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Interest Rates Dynamics and Saving Mobilisations in Nigeria: 1987-2015

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Abstract

Financial repression has been identified to impose ceiling on deposit and lending nominal interest rates at a low level relative to inflation. This often results in low or negative interest rates that discourage savings mobilization and channeling of mobilized savings through the financial system. The paper thus examined the effect of interest rates dynamics on savings mobilization in Nigeria between 1987 and 2015 using a restricted Auto Regressive Distributive Lag (ARDL) model. Break-point unit root test was carried out to test the stationarity levels of the variables before conducting the regression analysis to avoid spurious regression results. The co-integration results showed that long-run equilibrium relationship exist among the variables used for the analysis; while the coefficient of the speed of adjustment revealed that once there is disequilibrium in the system, it takes an average speed of 58.07percent to adjust itself back towards long-run equilibrium level. Findings from the study therefore revealed that maximum lending rate (MLR) has adequately enhanced optimal saving mobilization within the period under study. This was in-line with interest rate spread (IRS) which was also found to have a significant effect on saving mobilizations. However, the Minimum rediscount rate (MRR) and gross national income did not adequately enhanced savings mobilizations within the period under review. Suggestive from the analysis therefore is that there is the need for monetary authorities to embark on routine efforts aimed at reducing the widened gap between gross national income and savings rates to foster a moderate rise in nominal interest rates that would enhance adequate savings deposits. Focus should also be made on ways of reducing the abysmally high rediscount rates of deposit money banks so as to encourage savings.

Keywords:

Interest rates, Minimum rediscount rates, Maximum lending rates, Savings mobilizations, Interest rate spread

JEL Classifications: E43, E52 and G21

INTRODUCTION

For decades, financial institutions are statutorily mandated with the primary responsibility of financial intermediation in order to make funds available to all economic agents. The intermediation process involves moving funds from surplus spending sectors or units of the economy to deficit spending sectors or units. The extent to which this could be done depends on the level of development of the financial sector, as well as the savings habit and degree of financial literacy of the populace.

However, financial repression is one of the causes of unsatisfactory growth performance of developing countries, and this arises mostly where a country imposes ceiling on deposit and lending nominal interest rates at a low level relative to inflation. Both McKinnon (1973) and Shaw (1973) advocated that financial liberalization was needed to remedy the problems caused by the financial repressive policies of developing countries.

The availability of investible funds is therefore regarded as a necessary starting point for all investments in the economy which will eventually translate into economic growth and development (Uremadu, 2005). This is because it ultimately determines the cost, the direction and availability of credit within an economy. The behaviour of interest rates thus, to a large extent, determines the investment and savings activities and hence economic growth of a country.

Nigerian economy has witnessed financial repression in the early 1980s due to rigid exchange and interest rate controls which resulted in low direct investment. Funds were inadequate as there was a general lull in the economy. Consequently, there was a persistent pressure on the financial sector, which in turn necessitated a liberalization of the financial system. The Nigerian government deregulated interest rate in 1987 as part of the Structural Adjustment Programme (SAP) policy package introduced in 1986. The official position then was that interest rate liberalisation would among other things; enhance the provision of sufficient funds for investors, especially manufacturers, who are prime agents- and promoters of economic growth. However, in a dramatic policy reversal, the government in January, 1994 out-rightly introduced some measures of regulation into interest rate management. It was claimed that there were "wide variations and unnecessarily high interest rates" under the complete deregulation of interest rates. Deposit rates were set at 12 percent between 15 percent per annum while a ceiling of 21 percent per annum was fixed for lending (CBN, 2010; Onwumere, Okore, Amah & Ibe, 2012).

