Analysis of the Effects of Money Market Fund Mobilization on the Dynamics of Nigerian Economic Growth

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

> ***Original Research Article***

Abstract

Economic growth is a function of some productive efforts among which savings mobilizations is considered very vital. This study examines savings mobilization strategy and its impact on Nigeria's economic growth during the year 2001-2022.This is vested with the objectives to investigate the effect of banking density, savings rates and money supply on economic growth. The study relies on time series data sourced from the publication of the Central Bank of Nigeria. Gross Domestic Product Growth Rate (GDPGR) was adopted as dependent variable, while Banking Density (BD), Savings Rates (SR) and Money Supply (MS) were the

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independent variables. Augmented Dickey Fuller (ADF) unit root test was employed, to test the stationarity. The Auto Regressive Distributive Lag (ADRL) was used to ascertain the relationship between the variables alongside Vector Error Correction Model (VCM). Post estimation diagnostic tools used include Breuch-Godfrey serial correlation LM test and the CUSUM test for stability. From the ARDL, β-coefficient and the associated probabilities were adopted to determine the extent and direction of relationship on economic growth. Data were tested at 5% level of significance; it was discovered that banking density and savings rates affected economic growth positively but with insignificant effects, while money supply affected economic growth negatively with insignificant effect. The study therefore recommends amongst others, that stakeholders, be directed towards entrenching higher banking density as opposed to banking desert, and that money supply should be made dynamic in accordance with economic realities.

1 Introduction

"Economic growth at all stages and levels of sophistication have long been known to be dependent on some combinations of sustainable productive efforts made by economic agents among which savings mobilization is considered paramount. This has been evidently corroborated by common notion that countries with higher rates of savings have had a faster economic growth than those with lower saving rates" [1,2]. Evidences from theoretical views and empirical findings substantiate the merits of savings mobilization with the claim that capital accumulation creates greater opportunities for production and the productivity of a country by providing some additional income streams for more economic activities. It was along these thoughts that Ang [3] reviewed the United Nations Conference on "Trade and Development and Globalization: Facts and Figures" (2004). It was emphasized that the main factor in increasing in-country capital is the increase of savings and that, in that regard, developing countries should prioritize programs that promote domestic savings, in order for capital to be invested towards the most productive practices.

"The unattractive global savings have been worsened over the last decade because they were largely channeled to advanced countries rather than the developing world, where finance is mostly needed for achieving development goals" [3]. The case with Nigeria is spectacular, having undergone many economic and banking reforms in recent time, made by the Federal government through the monetary authorities, which ranges from bank consolidation to the recent aborted naira redesign of 2023, which were all aimed at improving savings mobilization toward increased investment and economic growth.

This study seeks to specifically explore the Nigerian money market savings mobilization efforts and empirically determine its effect on economic growth. Specifically, the study examines the effects of banking density, savings rate and money supply on Nigerian economic growth.

1.1 Statement of the problem

Taking a departure from the old debates on finance and growth nexus that related with the fundamentalists point of view and the Keynes model (1936), there exists, in recent years a plethora of studies by different authors on savings-growth relationship. "This shows an indication that there has not been a conclusive agreement on the debates as to whether it is savings that leads to economic growth or whether it is the growth in economy that causes the change in the rates of savings" [2]. It has also been noted that there exists a divergence in the perceptions and also in empirical findings among researchers from different economic environments over matters relating to the role of savings on economic growth. The duration of the age long debate has created a wide research gap that demands taking some microscopic looks at the savings mobilization efforts of the financial market subsectors from various economies, whether such has any bearing with economic growth.

The case with savings mobilization efforts by the money markets among developing economies, with specific reference to Nigeria have called for investigations, where economic environment is beclouded with many negative issues relating to mismanagement, fraud and policy inconsistency. The combination of these negative issues may in practice hinder the efficiency of every economic development effort including savings

mobilization. This study is saddled with the responsibility of empirically investigating the effect of the savings mobilization efforts of the Money market on Nigerian economic growth.

1.2 Significance of the study

The study will assist in broadening the understanding and scope of knowledge of bankers, regulatory authorities, policy makers and researchers with relative to the vital roles expected of the money market and to various activities in savings mobilization.

2 Literature Review and Theoretical Framework

2.1 Savings mobilization efforts

Savings mobilization entails creation of safe and sound institutions where savers can place their deposits with the hope that they will get the total value of their funds along the real return in the course of withdrawal. As indicated by the United States' Federal Reserve Bank (2005), "Savings mobilization can be assessed by examining the effectiveness with which the financial system provides saving facilities and mobilizes financial resources from households and firms. The extent of financial savings could be ascertained by examining the level and trends in the ratio of broad money to GDP. This indicator may overstate the true picture if currency constitutes a high proportion of broad money. Other more specific indicators of access to savings facilities include the ratio of bank deposits to GDP and the proportion of the population with bank accounts. Information on the outreach of the financial system can help interpret developments in financial savings".

