

The impact of financial depth and efficiency on savings mobilization in Nigeria

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Abstract: This paper anchored on examining the effect of financial sector development on savings mobilization in Nigeria from 1981 to 2023. Precisely, the study explored the relative impact of financial depth and financial efficiency on the savings mobilization in Nigeria. The study made use of the autoregressive distributed lag (ARDL) model, the standardized regression model, and Granger causality test in the analysis. The ARDL estimates indicated that both financial depth and financial efficiency initiated a desirable and significant effect on the savings level in Nigeria. Other key discoveries from the result were that both income and interest rate exerted positive and significant effect on the savings level in Nigeria. The standardized regression model result indicated that financial depth had a significantly larger impact on savings levels than financial efficiency. The Granger causality test supported the existence of a unidirectional causality from financial sector development to savings mobilization during the study period. The paper recommended for sustaining macro-stability in the financial system, boosting public policy for institutional reform and infrastructure, and proactive public policy for risk oversight and management.

Keywords: Financial development, financial engineering, savings mobilization, interest rate.

1. Introduction

A vibrant financial system is a fundamental reagent for ‘economic growth’ because it mobilizes savings, spurs information distribution, increases resource allocation efficiency, and smoothen risk management and diversification, all of which contribute to growth (Levine, 1997). The widespread consensus is that widened financial system is erratic, and hence less vulnerable. This is grounded on the concept that “deep and liquid financial systems with diverse instruments are more resilient than shallow ones” (Sahay *et al.*, 2015). Mohan (2006) defines financial deepening as expanding the population's access to and variety of financial services, plus improving the financial sector's efficiency and regulation. It also gauges how much funds the banking system contributes to entrepreneurial endeavors.

Levine (2005) has highlighted five primary roles of the financial sector that contribute to economic growth. These include hedging, trade, risk pooling, enabling the interchange of commodities and services, and mobilizing and pooling funds. They offer data that aids businesses in corporate governance and resource allocation, which can be accomplished directly or indirectly through bank-based financing (Nowbutsing, 2010). In addition to guaranteeing efficient and effective resource distribution, these tasks allow the sector to draw deposits, which eventually spurs growth.

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Regretfully, the government pedals the financial sector via “financial repressive” policies like interest rate controls, credit ceilings, and borrowing restrictions, which results in inefficient financial systems in many African nations (Aryeetey, 2008).

Regarding financial deepening and mobilization of local savings, John M. Keynes promoted government intervention in financial markets via “repressive financial policies like interest rates and credit regulations in order to spur growth” (Keynes, 1936). Shaw (1973) and McKinnon (1973), however, both criticize repressive financial policies, arguing that “they discourage the mobilization of savings and that a well-developed financial system will improve the efficacy and efficiency of financial intermediation” (Twerefou and Ayimadu, 2018). Aligning with the findings of McKinnon (1973) and Shaw (1973), numerous developing nations, notably those in Africa, have turned to financial system liberalization, which involves lowering government participation in the industry through the privatization of banks, among other measures. By mobilizing savings, such policies are anticipated to boost financial intermediation, stimulate investment, and improve resource allocation efficiency (Cobbina, 1999).

The argument that foreign financing has failed to alleviate the credit limitations prevalent in many developing nations makes it necessary to increase domestic savings (Addison, 2007; Ang, 2010). The deficiency of apt financial structures that can effectively mobilize savings and make them accessible to borrowers, however, is said to have been a significant cause (Mavrotas & Kelly, 2008). However, the existing research in this field has shown conflicting results. Some studies have found a negative correlation between savings and the development of the financial sector, while others have found a positive correlation (Sahoo and Dash, 2013; Odhiambo, 2008; Ang, 2010; Kapingura & Alagidede, 2016; Dirir and Kadir, 2023). Studies that advocate for the growth of the financial sector contend that it improves the effectiveness of directing mobilized resources toward beneficial purposes. Superior saving alternatives, comprising loftier deposit rates, and a variety of savings options with higher returns are characteristics of a developed financial sector (Khan & Hye, 2010). These resources will support economic growth by being directed toward productive industries. But according to some research, the growth of the financial sector reduces credit restrictions and can make people less inclined to save (Bayoumi, 1993; Ang, 2010).

The savings and investments made by domestic businesses, governments, and people might be regarded as domestic resource mobilization. The risks of external mobilization, such as foreign direct investments and official development assistance (ODA), which come with certain conditions and difficulties, are not present when resources are mobilized locally. For instance, aid and other forms of ODA are unpredictable and volatile, and they can be defined by factors like declining export revenue and currency appreciation. According to Culpeper and Bhushan (2008), foreign direct investments are primarily intended to benefit investors rather than the needs and advancements of the nation.

To demonstrate the significance of savings, Blanchard & Milesi-Ferretti (2011) propose that a nation's current account deficit may be decreased when it has a high level of savings. Hence, a country is likely to have a current account deficit or fall short of making the most of its domestic investments if there are insufficient savings. The problem with encouraging domestic resource mobilization, uniquely in Africa, is that these nations have resource constraint. In light of this, some economists have described growing domestic resource mobilization as a difficult alternative to mobilizing foreign resources (Aryeetey 2008). Furthermore, “repressive policies such as lower corporation tax collections, capital flight, and tariff reductions continue to deplete domestic resources in many nations”

(Baunsgaard and Keen, 2005). This is where a liberalized, deep, and efficient financial system has a critical role to play to spur domestic savings.

The literature has provided diverse ways of measuring financial depth and financial efficiency. Though financial depth has been generally measured as the ratio of total broad money supply to GDP (Cole, 2008) and total private credit (% of GDP), it fails to capture key factors that truly defines the depth of the financial system such as commercial bank branches, number of ATMS, proportion of the population having bank accounts, among other factors. Similarly, financial efficiency has been measured in terms of interest rate spread, the ratio of total costs of financial intermediation to total assets, and the bid and ask spread which are all quantitative proxies for financial efficiency. However, lack of unique measurement of financial depth and financial efficiency raises concerns as to which indicator best fits for empirical analysis. This challenge has been addressed through the introduction of the financial system development indicators by the International Monetary Fund (IMF). Table 1 presents these indicators along with savings statistics for Nigeria for selected periods.