The level of funds mobilization by banks is quite low due to a number of reasons, ranging from low savings deposit rates to the poor banking habits or culture of the people (Nnanna, Englama & Odoko, 2004). Savings deposit rate was found to have dropped from all time high of 18 percent in 1990, 16.7 percent in 1993; 10.6 percent in 2004 to 3.38 in 2014 and 3.58 in 2015 (CBN, 2015). Another disincentive to funds mobilization is the attitude of banks towards small savers. Most banks target corporate customers and government deposits and pay little or no attention to the small savers. Admittedly, the services rendered to the small savers are more tasking on the banks, but there is need to encourage them to save. Available information indicated that the funds from household savings are relatively cheaper and more stable than government deposits that are very volatile and expensive due to unpredictable oil price where these deposits are generated from. However, the role of savings in economic growth of any country cannot be over-

emphasized. Conceptually, savings represent that part of income not spent on current consumption. When applied to capital investment, savings increase output (Adesoye & Maku, 2015). Institutions in the financial sector like deposit money banks (DMBs) or commercial banks mobilize savings deposit on which they pay certain interest.

The problem of mobilising savings and deposits has always been the bane of economic growth and development. In developing economies, Nigeria inclusive, savings rate has been declining since the first oil shock and in the early 1990s. However, this trend conceals a large and increasing dispersion of savings rate.

The interest rate reform policy under financial sector liberalization in Nigeria was also to achieve efficiency in the financial sector, engender financial deepening and encourage savings. The financial sector reforms began with the deregulation of interest rates in August 1987 (Chete, 1999). Prior to the deregulation of interest rate in Nigeria, the prevailing rates of interest were regulated by government through the Central Bank of Nigeria (CBN). This was meant to guide the economy to follow the desired direction of growth. However, it was soon realized that, the low rates of interest that prevailed could not be sustained. Nigerian economy witnessed the introduction of Structural Adjustment Program (SAP) which shifted emphasis from public sector to private sector. The goal was to, among other things, encourage private domestic savings, encourage private domestic investment and encourage capital formation in order to enhance economic growth. By encouraging savings, resources were expected to be diverted from current consumption to investment in capital enterprises.

Therefore, the expectation of interest rate reform was that it would encourage savings and make loanable funds available to the banking institutions. But, the criticism has been that the tunnel-like structure of interest rate in Nigeria is capable of discouraging savings and retarding growth in view of the empirical connection between savings, investment and growth. The link between these variables has been emphasized such that if individuals or firms save, that means there is a greater possibility of investing in the near future. The more you save, the more resources are available for investments i.e. the disposable income is shared between saving and consumption. Consequently, a higher level of investment is capable of creating brighter chances of economic growth.

The paper thus examined the effect of interest rates on saving mobilization in Nigeria by adopting the Auto Regressive Distributed Lag (ARDL) approach.

The other sections of the paper are structured into literature review; section three captures the methodology, sections four is the results and discussion and lastly, conclusion and recommendation in section five.

LITERATURE REVIEW

The Concept and Measurement of Savings

Schreiner (2004) remarks that; production requires natural resources, tools, and human capital. These factors of production come from saving the 'choice to move resources through time rather than to use them up now'. Without saving, people are hunters and gatherers who live hand-to-mouth. With saving, people can build steadily on the past to improve the future. In short, saving drives development.

Schreiner (2004) also contends that, resources received in a given time period are income; resources controlled at a point in time are assets or savings. Both income and assets refer to resources; they differ only in the frame of reference. If resources received as income are not immediately consumed, then they become assets. Moving resources through time is saving. The definition includes both conscious and unconscious failure to consume. Thus, examples of saving include putting cash in a bank rather than buying meat pies as well as failing to take cash out of a bank account to buy meat pies.

Moving money through time is financial saving and it has three stages as explained by Beverly, Moore, Amanda & Mark (2003). The first is "putting in". "Putting in" means "depositing" changes cash into bank account balances. Although many people equate "depositing" with "saving", "saving" is a far broader concept than just "depositing". This is because, saving has as its goal the formation of financial asset while deposit may be motivated by the need for temporary adjustment of portfolio by an economic agent.

The second stage of financial savings is maintaining balances, or "keeping in". Although not always recognized as saving, failure to consume assets does move resources through time. The third stage is "taking out". Resources "taken out" may be consumed (dissaved) or kept in another form (saved). For bank accounts, "taking out" means making withdrawals.