2.1.1 Banking density

Bank density conceptually indicates the total number of bank branches, the population per bank branch, and the distribution of branches. On the other side, the absence of density is an indication of geographic areas with relatively little financial access called "banking deserts". "The concept of "banking deserts" appears to be uniquely American, it is often most evident in large central-city areas. Urban density gradients and income gradients often follow different paths in US cities compared to elsewhere. But, since poverty is concentrated in these areas, residents lack access to financial services; limited automobile access and reliance on underfunded public transportation may matter more than physical proximity to a bank branch, even if it is only a few miles away. Noticeably, where-ever poverty is concentrated in an area, residents lack access to financial services; limited automobile access and reliance on underfunded public transportation might matter more than physical proximity to a bank branch" [4].

The case with bank density as defined per population is a relative term among developing economies since their commercial banks are usually business oriented and are only prominent at administrative, commercial and education centres.

2.1.2 Savings rate

Savings is the mobilizing and channeling of deposits from households and firms to the productive sectors of the economy via savings mobilization efforts associated with financial intermediation and financial deepening which reflects the soundness of the financial sector and the ability with which credit are created with respect to lending and deposit rates. Savings rate is a function of the Monetary Policy Rate (MPR) which represents the benchmark interest rate at which Central banks lend money to commercial banks. Whereas lending rate is the rate at which banks lend money to their customers, savings rate is the rate at which banks pay in addition to the amount borrowers keep with the banks over a period of time. An economic effective savings and lending rates will in accordance to theories and empirical findings attract savers and investors to use the money market mechanism for fund mobilization. This is therefore an indication that the role of bank savings rates in fund mobilization and economic growth is vital.

As observed by Rabaj and Mexhuani [2] "a rise in aggregate savings would yield larger investment associated with higher GDP growth. As a result, the high rate of savings increase the amount of capital and lead to higher economic growth in the country. They further posit that based on the theory of marginal inclination to save

revenue, growth leads to the expansion of the savings rates and that it cannot be denied that an increase in aggregate savings would boost investment and promote economic growth. The objective of economic growth is not achievable without significant level of resources from the financial sectors being mobilized and deployed to finance business expansion and growth. The money market has to be effective intermediaries for mobilizing and channeling deposits to the productive sectors of the economy via savings mobilization efforts. Since independence in 1960, the money market in Nigeria has been playing this important role in development process of the nation".

2.1.3 Money supply

Money supply is the behavior of the central bank of a country that has the mandate to control the money supply through monetary and fiscal policies and bring about the desired economic objectives changes. The equilibrium amount in the market for money explains the money stock, as opposed to the money supply, which is a behavioral function specifying the amount that would be supplied at various interest rates and income levels. Odi [5] conceptualized "money supply as the sum of all the currency and other liquid assets in a country's economy on the date measured, it comprises all cash in circulation and all bank deposits that the account holders can easily convert to cash".

Money supply and money stock are identical in the case where money supply is exogenously determined, usually by the policies of the Central bank. In such a case, it is independent of the interest rate and other economic variables. Much of the monetary and macroeconomic reasoning of a theoretical nature assumes this case, so that the terms "money stock" and "money supply" are used synonymously. One has to judge from the context whether the two concepts are being used as distinct or as identical ones. The control of the money supply rests with the monetary authorities. Their policy with respect to changes in the money supply is known as monetary policy. The generic contents of these monetary variables can be taken to be as follows:

$$M_1 = \text{Currency in the hands of the public} + \text{checkable deposits in commercial banks;}$$

$M_2 = M_1 +$ savings deposits in commercial banks. These generic components are molded to suit the context of different countries and their central banks. Further, in general, with increases in the substitutability of different monetary assets, the components of each of the aggregates have broadened over time. Often, the variations in the components of M_1 are accommodated by using terms such as M_1, M_1+, M_1++, etc.

2.1.4 Money market

Money market is the term which embraces all institutions that handle the purchase and sale plus transfer of short term money and credit instruments. The money market securities are usually small risk due to loss, because they are issued by obligors of the highest credit ranking and they mature in one year. Money market is the market for the purchases and sales of large volumes of short-term debt instrument such as commercial papers, treasury bills, purchase agreements, treasury certificates, development stocks and such other products that usually take place between financial institutions, companies and individuals which are viable economic tools for gendering sustainable economic growth.