Table 1: Indicators of financial depth and efficiency and savings statistics in Nigeria

Year	Financial Depth Index	Financial Efficiency Index	Total Savings (₦ billions)	% of GDP
1981	0.03	0.33	6.56	4.71
1985	0.03	0.35	12.52	6.67
1990	0.03	0.24	29.65	5.99
1995	0.04	0.21	108.49	3.50
2000	0.03	0.27	385.19	5.45
2005	0.04	0.30	1,316.96	5.70
2010	0.06	0.25	5,941.37	10.71
2015	0.06	0.30	11,763.92	12.36
2020	0.07	0.32	20,841.84	13.51
2021	0.07	0.31	25,589.29	14.53
2022	0.07	0.33	30,240.02	14.94
2023	0.07	0.32	47,375.98	20.21

Source: International Monetary Fund (2023); Central Bank of Nigeria (2023).

As could be observed from Table 1, the financial depth indicator portrayed a weak level of financial deepening within the Nigerian financial system as the indicator increased slightly from 0.03 in the 1980s to 0.04 in the 1990s and hovering between 0.06 and 0.07 in the 2000s. The financial efficiency index exhibited a fluctuating trend over the years with the index moving from 0.33 in 1981 to 0.35 in 1985 before recording a downward trend to 0.21 in 1995. The value thereafter hovered between 0.27 and 0.32 between 2000 and 2023. The total domestic savings have been exhibiting a levitating trend over the time though with a negative growth rate of -2.23% being recorded for only 1995. The aggregate savings (% of GDP) in Nigeria was 4.71% of GDP in 1981 and increased to 10.71% in 2010 with a further increase to 20.21% in 2023.

Since the depth of the financial system as well as its efficiency are crucial for savings mobilization, it consequently befits to establish whether it is financial deepening or financial efficiency that drives savings mobilization in Nigeria. This therefore raises critical questions for this study. Such questions are: does financial depth affects savings mobilization in Nigeria? Does financial efficiency affect savings mobilization in Nigeria? Between financial depth and financial efficiency, which one greatly impacted on savings mobilization in Nigeria? What kind of causal relationship exists among financial

depth, financial efficiency, and savings mobilization in Nigeria? It is within this background that this paper seeks to evaluate the relative impact of financial depth and financial efficiency on savings mobilization in Nigeria from 1981 to 2023. The particular purposes of this research are highlighted as follows: (i) to investigate the influence of financial depth on savings mobilization in Nigeria; (ii) to examine the effect of financial efficiency on savings mobilization in Nigeria; (iii) to ascertain the relative impact of financial depth and financial efficiency on savings mobilization in Nigeria; and (iv) to establish the nature of causal relationship existing between financial sector development indicators and domestic savings in Nigeria.

This paper is structurally presented in five major sections. The section 1 drives home background issues on how financial development affects the mobilization of savings and raises key questions which establish the footing of the study objectives. Section 2 presents the conceptual issues along with the theoretical and empirical literature review which therefore forms the basis of our research gap which this study pursues to bridge. In section 3, the methodology of the research is presented where the autoregressive distributed lag (ARDL) technique of analysis, the standardized regression analysis, and the Granger causality test are discussed based on their usage in achieving the set objectives. Section 4 offers the empirical findings of the study while in section 5, the conclusion and recommendations are presented.

2. Literature Review

2.1 Conceptual Clarification

Financial Depth

Financial depth or financial deepening entails enhancing access to financial services. A scenario where there is a greater selection of financial services and improved access to financial services for various socioeconomic segments within the economy is termed “financial deepening”. One noteworthy aspect of financial deepening is its capacity to boost economic growth by providing economic units lacking sufficient financial access with access to financial services. In an undeveloped financial system, relationship banking is usually the only way for the economic units to have improved access to financial services (Nyamweya, Ochieng and Obuya, 2020). According to Goswami and Sharma (2011), economic units also generate resources internally and rely less on outside funding to finance the expansion of their endeavors. An enhancement in the group of financial services that are designed to each of the county's economic units can also be referred to as “financial deepening” (Goswami and Sharma, 2011).

The M2/GDP ratio is sometimes referred to as financial deepening (Cole, 2008). The ability of economic actors and sectors to use financial markets for investment and savings, not limited to access to capital and financial assets, is the conceptual definition of financial deepening. Markets and financial intermediaries are in a superior standing to manage higher turnover and make bigger amounts of capital base available without necessarily producing reciprocal volatility in asset prices. Furthermore, in an economy with deep finance, financial institutions can offer a wider range of assets for risk diversification or hedging during risk sharing or transfer processes. As noted by Goswami and Sharma (2011), deep financial markets allow investors and savers to deploy their excess financial resources to a broader array of risk-sharing and quality investment options, while ultimately granting borrowers access to a wide range of risk management and financing tools.

Financial Efficiency

Financial efficiency is the capacity of financial markets to offer premium financial products at competitive prices. Competition and financial efficiency are connected concepts in the money and capital market since more competitive systems are typically also more efficient (Permana and Andjani, 2014). “Both the spread of interest rates and the ratio of total costs of financial intermediation to total assets are examples of quantitative proxies of efficiency that aid in assessing the effectiveness of the financial system” (Nyamweya et al., 2020). Among the components of the cost of financial intermediation are net profits, taxes, bad debt due to loan default, operating expenses, and other intermediation costs. Items taken from the comprehensive income statements and aggregated statement of financial position for the individual financial institutions engaged in financial intermediation may be used to calculate the intermediation expenses. However, “because financial institutions must build a sufficient shield for loan default and impose a risk premium on financial products owing to exposure to credit risks, Nyamweya et al. (2020) noted that the variation between the lending rate and the deposit rate can occasionally stay extraordinarily large even with increased efficiency” (Philippon, 2015).

