (-1) coefficient shows that 55.1 percent of the error produced in the previous period are corrected in the current period. From the model, the study concludes that there is significant relationship between 3months savings rate and Nigeria real gross domestic product. The study concludes that there is significant relationship between 6months savings rate and Nigeria real gross domestic product. The study concludes that there is no significant relationship between 12 months savings rate and Nigeria real gross domestic product.

Recommendations

i. The government should set a sound and fertile environment such as further reforms in the banking sector and deregulations of savings and lending rates in order to foster domestic saving that enhances Nigeria economic growth.
ii. The federal government of Nigeria through its Central Bank should strengthen commercial banks to dispense more credits to private investors for sustained increase in economic activities and a robust monetary policy to check mate inflation. The regulatory authorities should be encouraged to direct their credit to priority sectors of the economy.
iii. Monetary authorities should regulate the activities of deposit money banks to ensure that they gear up the growth of credits to private sectors by examining factors, such as lending interest rate which can possibly undermine lending to these sectors.

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