Money market in monetary and macroeconomics is the market in which the demand and supply of money interact, with equilibrium representing its clearance. Money market is the market for the purchases and sales of large volumes of short-term debt instrument such as commercial papers, treasury bills, purchase agreements, treasury certificates, development stocks and such other products that usually take place between financial institutions, companies and individuals which are viable economic tools for gendering sustainable economic growth. By providing liquidity for effective functioning of all the entities in an economy, money market have gained the confidence of economic regulators and that of economic planners globally having become the pivot on which both the developed and developing economies run.

2.1.5 Economic growth

"Economic growth could be defined as the increase in the amount of goods and services in a given country at a particular time. This of course indicates that when the real per capita income of a country increases over time, economic growth is taking place. A growing economy produces goods and services in each successive time

period, showing that the economy's productive capacity is at increase. Broadly speaking, economic growth raises the standard of living of people and reduces the inequalities of income distribution" [6].

Economic growth is the positive outcome from the process by which a nation's wealth increases overtime. The most widely used measures of economic growth are the rate of growth in a country's total output of goods and services evaluated by the Gross Domestic Product (GDP). This is therefore an indication that economic growth is primarily driven by improvement in productivity, producing more goods and services with the same inputs of labor, capital, energy and materials.

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According to Ogbulu and Torbira [7], "Economic growth is a sustained rise in the output of goods, services and employment opportunities with the sole aim of improving the economic and financial welfare of the citizens. Economic growth can also be viewed as an increase in a country's productive capacity, identifiable by a sustained rise in real national income. Economic growth is an important issue in economics and is considered as one of the necessary conditions to achieve better outcomes on social welfare, which is the main objective of economic policy. It is thus an essential ingredient for sustainable development. Gross Domestic Product (GDP) has been often adopted as an appropriate surrogate for economic growth. The economic growth as proxy by GDP is one of the primary indicators used to gauge the health of a country's economy. It represents the total value of all goods and services produced over a specific time period looking at the size of the economy. Usually, GDP is expressed as a comparison to the previous quarter or year. It is equal to the total expenditures for all final goods and services produced within the country in a stipulated period of time".

2.1.6 Theory of financial intermediation

The theory of financial intermediation as propounded by Allen and Santomero (1998) asserts that "the growth of intermediation tends to lead to the advancement of financial markets and the development of the financial sector leads to the expansion of the economy. Banks have been since earliest times, receiving deposits from households and giving loans to economic agents that require capital. The economic agents invest cash in economic activities that generate revenues and enhance economic growth. Financial intermediation theory totally excludes the traditional Arrow-Debreu model of resource distribution. This model declares that households and firms relate through markets and financial intermediations play no role. According to the theory, markets are complete and perfect. Distribution of resources is therefore effective and there is no room for intermediaries to enhance wellbeing. Furthermore, the Modigliani-Miller theorem is relevant in this context as it affirms that financial arrangement does not make a difference, as households can create portfolios to offset any situation taken by an intermediary, thus intermediation would not create value". Allen and Santomero (1998), in their point of view, stated that "financial markets permit an effective allocation and such that the claim that financial intermediation has no role to play is obviously at odds with what is noted in practice. This theory is considered very important because it was based on financial intermediation which is the primary role of the money market".

2.1.7 Demand - following hypothesis

The demand-following view of the development of the financial markets is merely a lagged response to economic growth (growth generates demand for financial products). This implies that any early efforts to develop financial markets might lead to a waste of resources which could be allocated to more useful purposes in the early stages of growth. As the economy advances, this triggers an increased demand for more financial services and thus leads to greater financial development. Some research work postulate that economic growth is a causal factor for financial development. According to them, as the real sector grows, the increasing demand for financial services stimulates the financial sector.

2.1.8 Supply-leading hypothesis

The supply-leading hypothesis suggests that financial deepening spurs growth. The existence and development of the financial markets brings about a higher level of saving and investment and enhance the efficiency of capital accumulation. This hypothesis contends that well-functioning financial institutions can promote overall economic efficiency, create and expand liquidity, mobilize savings, enhance capital accumulation, transfer resources from traditional (non-growth) sectors to the more modem growth inducing sectors, and also promote a competent entrepreneur response in these modern sectors of the economy. This study considers the reviewed theories as very important and been closely relevant they jointly formed an anchor upon which the study rests. Nevertheless, the tenets of the Supply- Leading hypothesis is considered most important being centered on interrelated evidences on financial deepening, saving mobilization, financial market development and economic growth

2.2 Empirical literature review

Rahman and Uddin (2005) investigated "the role of saving in accelerating economic growth in Bangladesh and estimates a simultaneous equation related to this to assess the impact of various factors in determining savings and economic growth in Bangladesh with special emphasis on the impact of financial sector reforms initiated in the late 1980s. The findings revealed that the growth rate and real rate of interest have a positive impact on saving rate. Also the dummy variable (financial reform index) has a significant positive effect on saving rate indicating that the financial sector reform has ultimately enhanced saving rate in Bangladesh. Population per branch of scheduled banks, on the other hand, is negatively related to saving rate suggesting that increased availability of branches of banks can stimulate the saving tendency of people. Further, financial savings in turn, foreign direct investment and literacy rate positively affect the growth rate of the economy. Their findings also confirmed the saving-growth simultaneity reflecting that saving and growth positively affect each other and go hand to hand".