When spot prices of financial assets accurately represent all available market knowledge, this is referred to as financial efficiency in capital markets. Therefore, daily fluctuations in the market values of financial assets are random in an efficient financial system, and investors' knowledge of historical prices may not be helpful in predicting potential price changes (Bazot, 2017). “The lowest price at which a dealer is prepared to purchase a financial instrument is known as the ‘bid’, and the zenith price at which a dealer is eager to sell a financial instrument is known as the ‘ask’. The difference between this two (bid-ask spread) is used as a stand-in for the capital markets' efficiency within the larger financial markets. More efficient markets often have smaller bid-ask spreads (Nyamweya et al., 2020).” Since the bid-ask gap is also a measure of capital market liquidity, evaluating the efficiency of the capital market would need a thorough examination of the degree of competition in the financial markets as well as the volatility of price movements” (Bazot, 2017).

It is worth noting that while financial depth is more concerned about improving the access to financial services, financial efficiency is more focused about reducing the cost of financial intermediation.

2.2 Theoretical Literature

Some theories have identified to explain the nexus concerning financial development, savings mobilization, and investments. These are the prior savings theory, the credit creation theory, and the theory of forced savings.

2.2.1 Prior Savings Theory [PST]

This theory maintains that all savings within an economy may realize investment openings because it views saves as a necessary condition for investment. In order to encourage voluntary savings for investment and development, the theory therefore supports a suitable combination of fiscal and monetary policy. Investments that are not funded by earlier savings will cause inflation rather than economic development since they are a substitute for consumption. Since the PST believes that inflation hinders growth, it supports measures to limit it and suggests a policy of moderately high positive real interest rates to encourage people to save.

McKinnon (1973) and Shaw (1973) assert that financial deepening encourages saving by improving intermediation efficiency, which offers various saving options that align with the risk aversion, income profiles, and personal preferences of agents (Schmidt-Hebbel and Servén, 2002). The propensity to engage in the financial system is greatly influenced by developments related to

financial deepening, such as the decrease of bank line wait times, the expansion of bank branches' geographic locations, and the lifting of minimum deposit restrictions (Honohan and Lane, 1999).

According to the PST, the volume and structure of the financial system have a shock on investment and savings. Savings and investment rates are accelerated by the financial system, which also enhances the efficiency and optimality of their composition, allocation, and use. In addition to lowering investments and the cost of converting savings into investments, it also lowers idle savings or activates savings. To do this, the financial system makes sure that funds are effectively transferred from ultimate savers, the surplus financial unit, to ultimate investors, the deficit financial unit.

It is necessary to link investors and savers because of the contrast between the eventual investors and the surplus financial unit. Otherwise, investment plans would have to be shelved due to a lack of funds, and savings would be hoarded due to a lack of investment options. By creating a connection between savers and investors, the financial system facilitates the mobilization of funds and makes it possible for investment ideas to become reality.

2.2.2 The Credit Creation Theory [CCT]

According to the CCT, the financial system's contribution to growth extends beyond boosting investments based on earlier savings. The financial system, according to King and Levine (1993), provides financing or credit by creating credit in anticipation of savings, which is a positive and catalytic role. This guarantees that investments and savings will remain separate for a specific time frame. The proper level of income is produced by the investments made possible by generated credit, which ultimately results in savings equivalent to the initial investment. According to the theory, sustained inflation rather than sustained growth would occur if investments made using newly created credit do not immediately generate income.

2.2.3 The Theory of Forced Savings [TFS]

The TFS (also known as inflationary financing) is credited to J. M. Keynes and J. Tobin and emphasizes on increasing of investments not with prior savings, or not without prior savings, but with forced savings. According to this idea, "investment is not dictated by savings rather, it is savings that are dictated by investments which may be raised independently via monetary expansion" (Mishkin and Eakins, 2014). The monetary growth function as a stimulant for development through four channels: (i) It could increase output, savings, and aggregate demand if resources are not fully utilized; (ii) When resources are fully used, inflation will increase, thereby suppressing the real rate of return on money or financial assets. Thus, rendering real balances less desirable to keep, and encouraging wealth holders to increase their investments in tangible capital.

An increase in savings would follow from the ensuing rise in capital intensity. This phenomenon of monetary expansion is known as the "Tobin or Portfolio Shift Effect" (Katsande, 2016); (iii) The distribution of income is altered by inflation to benefit profit-seekers, which results in savings. This phenomenon is known as the "Income Distribution Effect" (Katsande, 2016); (iv) When real money balances are taxed by inflation, funds are transferred to the government to fund investments. The term "Inflation Tax Effect" refers to this scenario. The decline of money's real purchasing power and the actual resources that holders must give up in order to restore the money's true worth make up the inflation tax on money holdings. The private sector transfers resources to the government, which is the money issuer, through inflation, which is a tax on money. The policy consequence of the Keynes-Tobin approach is that a low or negative real interest rate is required to encourage private investment since investment, not saving, is the factor limiting growth.

2.3 Empirical Literature

Empirical studies that have been conducted to ascertain the link between financial development and savings mobilization include the works of Ziorklui (2001) in Ghana, Athukorala and Sen (2004) in India, Odhiambo (2008) in Tanzania, Quartey and Prah (2008) in Ghana, Odhiambo (2008) in Tanzania, Mavrotas and Kelly (2008) for 17 African countries, Horioka and Yin (2010) in Asia, Ang (2011) in Malaysia, Sahoo and Dash (2013) in South Asia, Sharma and Kumar (2013) in India, Bayar (2014) for seven Asian countries, Twerefou and Ayimadu (2018) for 42 African countries, Atan and Effiong (2021) for Nigeria, etc. The key findings of these studies reflect the positive role of financial development on fostering savings mobilization. A summary of these empirical studies is presented below.