Each stage is a distinct aspect of financial savings. Savings might be high in one stage but low in another, so measurement should look at all three stages. For example, savers with large deposits may have high savings in terms of "putting in", but, if they make quick withdrawals, they may have low savings in terms of "keeping in". Likewise, savers with low deposits might nonetheless maintain balances for a long time. Finally, savers with high savings in terms of "putting in" and/or "keeping in" might-if withdrawals are consumed rather than converted to other assets-have low savings in terms of "taking out". Financial savings must explicitly include time. Changes in resources in a period of time are flows, and resources at a point in time are stocks. Stocks and flows describe two stages of financial savings, "putting in" as flows of deposits and "taking out" as flows of withdrawals (or "keeping in" as stocks of balances to be withdrawn later). Stocks and flows, however, describe "keeping in" inadequately. Measuring the resources held through time requires a "flow-field stock" Asset accumulation occurs if saving consistently exceeds dissaving.

THEORETICAL REVIEW

The Loanable Funds Theory of Interest

The neo-classical or loanable funds theory explains the determination of interest in terms of demand and supply of loanable funds or credit. According to the theory, the rate of interest is the price of credit which is determined by the demand and supply for loanable funds (Jhingan, 2002). It is the price which equates the supply of credit or saving plus the net increase in the amount of money in a period, to the demand for credit or investment plus net hoarding in the period. The demand for loanable funds does not determine rate of interest by itself, the supply of loanable funds must be added to complete the picture. Rose (2003) observed that the demand for loanable funds consists of credit demands from domestic businesses, consumers, and governments; and also borrowing in the domestic market by foreigners. The supply of loanable funds stems from domestic savings, dishoarding of money balances, money creation by the banking system, and lending in the domestic market by foreign individuals and institutions.

The theory is however criticized on ground that it over emphasizes the influence of the rate of interest on savings. People have been found to save not to earn rate of interest but to satisfy

precautionary motive, and as such savings are interest inelastic. It has also been criticized for combining monetary factors with real factors this makes the theory unrealistic.

Empirical Review

A number of scholars have investigated the effects of real interest rate on savings mobilization. In Nigeria and other developing economies, interest rate has shown significant effect on financial savings especially time and savings deposits while the structure of deposits was determined by differentials in deposits rates (Ndekwa, 1991).

Through further investigation using monthly data, Ndekwa discovered that interest rate deregulation in Nigeria have a positive impact on financial savings between 1986 and 1988 and in Ghana between 1976 and 1980. Consequently, negative real interest rates resulted in decline of financial savings in real terms. But on the contrary, the Malaysian economy witnessed a steady policy of positive inflation-adjusted interest rates which led to growth in real term savings deposits.

Rahman and Uddin (2014) examined the role of saving in accelerating economic growth in Bangladesh and estimates using a simultaneous equation. Their 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 confirm the saving-growth simultaneity reflecting that saving and growth positively affect each other and go hand to hand.

Oluwatoyin and Adebipe (2013) examined the effects of interest rate deregulation on deposit mobilization in the Nigerian Banking Industry. Their study employed the ordinary least square method by using relevant data and information from 1993 to 2010. They found out that real interest rate is a critical factor determining savings in the country. It was equally revealed that inflation has a negative effect on deposit mobilization while income was found to be the greatest determinant of saving and deposit mobilization. Their study therefore recommends that there is an urgent need, for the government to review its interest rate policy and consistently pursue effective monetary policy and reforms aimed at enhancing the workings of this policy variable (interest rate). Their study equally recommended a broad based main economic policy geared towards improved and sustainable income level, which has to be rigorously and persistently, pursued especially its economic and banking sector reforms.

Onwumere, Okore, Amah and Ibe (2012) examined the impact of interest rate liberalization on savings and investment in Nigeria over the period 1976 to 1999. Their study revealed that interest rate liberalization had negative non-significant impact on savings and negative significant impact on investment in Nigeria. Thus, interest rate liberalization, though a good policy, was counterproductive in Nigeria. They stated that this might probably be as a result of improper pace and sequencing. In determining the appropriate sequencing of interest rate liberalization, we recommend that the authorities need to distinguish not only between loan and deposit transactions but also between wholesale and retail transactions. Interest rates on wholesale transactions between sophisticated entities should be liberalized first, followed by lending rates and then deposit rates. This gradual approach safeguards the profitability of banks while allowing time for people and firms to adjust to liberalization.