Ang [3] identified "the key factors behind Malaysia's remarkable savings performance. Drawing on the life cycle theory, the saving function is estimated by incorporating other relevant structural features and institutional settings of the Malaysian economy into the specification. Particular emphasis has been placed on the roles of financial factors in mobilizing funds in the private sector. The results suggest that financial deepening and increased banking density tend to encourage private savings. Development of insurance markets and liberalization of the financial system, however, tend to exert a dampening effect on private savings".

Agarwal [8] investigated "the causality between gross domestic product (GDP) and saving for a sample consisting Asian economies. The author discovered that, in most economies causality runs from GDP to saving". In Mexico, Sinha and Sinha [9] employed "econometric techniques to validate or invalidate the claim that higher saving rate leads to high growth rate. The empirical results did not support the view that higher savings rate causes higher economic growth. The authors concluded that causality runs from economic growth to saving".

Mohan [10] examined "the relationship between domestic savings and economic growth by taking into consideration the income levels of the different countries studied. He grouped the countries into various categories, namely low income countries (LICs), low middle income countries (LMCs), upper middle income countries (UMCs), and high income countries (HMCs). The author's results support the claim that causality runs from economic growth rate to growth rate of savings. The author submitted that the income level of a country plays an important role in determining the causal relationship between savings and economic growth. In addition, the author reported that empirical results were mixed in the LICs, while causality runs from growth rate to savings rate for most of LMCs. Finally, whereas in the HICs (except Singapore), causality runs from economic growth rate to growth rate of savings, a feedback causal relation was more prevalent in the UMCs".
Bassam AbuAl-Foul [11] employed "an econometric technique to investigate the long-run relationship between real gross domestic product and real gross domestic saving for Morocco and Tunisia during the period 1965-2007 and 1961-2007, respectively. The regression exercise reveals interesting results. For instance, it was shown that whereas a long-run relationship exists between gross domestic product and gross domestic saving in Morocco, there was no such evidence for Tunisia. Secondly, the Granger causality test indicates the existence of a two-way causal relationship between gross domestic product growth and gross domestic saving growth in Morocco. Lastly, the author observed a unidirectional Granger causality between real gross domestic product

and real gross domestic saving as causality runs from gross domestic saving growth to gross domestic product growth in Tunisia".

In the case of Nigeria, Abu [11] employed "the Granger-causality and co-integration techniques to analyze the relationship between saving and economic growth in Nigeria during the period 1970- 2007. The Johansen co-integration test indicates that the variables (economic growth and saving) are co-integrated, and that a long-run equilibrium exists between them. In addition, the granger causality test reveals that causality runs from economic growth to saving, implying that economic growth proceeds and granger causes saving. Thus, they reject the Solow's hypothesis that saving precedes economic growth, and accept the Keynesian theory that it is economic growth that leads to higher saving".

Saltz [12] using "the model of vector error correction (VEC) and the model of vector auto regression (VAR) analyzed the relation between savings and economic growth in seventeen countries from all over the world. The results of the analysis indicated that in nine of the analyzed countries economic growth was the cause of increased domestic savings. In two countries the opposite relation was noticed, while in three other countries no causal relation between economic growth and domestic savings was identified. Finally, in two countries, the existence of a two-way causal relation between analyzed variables was confirmed".

Misztal [13] analyzed "the cause and effect relationship between economic growth and savings in advanced economies and in emerging and developing countries2. Employing co-integration models and Granger's causality test in estimating the relationship, the results confirmed the existence of one-way casual relationship between gross domestic savings and gross domestic product in the case of developed countries as well as in developing and transition countries. At the same time it revealed the absence of causal relationship between gross domestic product and gross domestic savings both in developed economies and developing and transition countries".

Anderson [14] conducted "a study to investigate the causal relationship between real output and savings for Sweden, UK and USA. The results indicated mutual long run relationship between variables only for Sweden and UK. The result also indicated short run bidirectional causality for USA and unidirectional causality from saving to output for UK. No significant evidence of short run causality was found for Sweden. He concluded that the causal chain linking savings and output might differ across the countries. He also suggested that causality in the long run might go in different directions than causality associated with short-term disturbances".