Table 2: Summary of empirical literature

Author/Date	Sample	Methodology	Findings
Ziorklui (2001)	Ghana	Ordinary Least Squares (OLS)	The ability of Ghana's banking industry to mobilize savings was greatly induced by the expansion of the financial sector.
Quartey and Prah (2008)	Ghana	Granger causality test	There is no proof that savings and the growth of the financial sector are causally interrelated.
Mavrotas and Kelly (2008)	17 countries in Africa (1972-1994)	Panel Regression Analysis	Despite the fact that some of the nations had positive nexus, the results were equivocal.
Horioka and Yin (2010)	Developing economies in Asia (1966-2007)	Panel Regression Analysis	Up until a certain threshold, the growth of the financial system raises the domestic savings rate.
Ang, Timmermann, and Allan (2011)	Malaysia (1960-2007)	Error correction model	Savings were greatly and favorably influenced by FD.
Wang, Xu, and Xu (2012)	31 OECD countries and 12 East Asian countries (1960-2008)	Panel Regression Analysis	The rapport between domestic savings and FD is hump shaped. In other words, as FD progressed, the overall saving rate first increased before declining.
Shahbaz, Afza, and Shabbir (2013)	Pakistan (1950-2011)	ARDL and Granger causality test	A causal link exists between domestic savings and FD.
Sahoo and Dash (2013)	South Asian Countries	Panel cointegration test	Funds are mobilized more quickly when the FS is developed.
Bayar (2014)	Seven Asian countries (1992-2011)	Panel cointegration test	Domestic savings and growth are positively impacted by FD.
Ogbokor (2014)	Namibia (1991-2012)	Error correction model	The impact of deposit rates and FD on savings is negligible.
Kapingura and Alagidede (2016)	South Africa (1980–2012)	Johansen Cointegration Test and VECM	The impact of FD on savings was both positive and substantial.
Moussavou (2017)	Congo-Brazzaville	Vector error correction model (VECM)	Domestic savings fluctuations can be explained by FD.
Twerefou and Ayimadu (2018)	42 African countries (1998 – 2015)	System generalized method of moments dynamic panel estimation.	Africa's savings movement has not been sparked by FD. Nonetheless, gross domestic savings were greatly enhanced via upsurge in per capita income.

Otiwu, Okere, and Uzowuru (2018)	Nigeria (19851-2015)	VECM	In Nigeria, private domestic savings are primarily shaped by per capita income and financial inclusion.
Odi and Oji (2020)	Nigeria (1987-2020)	OLS, Granger causality, and VECM	The growth of the capital and money markets, the money supply, and private sector credit all contribute to Nigeria's gross national savings.
Atan and Effiong (2021)	Nigeria (1981 to 2019)	Autoregressive distributed lag (ARDL) model	Savings were positively and significantly impacted by FD.
Dirir and Kadir (2023)	Djibouti (1987 to 2021)	Nonlinear ARDL	The mobilization of savings is positively and significantly impacted by FD.

Note: FD = financial development; FS = financial system.

Source: Compiled by the author.

There have been paucity of empirical studies linking financial development with savings mobilization. This study therefore seeks to fill this gap by investigating the influence of financial depth and financial efficiency on savings mobilization in Nigeria. By utilizing data from 1981 to 2023, this study offers recent empirical findings that presents implications for policy formulation within the Nigerian economy. The study also utilizes the threshold regression analysis, which makes this study quite different from other studies, to ascertain the relative impact of financial depth and financial efficiency on savings mobilization in Nigeria.

3. Methodology

3.1 Model Specification

The model for this study was adapted from the empirical work of Bayar (2014) who examined the effect of financial development on domestically mobilized savings in emerging Asian economies. The key modifications made to their model is the incorporation income and Treasury Bills rate into the function. Further, instead of using different measures of financial deepening, this study utilized a composite index for financial depth and financial efficiency developed by the IMF in the analysis. The notional functional construct of the model is therefore specified as follows:

$$SAVG_t = f(PCI_t, SINTR_t, FIND_t, FINE_t, INFR_t, TRBL_t, AGDP_t) \quad (1)$$

where SAVG is the total domestic savings (% of GDP), PCI is the per capita income, SINTR is the interest rate on savings, FIND is the index for financial depth, FINE is the index for financial efficiency, INFR is the inflation rate, TRBL is the Treasury Bill rate, and AGDP is the age dependency ratio. It should be noted that the FIND was computed as a weighted mean of financial institution depth and financial market depth while FINE was calculated as a weighted mean of financial institution efficiency and financial market efficiency. From Equation (1), the econometric construct of the model can therefore be specified as follows:

$$SAVG_t = \beta_0 + \beta_1 PCI_t + \beta_2 SINTR_t + \beta_3 FIND_t + \beta_4 FINE_t + \beta_5 INFR_t + \beta_6 TRBL_t + \beta_7 AGDP_t + \mu_t \quad (2)$$

Equation (2) presents the econometric construct of the model where β_0 is the intercept, β_1 to β_7 are the partial slope coefficients of the regressors, and μ_t is the error term. It is presumed that $\beta_1 > 0$ to align with the macroeconomic idea that higher income will be associated with higher level of savings. Also, it is expected that $\beta_2 > 0$ since interest on savings is an incentive for households to save more. Both β_3 and β_4 are expected to be positive because financial development is crucial to both

mobilization and allocation of savings. It is also expected that β_6 will be positive while β_5 and β_7 will be negative. The negative β_7 is an indication that higher dependency reduces disposable income which has a detrimental effect on savings.

3.2 The Data

The data used for this study are time series data for the period 1981 to 2023 which make a total of forty-three (43) observations. The data were gathered from key secondary sources which were the Central Bank of Nigeria (CBN), the World Development Indicators (WDI), and the International Monetary Fund (IMF). Data were collected on key variables for the study which are savings, per capita income, interest rate on savings, financial depth, financial efficiency, inflation rate, Treasury Bill rate, and age dependency ratio. While financial depth and financial efficiency were expressed as indices, the rest of the variables were all expressed in percentages. The data on savings, interest rate on savings, inflation rate, and Treasury Bill rate were obtained from the CBN; data on per capita income and age dependency ratio were sourced from the WDI, while data on financial depth and financial efficiency were gotten from the IMF. The data on financial depth and financial efficiency takes on values between 0 and 1. The closer the value to 1, the higher the level of financial development and vice versa.