Obute, Adyorough, and Itodo (2012) established the relationship that exists between deregulated interest rates and economic growth through savings and investment in Nigeria, and also to make a comparative analysis between the impact of regulated and deregulated interest rates on economic growth in Nigeria. They hypothesized that interest rates deregulation do not have significant influence on economic growth in Nigeria. Four separate models were estimated to capture the relationship between; Real Deposit Rate (RDR) and Total Savings (TS) (Model 1), Real Lending Rate (RLR) and investment (INV) (Model 2), INV and economic growth (Model 3), and, RLR and economic growth (RGDP) (Model 4) for both the deregulation era (1987-2009) and the regulation era (1964-1986). Their research revealed that RDR does not have significant impact on total savings before and after the deregulation exercise, RLR also does not have significant impact on investment before and after the deregulation exercise, investment has a positive and significant impact on economic growth before and after the deregulation of interest rate, and, RLR does not have a significant impact on economic growth before and after the deregulation exercise. This may be due to the incomplete deregulation of interest rates as its value is still tied to the monetary policy rate even after the deregulation exercise. They recommended that interest rates should be effectively deregulated to allow the country reap the full benefits of the financial reforms introduced about 25 years ago with very little satisfactory results.

Bwire, Mukungu, Luganda and Ilukor (2010) investigated the impact of real interest rates on national savings in Uganda for the period 1975-2006. Their study highlighted the responsiveness of national savings to the real interest rates; establishes the impact of institutional change in the financial sector on savings mobilization and generates empirical evidence relevant to the enhancement of national savings mobilization and investment. Using modern econometric techniques, a generic national savings model is estimated. Their results suggested that financial liberalization is a necessary but not a sufficient condition for stimulating national savings.

Jimoh (2013) examined Interest Rate Sensitivity and Banks' Investment in Nigeria. using time series analysis and annual data from 1980 - 2011. He used Ordinary least square model to capture the variables in the model. His empirical results indicate that real lending rates was found to be significant and highly negatively sensitive to all the incorporated financial indicators in Nigeria during the review periods. This implied that overall financial policy instituted and regulations have been effective in stabilizing the sensitivity of interest rate to changes in banks' investment in Nigeria.

Gaire (2015) also analyzed effect of Real Interest Rate on Saving Behavior in Nepal from 1975 to 2010 using annual data published by Nepal Rastra Bank (NRB). His findings showed that average real interest rate for that period was as low as 1.32% and that there is a long-run relationship between real interest rate and saving behavior in Nepal. The estimated coefficients of correlation further indicate that the real interest rate have a strong positive correlation with gross domestic saving ratio. Likewise, the real interest rate affects the growth of bank deposit positively but negligibly.

LITERATURE GAP

It was discovered from the reviewed literatures that pre-estimation techniques utilized by various scholars relied on Augmented Dickey-Fuller (ADF) and Phillips-Perron (1988) unit root tests that does not account for structural breaks. A well-known weakness of the ADF and PP unit root tests is their potential confusion of structural breaks in the series as evidence of non-stationarity. In other words, they may fail to reject the unit root hypothesis if the series have a structural break. for the series that are found to be $I(1)$, there may be a possibility that they are in fact stationary around the structural break(s), $I(0)$, but are erroneously classified as $I(1)$. Perron

(2006) shows that failure to allow for an existing breaks leads to a bias that reduces the ability to reject a false unit root null hypothesis. To overcome this, the author proposes allowing for a known or exogenous structural break in the Augmented Dickey-Fuller (ADF) tests. Following this development, many authors, including Zivot and Andrews (1992) and Perron (2006) proposed determining the break point 'endogenously' from the data.