Sajid and Sarfraz [15] "employed co-integration and the vector error correction techniques using quarterly data for the period of 1973:1 to 2003:4, to investigate the causal relationship between savings and output in Pakistan. Their results suggest bi-directional or mutual long run relationship between savings and output level. However, there is unidirectional long run causality from public savings to output (GNP and GDP), and private savings to gross national product (GNP). The results also indicate that the speed of adjustment in case of savings is stronger than that of level of output. Implying that the overall long run results of the study favour the capital fundamentalist's point of view that savings precede the level of output in case of Pakistan. The short run mutual relationship exists between gross domestic product (GDP) and domestic savings. The results also indicate unidirectional short run causality from gross national product (GNP) to national and domestic savings; and from gross domestic product (GDP) to public savings. The short run causality runs only from national savings to gross domestic product (GDP). So the concluded that the overall short run results favour Keynesian point of view that savings depend upon level of output".

Saltz [12] investigated "the direction of causality between savings and growth rate of real GDP for 18 Latin American and newly industrialized countries for the period of 1960-1991. The results lent for greater support for the hypothesis that faster growth rate of real GDP caused higher growth rate of savings. Podrecca and Cormecci [16] discovered growth to saving; implying that economic growth proceeds and granger causes saving. Thus, they reject the Solow's hypothesis that saving precedes economic growth, and accept the Keynesian theory that it is economic growth that leads to higher saving. The author recommends that government and policy makers should employ policies that would accelerate economic growth so as to increase saving".

Olajide [17] investigated "the direction of causal relationship between saving and economic growth in Nigeria during the 1970 and 2006 period. The empirical results suggest that savings and economic growth are positively co-integrated indicating a stable long run equilibrium relationship. The causality test results showed the

existence of a unidirectional causality between savings and economic growth and the complementary role of FDI in growth".

Podrecca and Cormecci [16] found that "investment shares Granger caused growth rates and at the same time growth rates Granger caused investment shares. The Granger causality from investment shares to growth rates was found to be negative".

Aluko and Ajayi [18] examined "the determinants of banking sector development in sub-Saharan African countries using a panel of 25 countries from 1997 to 2014. It utilizes the system Generalized Method of Moments (GMM) dynamic panel model estimator. Using a composite index of banking sector development, the estimation results show that population density and simultaneous openness to trade and capital promote banking sector development while financial liberalization hinders banking sector development. This study reveals that institutional quality, population density, and trade openness increases the depth of the banking sector. Also, it demonstrates that law, inflation, and religion promote the efficiency of the banking sector while latitude, trade openness, income level, and ethnic diversity reduce banking sector efficiency. In addition, it shows that law and simultaneous openness to trade and capital enhances the stability of the banking sector while land area, financial liberalization, economic growth, and inflation adversely affect banking sector stability" .

Etale and Ayunku [19] investigated "if money markets spur economic growth in Nigeria? Using a granger causality approach, the study adopted money market instruments such as treasury bills (TBs), commercial papers (CPs) and bankers acceptances (BAs) as proxy for money market (independent variables), and gross domestic product (GDP) as proxy for economic growth (the dependent variable). Secondary time series data for the variables were collected from CBN Statistical Bulletin and the National Bureau of Statistics for the period 1989-2014. The study employed econometric techniques such as ADF, Unit Root Test, OLS, multiple regression and Granger Causality Test to analyzed the study data; strong evidence that TBs, and CPs had positive and significant influence on GDP, while BAs had positive but insignificant influence on GDP in Nigeria. The granger causality test result revealed no directional causality relationship between TBs and GDP, meaning that TBs does not granger cause GDP and vice-versa. There was also no directional causality relationship between CPs and GDP, BAs and GDP. However, there exists bi-directional relationship running from".

The study by Rabaj and Mexhuani [2] on "the correlation between savings and economic growth provides further insight on the case of Kosovo from both a qualitative and quantitative research methodology. The data used was from 2010 to 2017 and has been analyzed using the augmented Dickey-Fuller tests, Johansen cointegration tests, and Ganger causality test. The test of the unit root confirms stationarity, and the regression results showed that deposits have a significant positive impact on Kosovo's economic growth, because savings stimulate investment, production, and employment and consequently generate greater sustainable economic growth. Furthermore, loans and remittances also help boost the economy of Kosovo through their direct impact on investment. The paper confirmed that countries whose national savings rate is high are not dependent on foreign direct investment; consequently, the risk arising from volatile foreign direct investment decreases significantly"

2.3 Gap in literature

Similar data diagnostic tools were commonly used by the reviewed studies. This study has uniquely adopted the combination of three data diagnostic tool for testing the stationarity of the data, the tools used include; Augmented Dickey Fuller (ADF), Kwiatkowski-*Phillips-Schmidt-Shin* (KPSS) and Autoregressive Distributed Lag (ARDL). This will certainly and assuredly prevent spurious results.