3.3 Analytical Techniques

The analytical technique for this study was based on the ARDL model and the standardized regression model. The ARDL approach enables us to estimate both the short run and long run model in the event of cointegrating relationship in the model. The utilization of the ARDL approach arises from the unit root property of the time series. The unit root test is performed based on the augmented Dickey-Fuller (ADF) test based on the constant and trend assumption. The test is followed with a test for cointegration based on the Bounds test for levels relationship. The Bounds test produces an F-statistic which upon significance, the existence of long run link in the model is established. The short run and long run model estimation based on the ARDL technique is obtained based on the ARDL(p, q) model where p and q are respectively the optimal lag of the regressand and regressors. The model is presented in its general construct with the error correction mechanism as follows:

$$\Delta S_t = \beta_0 + \sum_{i=1}^j \beta_1 \Delta Y_{t-i} + \sum_{i=0}^k \beta_2 \Delta F_{t-i} + \theta ECM_{t-1} + \mu_t \quad (3)$$

where S_t is the regressand, F_t is a set of regressors, j and k are the ideal lag length of the regressand and regressors respectively, Δ is the difference operator, θ measures the speed of adjustment of the model from the short run disequilibrium to a long run equilibrium relationship, and μ_t is the error term. It is expected that $\theta < 0$ and statistically significant for any short run disequilibrium in the model to be adjusted in the long run.

To ascertain the relative impact of the effect of financial depth and financial efficiency on savings mobilization, the standardized regression model forms the basis for the analysis. The standardized regression allows all the variables to be placed on an equal footing thereby allowing for a comparison between or among the parameter estimates. “A variable is said to be standardized when the deviation of the variable from its mean is divided by the standard deviation” (Gujarati and Porter, 2003) as shown below:

$$SAVG_t^* = \frac{SAVG_t - \overline{SAVG}}{\delta_{SAVG}}$$

where $SAVG_t$ is the observational value of savings, $\overline{SAVG}$ is the mean of savings, and δ_{SAVG} is the standard deviation of savings. The similar process is conducted for other variables to be incorporated in the standardized regression model. The notional functional construct of the model is therefore specified as follows:

$$SAVG_t^* = f(FIND_t^*, FINE_t^*) \quad (4)$$

where $SAVG_t^*$ is the standardized savings, $FIND_t^*$ is the standardized financial depth indicator, and $FINE_t^*$ is the financial system efficiency indicator. Equation (4) is transformed into an econometric form as follows, bearing in mind that standardized regression model follows a regression-through-the-origin.

$$SAVG_t^* = \beta_1 FIND_t^* + \beta_2 FINE_t^* + \mu_t^* \quad (5)$$

where the β 's are the relative impact of the variables on the regressand. If $\beta_1 > \beta_2$ in absolute term, then it can be viewed that financial depth has a relatively greater impact on savings mobilization than financial efficiency and vice versa.

To determine the pattern of existing causal link between financial depth, financial efficiency, and savings mobilization in Nigeria, the pairwise Granger causality test is applied. The test is executed based on the believe that the lags of a variable and that of another variable which it depends on determines the current value of such variable. The model for the test is presented thereof:

$$\begin{cases} SAVG_t = \beta_1 + \sum_{i=1}^n \beta_i SAVG_{t-i} + \sum_{j=1}^m \beta_j FIND_{t-j} + \varepsilon_t \\ FIND_t = \alpha_1 + \sum_{i=1}^n \alpha_i SAVG_{t-i} + \sum_{j=1}^m \alpha_j FIND_{t-j} + \varepsilon_t \end{cases} \quad (6)$$

And

$$\begin{cases} SAVG_t = \beta_1 + \sum_{i=1}^n \beta_i SAVG_{t-i} + \sum_{j=1}^m \beta_j FINE_{t-j} + \varepsilon_t \\ FINE_t = \alpha_1 + \sum_{i=1}^n \alpha_i SAVG_{t-i} + \sum_{j=1}^m \alpha_j FINE_{t-j} + \varepsilon_t \end{cases} \quad (7)$$

Where the variables included are as prior defined, i and j are the lags of the variables, m and n are the optimal lag selected, and ε_t is the error term. The estimation of these equations generates the F-statistics whose significance supports the existence of causality between the variables or otherwise. The existence of causality can either be unidirectional or bidirectional. In unidirectional causality, one variable causes the other (say FIND Granger cause SAVG and not the other way round) while in bidirectional causality, the two variables cause themselves (say FIND causes SAVG and SAVG also causes FIND) reflecting the presence of a feedback relationship between them.

4. Results and Discussion

4.1 Unit Root Test

The ADF unit root test analysis was conducted on the time series variables to ascertain their order of integration. The test was conducted based on the constant and trend assumption and Table 3 present the result where $I(0)$ denotes that the time series variable is stationary at level and $I(1)$ denotes stationarity at first difference. The test is conducted based on the constant and trend assumption. The 5% significance level is utilized for determining the stationarity of the variables.

Table 3: Summary of unit root test result

ADF Statistic: Constant and Trend Assumption for all the variables					
Variables	Level	p-value	First Difference	p-value	Order of Integration
SAVG	-0.6025	0.9736	-4.2913	0.0079	$I(1)$
PCI	0.0404	0.9955	-3.7514	0.0298	$I(1)$
SINTR	-2.1196	0.5202	-6.2406	0.0000	$I(1)$
FIND	-3.4668	0.0563	-7.1238	0.0000	$I(1)$
FINE	-3.5706	0.0451	-----	-----	$I(0)$
INFR	-4.0883	0.0132	-----	-----	$I(0)$
TRBL	-3.2326	0.0920	-7.0346	0.0000	$I(1)$
AGDP	-0.7997	0.9563	-4.8726	0.0020	$I(1)$

Source: Estimated by the authors (2025)

The result of unit root test presented in Table 3 indicates that only financial efficiency and inflation rate were stationary at level while SAVG, PCI, SINTR, FIND, TRBL, and AGDP became stationary at first difference. This mixed order of integration requires a further investigation to detect the presence of long run association in the model.

4.2 Cointegration Test

The test for long run linkages requires utilizing the Bounds test to determine the presence of long run linkages in the model. The test is conducted based on the null hypothesis of “no levels relation” which is overruled when the F-statistic is significant at the 5% level. The result of the test is portrayed in Table 4 where k denotes the number of parameters, $I(0)$ denotes lower bounds and $I(1)$ denotes upper bounds.