Therefore, our paper utilised the Zivot-Andrews pre-estimation technique which provides a more robust result than the usual Augmented Dickey Fuller (ADF) test and also accounts for structural breaks. More so, from the empirical literature that was reviewed, previous studies who used the dummy variables to capture financial reforms; as well as Bounds test approach were experiences from other countries and none from Nigeria. Thus, our study is an improvement on that.

METHODOLOGY

The research design adopted for this research was the *ex-post facto* research design. The *ex-post facto* research design was used to determine cause-effect relationship between the dependent and independent variables with a view to establishing a causal link between them.

It also tested the hypotheses concerning cause-and-effect relationships, as well as combining the theoretical consideration with empirical observation.

Annual time series data (1987-2015) on maximum lending rates, minimum rediscount rate(MRR), Interest rate spread(IRS), Gross national income (GNI) and total savings(SAV) for Nigeria used in this study have been obtained from CBN Statistical Bulletin and Annual Reports (for various years)

Unit root tests is prerequisite to make sure that none of the variables is integrated of order 2 ($I(2)$) or higher order while applying the ARDL approach to cointegration, because the calculated F-Statistic does not remain valid in the presence of $I(2)$ or higher orders and the bound test is based on the assumption that the variables are $I(0)$ or $I(1)$ (Yildirim & Sezgin, 2003; Ouattara, 2004). Therefore, testing the unit root is very crucial before estimating the ARDL model. For this purpose, the paper used break-point unit root tests to check the robustness of the results.

Traditionally, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are used to assess the order of integration of the variables. Uniform outcomes of both tests are necessary for the final conclusion about the stationarity properties of each series. However, a well-known weakness of the ADF and PP unit root tests is their potential confusion of structural breaks in the series as evidence of non-stationarity. In other words; they may fail to reject the unit root hypothesis if the series have a structural break. In other words, for the series that are found to be $I(1)$, there may be a possibility that they are in fact stationary around the structural break(s), $I(0)$, but are erroneously classified as $I(1)$. To overcome this, Perron (1989) proposes allowing for a known or exogenous structural break in the Augmented Dickey-Fuller (ADF) tests

Therefore, Pre-testing the time series properties of the data was carried out using the Zivot and Andrews (1992) and Vogelsang and Perron (1998) unit root test technique. The Zivot and Andrews (1992) and Vogelsang and Perron (1998) technique provides a more robust result than the usual Augmented Dickey Fuller (ADF) test and also accounts for structural break.

To examine the long run as well as short run relationship between the rate of interests, and domestic savings mobilization in Nigeria, an appropriate econometric model is required for empirical analysis such an ARDL error correction model. The paper tested the McKinnon-Shaw

hypothesis on the Nigerian economy by employing the Autoregressive Distributed Lag (ARDL) modelling approach. This study thus uses Bounds testing approach to Co-integration employed within the framework of Autoregressive Distributed Lag model (ARDL) developed by Pesaran, *et al.* (1997), as it can be applied without considering the same order of integration of all variables i.e. either they are integrated of order I(0), I(1) or of mixed order.

The ARDL bounds test is based on the F-statistic, which has a non-standard distribution. Two critical bounds are given by Pesaran and Pesaran (1997). For Co-integration test. The lower critical bound assumes that all the variables are I(0), while the upper bound assumes all the variables to be I(1).

Pesaran, Shin and Smith (2001) unrestricted ARDL (p, q_1, \dots, q_k) model by means of OLS is specified as:

$$y_t = \alpha + \sum_{i=1}^p \gamma_i y_{t-i} + \sum_{j=1}^k \sum_{i=0}^{q_j} X_{j,t-i} \beta_j + \varepsilon_t \text{-----(1)}$$

Where;

y_t = dependent variable at time t

X_j = maximum lending rates, minimum rediscount rates, interest rate spread, and gross national income at time t

γ = coefficient of parameter estimate of lagged savings mobilized at time t

As a tradition, the test for null hypothesis of no Co-integration against alternative of the existence of a long run relationship is tested by using F-test such as;

$$H_0 = \alpha_1 = \alpha_2 = \dots = \alpha_n = 0$$

$$H_1 = \alpha_1 = \alpha_2 = \dots = \alpha_n \neq 0$$

If the computed F-statistic falls above the upper bound critical value of F-tabulated developed by Pesaran, the null of no Co-integration is rejected which implies that long run relationship exists among the variables of interest. On contrary, if it falls below the lower bound, then the null of no Co-integration cannot be rejected. Finally, if it lies between these two bounds, the result seems inconclusive.