The reviewed studies relied on the Gross domestic Product (GDP) either at current price or the implicit deflator, this study relied on the Gross Domestic Product Growth Rate (GDPGR) as the dependent variable.

Majority of the studies used Ordinary Least Square (OLS) on which the present- day researchers have contested the obsolete nature of the technique. This study used the Auto Regressive, and Distributive Lag ARDL bound testing to test the relationship between the explanatory variables.

To the best of the researcher's knowledge, no study on this subject matter, specifically on Nigerian economy has endeavored to cover current years up to 2022.

3. Methodology

3.1 Research design

This study adopts the *ex-post facto* design and relied on secondary data which were obtained from the Central Bank of Nigeria's statistical Bulletin (2000 to 2022). The dependent variable, (economic growth) is measured by Gross Domestic Product Growth Rate (GDPGR) while the independent variables are banking density, savings rates, and money supply.

3.2 Data used for the study

The study used annual time series data that covered a period of 22 years, spanning between the years 2001 to 2022. It is a country-specific study limited in geographical scope to Nigeria and only considered the Nigerian money market activities such that are directed towards savings mobilization.

Table 1. Annual time series data of Nigerian market activities from 2001-2022

Year	Gdpgr	Banking density	Savings rate	Money supply
2001	5.02	2193	21.55	1269.5
2002	5.02	2193	21.34	1505.96
2003	15.32	2193	30.19	1952.92
2004	7.35	2492	22.88	2131.82
2005	9.25	3492	20.82	2637.39
2006	6.44	3233	19.49	3797.91
2007	6.06	4200	18.7	5127.4
2008	6.59	4952	18.36	8008.2
2009	6.76	5436	18.7	9411.11
2010	8.04	5809	22.62	11034.94
2011	8.01	5454	22.51	12172.49
2012	5.31	5564	22.42	13893.22
2013	4.23	5639	23.79	15154.64
2014	6.67	5526	24.69	16238.52
2015	6.31	5470	25.74	18898.6
2016	2.65	5570	26.71	21624.62
2017	1.62	5714	27.29	22363.43
2018	0.81	5304	30.68	25079.76
2019	0.93	5309	29.75	31350
2020	1.53	5320	30.67	38480.14
2021	1.53	5322	31.34	40222
2022	1.59	5345	30	40238

Source: Central Bank of Nigeria Annual Bulletin

3.3 Data analysis technique

To determine the unit root, Augmented Dickey Fuller (ADF) unit root test was employed. The Auto Regressive Distributed Lag (ARDL) bound testing methodology as developed by Pesaran and Shin [20] which has been discovered and favored above the co- integration analysis established by Engle and Granger [21] was used to ascertain that there are no spurious results. Error Correction Model (VCM) was adopted to verify the span of relationship between the dependent variable and the exogenous variables. Post estimation diagnostic tools used include the Breusch-Godfry Serial Correlation LM Test and the CUSUM test for stability of the model. Following Tokoyan and Adekeye [22]; Rabaj and Mexhuani [2], the ADRL test F-statistics and β-Coefficients were adopted to determine the extent to which the independent variables affect the economic growth.

3.4 Model specification

The model for this study is adapted as used by Tokoyan and Adekeye [22] and Rabaj and Mexhuani [2]. The model is modified to accommodate savings mobilization variables in conformity with the study's objectives. The model is formulated as

$$GDPGR = f(BD, SR, MS, \mu)$$
$$GDPGR = b_0 + b_1 + BD_t + b_2 SR_t + b_3 MS_t + \mu$$

The Logarithm for econometric transformation is represented as:

$$\log GDPGR = b_0 + \log b_1 BD_t + b_2 \log SR_t + b_3 \log MS_t + \mu,$$

where

$b_{0...bt}$ = the parameters to be estimated
$\log BD$ = logarithm of banking density
$\log SR$ = logarithm of savings rates
$\log MS$ = logarithm of money supply.
μ = error term.

4 Results and Discussion

Table 2 shows the behavior of the statistical variables, indicating that data for money supply have the highest mean while savings rates have the lowest mean.