Table 4: Bounds cointegration test result

H ₀ : No levels relationship				
Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	5.9077	10%	1.99	2.94
K	7	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99

Source: Estimated by the authors (2025)

The estimated result in Table 4 reported an F-statistic of 5.9077 which lies outside the 5% critical lower and upper bounds. This denotes signal of long run linkages in the model. Hence, there is a cointegrating relationship in the model which necessitates the estimation of both the short run and the long run models using the ARDL approach.

4.3 Short Run Error Correction Model Estimation

The short run dynamics of the model was estimated to determine how the model adjust to attain long run equilibrium relationship. table 5 presents the result where it can be observed that the error correction term coefficient of -0.7363 denotes that 73.63% of the short run disequilibrium in the model is corrected annually. Further, the R-squared value of 0.9229 denotes a good fit of the regression line and implies that the regressors accounted for about 92.29% of the total variation in savings in Nigeria during the period of analysis. The DW statistic of 1.7417 is indication that the model is devoid of serial correlation.

The result indicated that financial depth and its lags exerted positive and significant short run effect on the level of savings in Nigeria during the study period. The implication here is that improved financial depth will help stimulate the banking habit of the people thereby ensuring increased savings mobilization within the economy. The estimated coefficient portrays that a 1% upsurge in financial depth culminate to a 13.4227% upsurge in the level of savings. Also, the first period lag of financial depth accelerated the current level of savings by 24.8071% on the average. The second and third period lags of financial depth also resulted to an upsurge in the current level of savings by about 59.1548% and 45.559% respectively.

Financial efficiency was also noted to introduce a favorable and significant effect on savings during the study period. A 1% upsurge in financial efficiency will lead to a 6.6635% intensification in the level of savings in the short run. Financial efficiency boost savings mobilization because an efficient financial system ensures that transactions are carried out at the least possible cost. The significance of financial depth and its lags and financial efficiency is a clear indication that financial development is crucial for savings mobilization in the Nigerian economy. Based on the coefficient of financial depth (13.4227) and financial efficiency (6.6635), it can be stated that financial depth has a greater impact on savings mobilization in Nigeria compared to financial efficiency.

The short run dynamics indicated that PCI introduced a deleterious and significant effect on the level of savings while the lags wielded a desirable and significant effect. The estimate portrays that a 1% upsurge in PCI will lead to a 7.1731% diminution in savings in the short run. This is a clear case where individuals see an immediate increase in their income as an avenue to purchase their immediate pressing needs rather than being channeled into saving. The first period lag of PCI increased the current level of savings by 21.5764% while the second and third period lags increased the current level of savings by about 12.9924% and 12.3954% respectively. The significant positive effect of the lags of PCI on savings is an indication that sustained increased in per capita income will make individuals to see such an increase as their permanent income which will therefore help them in planning their savings decisions.

Table 5: ARDL Error Correction Model Estimates

Dependent Variable: D(SAVG)				
Selected Model: ARDL(1, 4, 4, 4, 1, 3, 4)				
Sample: 1981 2023				
Variable	Coefficient	Std. Error	t-Statistic	Probability
D(PCI)	-7.1731	1.8934	-3.7886	0.0030
D(PCI(-1))	21.5764	2.9398	7.3393	0.0000
D(PCI(-2))	12.9924	2.6955	4.8200	0.0005
D(PCI(-3))	12.3954	2.4119	5.1392	0.0003
D(SINTR)	0.6117	0.0834	7.3316	0.0000
D(SINTR(-1))	0.1929	0.0975	1.9787	0.0734

D(SINTR(-2))	0.3578	0.0685	5.2258	0.0003
D(SINTR(-3))	-0.1807	0.0746	-2.4233	0.0338
D(FIND)	13.4227	1.9818	6.7729	0.0000
D(FIND(-1))	24.8071	2.3305	10.6421	0.0000
D(FIND(-2))	59.1548	16.7638	3.5287	0.0047
D(FIND(-3))	45.5590	14.7890	3.0806	0.0105
D(FINE)	6.6635	2.1659	3.0765	0.0118
D(INFR)	-0.1317	0.0187	-7.0284	0.0000
D(INFR(-1))	-0.1978	0.0239	-8.2890	0.0000
D(INFR(-2))	-0.0879	0.0141	-6.2470	0.0001
D(TRBL)	0.0052	0.0328	0.1598	0.8760
D(TRBL(-1))	0.4218	0.0587	7.1860	0.0000
D(TRBL(-2))	0.1006	0.0399	2.5189	0.0285
D(TRBL(-3))	-0.0978	0.0415	-2.3567	0.0380
D(AGDP)	-8.0676	2.7455	-2.9385	0.0289
D(AGDP(-1))	-7.6557	5.5986	-1.3674	0.3049
CointEq(-1)	-0.7363	0.0837	-8.7942	0.0000
R ²	0.9229	Mean of SAVG		0.3483
Adjusted R ²	0.8373	S.D. of SAVG		1.4125
DW statistic	1.7417			

Source: Estimated by the authors (2025)

The effect of interest rate and its lags were noted to enforce favorable and significant effect on savings exception of the third period lag where the effect was deleterious and significant. The coefficient portrays that a 1% increase in SINTR will lead to a 0.6117% increase in the level of savings in the short run. Also, the first period lag of SINTR augmented the current level of savings by 0.1929% on the average while the second period lag amplified it by 0.3578% on the average. Conversely, the third period lag reduced the current level of savings by about 0.1807% on the average. The positive effect of SINTR on savings is an indication that interest rate generates returns and individuals will be willing to save more in order to gain more returns when the rate of interest is high. If the previous years' interest rate was high, individuals will expect it to be high in the current period and therefore save more to reap the returns from their savings.

The effect of inflation and its lags on savings was observed to be negative and significant at the 1% level. A 1% increase in inflation will lead to a 0.1317% decrease in the level of savings. While the first period lag of inflation reduces the current level of savings by about 0.1978%, the second period lag reduced the current level of savings by about 0.0879% on the average. The negative effect of inflation on savings arises from the fact that inflation reduces the purchasing power of money. As such, more money will be required to purchase a given basket of a commodity. This will therefore expand the expenditure outlay which therefore reduces the possibility of savings.