The McKinnon-Shaw hypothesis consists of two distinct relationships i.e., the interest rate-savings nexus and the savings- investment nexus. The study however dwelled on the interest rate-savings nexus.

Theoretically, aggregate savings is a function of aggregate income and interest rate on savings, and in order to test the interest rate effect on savings, the following relationship is examined:

$$SAV_t = f(MLR_t, MRR_t, IRS_t, GNI_t, DUM_t) \text{-----(2)}$$

Where;

SAV_t = Savings

MLR_t = Maximum lending rates

- MRR_t = Minimum Rediscount Rates
- IRS_t = Interest rate spread
- GNI_t = Gross national income
- DUM_t = Dummy (break point dates)

Incorporating our money market interest rates and savings relationship into the unrestricted ARDL model framework of equation (1) so as to obtain the conditional (restricted) ARDL steady-state model (which was accomplished by applying OLS methods to estimate the general ARDL model), of the form:

$$\Delta \ln SAV_t = \alpha_0 + \sum_{i=1}^m \alpha_1^i \Delta \ln SAV_{t-i} + \sum_{j=0}^n \alpha_2^j \Delta MLR_{t-j} + \sum_{k=0}^o \alpha_3^k \Delta MRR_{t-k} + \sum_{l=0}^p \alpha_4^l \Delta RDR_{t-l} + \sum_{m=0}^q \alpha_5^m \Delta IRS_{t-m} + \sum_{n=0}^r \alpha_6^n \Delta \ln GNI_{t-n} + \lambda_1 \ln SAV_{t-1} + \lambda_2 MLR_{t-1} + \lambda_3 MRR_{t-1} + \lambda_4 IRS_{t-1} + \lambda_5 \ln GNI_{t-1} + \lambda_6 DUM_t + \varepsilon_t \text{ ---- (3)}$$

In the above equations, the terms with the summation signs represent the error correction dynamics while the second part [terms with λs in equation] correspond to the long run relationship between the variables.

Where;

- ln = natural logarithms; α₀ = Intercept or drift operator; α₁ – α₅ = coefficients of short run dynamics; λ₁ – λ₆ = Long run multipliers; Δ = First difference operator; k = Respective specific optimum lags orders of the variables entering ARDL-ECM; ε_t = Error term; t = time
- DUM = Dummy (break point dates)

Once a cointegration relationship is established between the variables, the study would proceed to examine the long-run effect and the short-run dynamics using unrestricted error correction term (ECT) estimator following position of Oluwatoyin and Adebipe (2013), the relationship between Savings mobilisation and interest rates is specified as:

$$\Delta \ln SAV_t = \alpha_0 + \sum_{i=1}^m \alpha_1^i \Delta \ln SAV_{t-i} + \sum_{j=0}^n \alpha_2^j \Delta MLR_{t-j} + \sum_{k=0}^o \alpha_3^k \Delta MRR_{t-k} + \sum_{l=0}^p \alpha_4^l \Delta IRS_{t-l} + \sum_{m=0}^q \alpha_5^m \Delta \ln GNI_{t-m} + \delta ECT_{t-1} + \varepsilon_t \text{ ---- (4)}$$

Hendry’s (1987) methodology of “general-to-specific was employed via stepwise regression procedure (*through the elimination of those variables and their lags that are highly not significant*), before finally arriving at an interpretable model or parsimonious model. The elimination process was carried out until the coefficient of the error correction term, ε_t have the expected negative sign, less than unity and it is highly significant at the 10 per cent level of significance. ECT_{t-1} is the lagged Error correction term. It is the residual obtained from the long run estimation.