Table 2. Descriptive statistics

Category Statistics				
Variable	**Count**	**Mean**	**Std. Dev.**	**Std. Err. of Mean**
LNGDPGR	22	1.415490	0.809772	0.172644
LNBD	22	8.387250	0.353917	0.075455
LNSR	22	3.185709	0.178939	0.038150
LNMS	22	9.189568	1.116079	0.237949

	LNGDPGR	**LNBD**	**LNSR**	**LNMS**
Mean	1.415490	8.387250	3.185709	9.189568
Median	1.735651	8.579417	3.149764	9.473045
Maximum	2.729159	8.667164	3.444895	10.60257
Minimum	-0.210721	7.693026	2.910174	7.146378
Std. Dev.	0.809772	0.353917	0.178939	1.116079
Skewness	-0.653437	-1.169555	0.033672	-0.490879
Kurtosis	2.275990	2.699297	1.719686	1.963890
Jarque-Bera	2.046102	5.098367	1.506761	1.867592
Probability	0.359496	0.078145	0.470772	0.393059
Sum	31.14079	184.5195	70.08560	202.1705
Sum Sq. Dev.	13.77035	2.630402	0.672404	26.15826
Observations	22	22	22	22

Source: Author's computation (2023)

The standard deviation ranges from 0.2 for savings rate to 1.1 for money supply and were significant to the mean. The Jarque-Bera, Skewness and Kurtosis show that data was normally distributed in that the probability of the associated Jarque-Bera are higher than 0.05 for all the exogenous variables and the values of the Kurtosis are within the range -1 to +1.

As regards the skewness, the data is negatively-skewed, an indication that the data is fairly concentrated on the negative side of the graph.

4.1 Test for stationarity (unit root test)

Table 3. Augmented dickey-fuller test result

Variable	t-Statistic	Prob.*	Status
LNRGDPGR	-3.8225	0.0102	I(1)
LNBD	-5.3270	0.0005	I(0)
LNSR	-5.3931	0.0003	I(1)
LNMS	-6.1312	0.0022	I(1)

Source: Author's computation (2023)

Table 3 shows that baking density is integrated at order 0 while savings rate and money supply are stationary only at first difference (Integrated at 1).

Hypothesis

H_0: Variable has a unit root (variable is non-stationary)
H_1: Variable has no unit root (variable is stationary)

Since the variables are integrated at different order, the bounds test was used to measure the relationship that exists amongst the variables.

Table 4. Bounds test for co-integration result

Model	ARDL (2, 0, 1, 0)	Model	ARDL (2,0, 1, 0)
F-Statistic	2.565864	t-Statistic	-2.691602
Sig.	5%	Sig.	5%
I(0)	3.23	I(0)	-2.86
I(1)	4.35	I(1)	-3.78
Decision	Estimate ECM Long Run Model	Decision	Estimate ECM Long Run Model

Source: Authors Computation (2023)

4.2 Decision rule

If the F or t-statistic value is less than the I (0) value, we do not reject the null hypothesis of no level relationship and we then estimate Auto Regressive Distributed Lag (ARDL). But, if the F or t-statistic value is greater than the I(0) value, we reject the null hypothesis of no level relationship and conclude that there exists a long run relationship then estimate Error Correction Model (ECM).

Result from Table 4 shows that there exists only a short-run relationship between the endogenous variable (Dependent Variable) RGDP and its exogenous variables LNBD, LNSR, and LNMS with F-statistic of 2.565864. This is less than I(0) value of 3.39 at 95% confidence interval.

Table 5. VAR Lag order selection result

Endogenous variables: LNGDPGR
Exogenous variables: C LNBD LNSR LNMS
Sample: 2001 2022
Included observations: 17

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-7.910615	NA	0.239874	1.401249	1.597299	1.420737
1	-3.597420	6.089216	0.163897	1.011461	1.256524	1.035821
2	0.511325	5.317200*	0.115275*	0.645726*	0.939802*	0.674958*
3	0.512238	0.001074	0.132302	0.763266	1.106354	0.797370
4	0.569803	0.060950	0.152093	0.874141	1.266241	0.913116

| 5 | 0.578717 | 0.008390 | 0.177763 | 0.990739 | 1.431852 | 1.034587 |

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table 5 unveils the VAR Lag Order Selection result, where the selected Lag (0) as the optimum lag for estimating the short-run relationship with the Akaike information criterion (AIC). This has a value of 5.804380. Therefore, the Autoregressive distributed lag short-run model will be estimated.