The Treasury Bill rate (TRBL) and its lags exerted a positive but inconsequential effect on savings in the SHORT RUN. The first period lag of TRBL increases the current level of savings by 0.4218% while the second period lag increased the current level of savings by about 0.1006%. However, the third period lag of Treasury Bill reduced the current level of savings by 0.0978% on the average. The positive effect of TRBL on savings arises from the fact that higher Treasury Bill rate encourages individuals to save and invest in Treasury Bills to reap the returns that it offers within the shortest possible period. Lastly, age dependency ratio exerted a negative and significant effect on savings while

its first period lag exerted a negative but insignificant effect. This aligns with the findings of Beshir (2017) in Ethiopia. The estimated coefficient portrays that a 1% increase in the age dependency ratio will initiate an 8.0676% decrease in the level of savings in Nigeria. High dependent population is a burden to the working population since they will have to use their income in supporting their needs. Consequently, the level of transfers will be high, and the households will have little or nothing left for savings.

4.4 Long Run Model Estimation

In the long run, the estimated model captured in Table 6 portrays that both FIND and FINE still exert positive and significant effect on the level of savings in Nigeria. Therefore, financial sector development is crucial for savings mobilization in Nigeria and supports the earlier findings of Sahoo and Dash (2013), Kapingura and Alagidede (2016), Atan and Effiong (2021), and Dirir and Kadir (2023). A 1% upsurge in FIND will lead to an 89.9035% improvement in the level of savings while a 1% upsurge in FINE leads to a 49.8558% amplification in the level of savings. The relative impact of FIND and FINE based on the estimated coefficient indicates that financial depth still has the greatest impact on the savings level compared to financial efficiency.

Table 6: Long run model estimates

Variable	Coefficient	Std. Error	t-Statistic	Probability
PCI	5.7478	1.6242	3.5389	0.0046
SINTR	0.8767	0.3386	2.5891	0.0252
FIND	89.9035	13.6727	6.5754	0.0003
FINE	49.8558	8.5888	5.8047	0.0012
INFR	0.4654	0.1368	3.4019	0.0059
TRBL	0.5675	0.2081	2.7270	0.0197
AGDP	5.2218	8.9306	0.5847	0.6179
C	-48.6339	17.2977	-2.8116	0.0169

Source: Estimated by the authors (2025)

The PCI also exerted a positive and significant long run effect on the savings level in Nigeria, and this supports the findings of Otiwu *et al.* (2018). A 1% upsurge in PCI will propel the savings level in the long run by approximately 5.7478%. It can be observed that PCI now exerts a positive effect on the savings level compared to the negative effect that was recorded in the short run. This is because over time, individuals will acquire the necessary durable and non-durable goods to boost their livelihood. Thus, greater proportion of any additional income acquired will be saved. The interest rate also exerts a positive and significant effect on the savings level in the long run. The estimated coefficient signifies that a 1% increase in interest rate will lead to a 0.8767% increase in the savings level.

The rate of inflation exerted a desirable and significant effect on the savings level in the long run. This is contrary to the expected negative effect. Possible basis for the positive effect can be connected to the opinion that over time, individuals will adjust their spending behavior even in the midst of rising price level in order to save. Thus, a 1% surge in inflation rate will initiate a 0.4654% increase in the savings level in the long run. The Treasury Bill rate also exerted a positive and significant effect on the savings level in the long run. The estimated coefficient portrays that a 1% increase in the TRBL in the long run will initiate a 0.5675% improvement in the savings level. The age dependency ratio offered a favorable but insignificant effect on the savings level. The constant term being statistically significant

indicates that the savings level will be -48.6339% if all the regressors are held constant. This is a clear indication that the Nigerian economy will experience dissaving accounting for 48.6339% of the national output when the explanatory variables are held constant.

4.5 Standardized Regression Analysis

To ascertain the relative impact of financial depth and financial efficiency on the savings level in Nigeria, the standardized regression model was estimated, and Table 7 presents the result.

Table 7: Standardized regression result

Regressand: SAVG*				
Variable	Coefficient	Standard Error	t-Statistic	Probability
FIND*	0.8476	0.1038	8.1685	0.0000
FINE*	0.0753	0.0786	0.9580	0.3440
R ²	0.7755	Mean of SAVG*		0.0000
Adjusted R ²	0.7582	S.D. of SAVG*		0.9999
DW statistic	1.8202			

Source: Estimated by the authors (2025)

The estimated model in Table 7 indicates that the (standardized) financial depth exerted a desirable and significant effect on the (standardized) savings level. The parameter portrays that a one-standard deviation increases in the (standardized) financial depth will lead to a 0.8476 standard deviation increase in the (standardized) savings level. By comparing the coefficients, it can be observed that the financial depth has the greatest coefficient compared to financial efficiency coefficient. Therefore, the conclusion here is that financial depth has the greatest relative impact on the savings level compared to financial efficiency.

4.6 Granger Causality Test

The result of the pairwise Granger causality test to detect the route of causality amid financial development and savings mobilization is presented in Table 8. The result indicated that financial depth Granger cause savings mobilization given that the F-statistic ($F = 3.52332$) is significant at the 5% level, but savings mobilization does not Granger cause financial depth. Hence, there is a one-directional causality routing from financial depth to savings mobilization.

Table 8: Pairwise Granger causality test result

Lag length: 2

H₀:	Observations	F-Statistic	Probability
FIND <i>does not Granger Cause</i> SAVG	41	3.52332	0.0400
SAVG <i>does not Granger Cause</i> FIND		0.76639	0.4721
FINE <i>does not Granger Cause</i> SAVG	41	10.2501	0.0003
SAVG <i>does not Granger Cause</i> FINE		0.31194	0.734
FINE <i>does not Granger Cause</i> FIND	41	0.08160	0.9218
FIND <i>does not Granger Cause</i> FINE		6.69285	0.0034

Source: Estimated by the authors (2025)

Also, financial efficiency Granger cause savings mobilization but savings mobilization does not Granger cause financial efficiency. Consequently, there is a unidirectional causality flowing from

financial efficiency to savings mobilization. Finally, a one-directional causality also routes from financial depth to financial efficiency, implying that financial depth Granger cause financial efficiency during the study period. The observed causality established in this study aligns with the findings of Quartey and Prah (2008) and Shahbaz *et al.* (2013) for Ghana and Pakistan respectively.