EMPIRICAL RESULTS AND DISCUSSION OF RESEARCH FINDING

Descriptive Results

Table 1 captures the descriptive results of the link between interest rate and saving mobilisation in Nigeria

Table 1: Descriptive Results of the Link between Interest Rate and Saving Mobilisation in Nigeria

	LOG(SAV)	MRR	MLR	IRS	LOG(GNI)
Mean	6.228032	13.9528	23.1793	15.66655	8.745554
Median	6.190418	13.5	22.42	15.86	8.838581
Maximum	9.393346	26	36.09	26.04	11.45259
Minimum	2.927453	6.13	17.6	3.1	5.263344
Std. Dev.	2.115914	4.00011	4.23526	6.13897	1.866452
Skewness	0.023845	0.75015	1.23316	-0.435089	-0.248442
Kurtosis	1.697928	4.47108	4.38588	2.150866	2.016379
Jarque-Bera	2.051345	5.33474	9.67072	1.786206	1.467406
Probability	0.358555	0.06944	0.00794	0.409384	0.480128
Sum	180.6129	404.63	672.2	454.33	253.6211
Sum Sq. Dev.	125.3586	448.024	502.247	1055.235	97.54196
Observations	29	29	29	29	29

Source: Authors' Computation, 2017

The descriptive results indicate that savings mobilisation in Nigeria during the period of 29 years (1987-2015) has minimum and maximum values of 2.97 percent and 9.39 percent respectively. The average value of the savings mobilized during the period is 6.22 percent with standard deviation of 2.11percent, implying that the data deviate from the both sides of mean by 4.11percent. This suggests that the savings mobilization in Nigeria is not widely dispersed during the period under study as the standard deviation was found to be less than the mean value. The coefficient of skewness of 0.02 suggests that the data on savings mobilization is positively skewed and did comply with the symmetrical distribution assumption. The probability value of Jarque-Bera of 0.35 also implies that the Gaussian distribution assumption of the normal data on savings mobilization was met. This indicates that the data on savings mobilization did follow the normal curve.

Table 2 shows that the minimum rediscount rate during the period has minimum and maximum values of 6.13 percent and 26 percent respectively. The average value of minimum rediscount rate during the period is 13.95percent (which is quite high) with standard deviation of 4 percent, implying that the data deviate from the both sides of the mean by 9.95percent This suggests that the data from the minimum rediscount rate variable is not widely dispersed from the mean during the sample period, as the standard deviation was found to be low. The coefficient of skewness of 0.75 suggests that the data is also positively skewed and also comply with the symmetrical distribution assumption. More so, the p-value of 0.06 for Jarque-Bera implies that the Gaussian distribution assumption of normal data was met.

Furthermore, the maximum lending rate during the period under study has minimum and maximum values of 17.6percent and 36.09percent respectively. The average amount of maximum lending rate charged during the period is 23.17percent with standard deviation of 4.23percent,

implying that the data deviate from the both sides of mean by 18.94percent. This suggests that the data on maximum lending rates is quite widely dispersed from the mean during the sample period, as the standard deviation was also found to be relatively high. The coefficient of skewness of 1.23 suggests that the data maximum lending rate is positively skewed and did not comply with the symmetrical distribution assumption. In addition, the p-value of 0.007 for Jarque-Bera on the other hand implies that the Gaussian distribution assumption of normal data is was not met.

Finally, the Interest rate spread during the period also has minimum and maximum values of 3.13percent and 26.04percent respectively. The average amount of IRS during the period is 15.66percent with standard deviation of 6.13percent, implying that the data on Interest rate spread deviate from the both sides of mean by 9.53percent. This suggests that the interest rate spread were widely dispersed from the mean during the sampled period, as the standard deviation was also found to be relatively high. The coefficient of skewness of -0.43 suggests that the data is negatively skewed and had not complied with the asymmetrical distribution assumption. More so, the p-value of 0.40 for Jarque-Bera implies that the Gaussian distribution assumption of normal data was met.