Table 6. Autoregressive distributive lag short run estimates

Dependent Variable: LNGDPGR
Method: ARDL
Sample (adjusted): 2003 2022
Included observations: 20 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike Information Criterion (AIC)
Dynamic regressors' (2 lags, automatic): LNBD LNSR LNMS
Number of models evaluated: 54
Selected Model: ARDL(2, 0, 1, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNGDPGR(-1)	0.690514	0.217595	3.173385	0.0073
LNGDPGR(-2)	-0.502979	0.297371	-1.691421	0.1146
LNBD	1.781272	1.734946	1.026702	0.3233
LNSR	1.827866	1.073975	1.701964	0.1125
LNSR(-1)	-1.880658	0.934314	-2.012875	0.0653
LNMS	-1.004412	0.681713	-1.473365	0.1644
C	-4.347038	12.03598	-0.361170	0.7238
R-squared	0.875477	Mean dependent var		1.395697
Adjusted R-squared	0.818005	S.D. dependent var		0.848657
S.E. of regression	0.362044	Akaike info criterion		1.075116
Sum squared resid	1.703987	Schwarz criterion		1.423622
Log likelihood	-3.751156	Hannan-Quinn criteria.		1.143148
F-statistic	15.23312	Durbin-Watson stat		1.878891
Prob(F-statistic)	0.000033			

Table 6 shows the Autoregressive Distributive Lag short run estimates and reveals that banking density affected economic growth positively with insignificant effect. The savings rates also affected economic growth positively but the effect was insignificant. Money supply affected economic growth negatively but the effect was insignificant. On the aggregate, all the variables significantly accounted for a high proportion of variation in economic growth to the tune of about 87% (R-square= 0.875477).

Given the residual effect of all the model's independent variables, the F-statistic value of 15.23312 and the associated probability which is significantly positive Prob (F-statistic) = 0.000033), it is accepted that money market savings mobilization efforts jointly had a positive and significant effect on economic growth during the years 2021-2022.

Table 7. Test for serial correlation

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.006654	Prob. F(2,11)	0.9934
Obs*R-squared	0.024167	Prob. Chi-Square(2)	0.9880

Hypothesis

H_0: no serial correlation
H_1: presence of serial correlation

The result from Table 7 shows that the null hypothesis cannot be rejected with a p-value of 0.1995. This is greater than 5% level of significance at 95% confidence interval for rejecting the null hypothesis. This implies that the ARDL is a good fit.

The table above shows that the model is within the 5% level of significance, indicating that the model is stable. Evidences from Augmented Dickey-Fuller unit root tests shows that the study's explanatory variables were stationary only at first difference except banking density that was stationary at zero difference. The Bounds test for co- integration revealed that there exists only a short run relationship between the endogenous variable and the exogenous variables. The findings prompted the use of the short run model of the Autoregressive Distributed Lag where the outcome shows the following:

Banking density shows a positive but insignificant effect on economic growth at the short run, the discovery is in line with the findings in Sajid and Sarafrox [15]. It is also not at variance with the findings of Ang [23] who discovered that increase banking density tends to encourage savings mobilization in the Malaysian economy.

Savings rates show a positive but insignificant effect on economic growth during the period studied, this came in contradiction to the findings of Raham and Uddin (2005) but corroborates the findings of Agarwal [8] and specifically that of Rabaj and Mexhuani [2] who found that savings stimulates investments, production employments and consequently generate economic growth in the economy of Kosovo [24].

On money supply, the result displayed an insignificant negative effect of money supply on economic at the short run. Further on the aggregate, all the variables significantly accounted for a high proportion of variation in economic growth during the period to the tune of about 87% (R- square = 0.875477). Given this residual effect of all the model's independent variables, the F-statistic value of 1523312 and its associated probability which is significantly positive (Prob. F-statistic = 0.000033), the outcome of the analyses show that money market savings mobilization efforts jointly had a positive and significant effect on economic growth during the years 2021-2022.

5 Conclusion

Every economic system without a steady growth in savings accumulation may remain protracted with dearth of funds for investment and production purposes.

Banking density has not been achieved in Nigeria with consideration of the population spread, and as against banking desert that is common in the rural areas which have the largest of her population. According to the theory, the more the banking desert exists in an economy, the less of savings towards investments and economic growth.

Savings rates fluctuations without certain bearing with economic realities usually impact negatively on the propensity of the citizen to put their money into savings which in turn hinder economic growth.

A faulty money supply mechanism can also do, in no less than what war a situation can do to plunder an economy into negative trends regardless of the stage of advancement and sophistication.

6 Recommendations

This study recommends major policy diversification as an urgent alternative to unproductive efforts in money market savings mobilization mechanism and strategies. The governments, monetary authorities, economic planners and all relevant stakeholders should work towards the following:

(i) Entrenching high banking density as opposed to banking desert through the policies of rural banking, bank branch multiplication, agency banking and the provision of appropriate legal framework for curbing frauds and other financial malpractices
(ii) Savings rates should be aligned with economic realities.
(iii) Money supply target of the apex bank should be made dynamic as occasioned by economic parameters free of political interference and policy inconsistencies.

Competing Interests

Authors have declared that no competing interests exist.

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