4.9 Discussion of Major Findings

Our study has shown that financial depth relative to financial efficiency have exerted eminent impact on savings mobilization in Nigeria. This aligns with the fact that financial deepening encourages saving by improving intermediation efficiency, which offers various saving options that align with the risk aversion, income profiles, and personal preferences of individuals (Schmidt-Hebbel and Servén, 2002). Financial depth ensures that the real sector have sufficient access to financial services including ensuring that savings outlets are readily available with close proximity to the surplus financial units. Meanwhile, it must be noted that such greater impact of financial depth on savings mobilization does not rule out the critical importance of financial efficiency on savings mobilization. This is because efficiency ensures that the intermediary role of the financial system is carried out at the least possible cost, and resources are efficiently channeled to the appropriate investment outlets.

The findings of this study have also revealed that income exerted a negative and significant effect on savings level in Nigeria in the short run. This is against the positive effect of income and savings put forward by Keynesian analysis in the income determination model. The reason for this can be attributed to the structural peculiarities of the Nigerian economy. An increase in income in the short run may create the incentive for households to purchase more durable goods which they could not purchase in the previous level of income. Hence, their consumption will rather increase in the short term instead of their savings. It is after they have acquired these necessary consumables that they will then tilt to save additional income received. This is validated by the positive and significant long run effect of income on savings which is obtained in the study.

While income exerted a positive and significant long run effect on savings, the savings interest rate also posed a positive and significant effect on the savings level in Nigeria during the period of analysis. The established positive link signifies the fact that higher interest rate serves as an incentive to save since it accounts for the time value of money, and as a means of making additional earnings from parting away with liquidity. The study has also portrayed the negative short run effect of inflation on growth. High level of inflation is likely to reduce the purchasing power of money. This therefore makes households to spend greater proportion of their income on consumption which therefore reduce the savings capacity of households.

5. Conclusion and Recommendations

The paper has established that financial depth had a significantly larger impact on savings levels than financial efficiency. The role of financial sector in an economy is geared towards ensuring the smooth mobilization of financial resources from the surplus financial unit to the deficit financial unit for the purpose of investments. The mobilization of these financial resources requires a developed financial sector in depth, access, and efficiency. An efficient financial sector will therefore guarantee a lower transaction in the financial intermediation process while financial access and depth ensures a smooth interaction between the financial sector and the economic agents. In this paper, we examined the effect of financial depth and financial efficiency on savings mobilization using time series data from 1981 to 2023. To achieve this, we utilized the ADF unit root test to detect the status of stationarity of the variables; the Bounds test to establish the existence/nonexistence of cointegration; the ARDL

model to estimate the short and long run parameters; the standardized regression model to determine the relative impact of financial depth and financial efficiency; and the Granger causality test to ascertain the path of causality amid financial depth, financial efficiency, and savings mobilization.

The result obtained from the unit root test provided evidence that our variables were stationary in mixed order of levels and first difference thereby providing the basis for checking for cointegration using the ARDL Bounds test. The result of the cointegration provided evidence of long run relationship in the model thereby requiring the estimation of both the short run and the long run model. The short run estimated model portrayed that savings interest rate affected the level of savings positively and significantly. This implies that higher interest rate on savings will encourage individuals to save and vice versa. Also, both financial depth and financial efficiency were observed to exert positive and significant effect on savings level. However, financial depth exerted a greater relative impact on savings level compared to financial efficiency. The result further portrayed that inflation and age dependency negatively affected the savings level during the study period.

Though income was observed to exert a negative impact on the savings level in the short run, its lags all exerted positive effect. The long run result indicated that both income and savings interest rate positively affected the savings level significantly. Both financial depth and financial efficiency were detected to wield favorable significant long run effect on the savings level with financial depth exerting the greatest impact relatively. The fact that financial depth had a greater relative impact on savings mobilization than financial efficiency was further supported by the result obtained from the standardized regression model. The Granger causality test identified a one-way causality flowing from financial depth and financial efficiency to the savings level in Nigeria.

The findings of this study have shown the crucial role of financial depth and financial efficiency on savings mobilization and therefore raises concerns for policy options to boost savings. Three interconnected components can be used to broadly organize efforts and actions to expand and deepen the financial system and improve access to financial services: (a) policies to maintain stable macroeconomic environments; (b) institutional and infrastructure reforms to establish frameworks that facilitate markets and private initiatives; and (c) regulatory and oversight policies to address risks and inefficiencies brought about by markets and market participants.

- a) **Sustaining macro-stability:** The demand for and supply of financial services may be significantly increased by consolidating fiscal positions through reforms (reducing fiscal dominance) and increased central bank autonomy. This would also increase policy credibility and minimize uncertainty over investment returns. For example, the lack of these elements usually makes bond holding riskier and hinders the growth of the local bond market. Financial repression further lessens their appeal by artificially suppressing interest rates. Similar to this, fiscal dominance may result in an issue volume that is higher than the current investor base's capacity to absorb it (banks, insurance companies, pension funds). In addition to impeding the growth of the bond market, this also creates questions about financial stability since the balance sheets of banks and the State get entangled.
- b) **Public policy for institutional reform and infrastructure:** In the provision of financial services, interventions that foster technical innovation, financial engineering, stimulate competition, and provide infrastructure to encourage participation can assist realize economies of scale and lower costs. Simultaneously, market-supporting reforms to fill in the gaps in the market and the elimination of ineffective laws and mandatory lending policies can have a good effect on the growth of the financial system.

- c) **Public policy for risk oversight and management:** The benefits of financial depth cannot be realized without proactive regulations to monitor market activity, encourage ongoing risk monitoring, and reduce systemic risks. Ensuring the positive performance of banks and controlling the risks to and from the banking system through careful regulation and strict supervision are essential given the prominence of banks in Nigeria's financial systems and their connections to capital (stock and bond) markets. While lowering related risks, a strong banking system may also offer a strong foundation for the growth of the capital market.

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