The descriptive results indicate that gross national income in Nigeria during the period of 29 years (1987-2015) has minimum and maximum values of 5.26 percent and 11.45 percent respectively. The average value of the gross national income generated during the period is 8.74 percent with standard deviation of 1.86percent, implying that the data deviate from the both sides of mean by 6.88percent. This suggests that the gross national income in Nigeria is not widely dispersed during the period under study as the standard deviation was found to be less than the mean value. The coefficient of skewness of -0.24 suggests that the data on gross national income is negatively skewed and had not also complied with the symmetrical distribution assumption. The probability value of Jaque-bera of 0.48 also implies that the Gaussian distribution assumption of the normal data on gross national income was met. This indicates that the data on gross national income followed the normal curve.

Unit Root Test Result

Table 2: Results of Zivot-Andrews Unit Root Test on Interest Rates and Saving Mobilisation in Nigeria

Variable	t-statistics	Order of integration	Break date	Maximum lag
MRR	-5.950686(-4.949133)*	I(1)	1996	5
MLR	-6.607021(-5719131)*	I(1)	1999	6
IRS	-4.955082(-4.893950)***	I(0)	2004	6
SAV	-5.033600(-4.893950)***	I(1)	2004	5
GNI	-9.939667(-5.347598)*	I(0)	2009	5

Note: *, ** and *** indicate asymptotic critical values of Zivot-Andrews test at 1percent, 5percent and 10percent levels respectively.

Source: Authors compilation (2017)

As indicated in Table 2, it maximum lending rate, minimum rediscount rate and saving deposits were stationary at first difference and integrated at order one {that is I(1)}. Maximum lending rate test statistics of -6.607021 was found to be greater than the critical value put at -5719131 at 1percent level of significance. The break period of maximum lending rate was found to have taken place in 1999. Minimum rediscount rate also had its test statistics valued at -5.950686 which is greater than the critical value put at -4.949133 also at 1percent significant level. The break period for this variable was however found to have occurred in 1996. Saving deposits which was

also found to be stationary at first difference has its break period to have occurred in 2004; and its test statistics value of -5.033600 was found to be greater than the critical value of -4.893950 at 10percent significance level.

However, interest rate spread and gross national income were found to be stationary at levels within the period under study. Interest rate spread was found to have same break periods with saving deposits in 2004. At its order of integration at zero, the test statistics value put at -4.955082 was found to be greater than the critical values put at -4.949133 and at 10percent significance level; while gross national income had its own break point date in 2009.

Since all the variables were found to be integrated at different orders, they all satisfied the ARDL-bound testing approach which necessitates every variable in the equation to be static either at level or at first modification.

Results of Co-integration Test

Table 3 presents the result of the co-integration test using the ARDL bound test approach to Co-integration. The result revealed that there is an existence of co-integration among the variables. The F-statistics values at 3.511 is greater than the lower and upper bound values put at 5percent level of significance. Hence, there is a sufficient proof of the existence of a long-run equilibrium relationship between interest rates and savings mobilisation in Nigeria between 1986 and 2015. The result thus shows that interest rates have long run sustainability on savings mobilization growth within the period under study.

Table 3: Results of ARDL-Cointegration Test on Interest Rates and Saving Mobilisation in Nigeria

Wald Test (ARDL Long-Run Equilibrium Condition)		
Test Statistic	Value	k
F-statistic	3.511846	5
Critical Value Bounds Values by Pesaran(2001)		
Significance	I0 Bound	I1 Bound
10percent	2.26	3.35
5percent	2.62	3.79
2.5percent	2.96	4.18
1percent	3.41	4.68

Notes: ***, ** and * significant at 10%, 5% and 1%, respectively.

Source: Authors compilation (2017)

ARDL-ECM and Statistical Test of the Hypothesis on Interest Rates and Saving Mobilisation in Nigeria

The ARDL-ECM results examine how the equation (4) changes to the long-run equilibrium. Hendry’s (1987) methodology of “general-to-specific was employed to eliminate all insignificant lags. Accordingly, this led to an initial estimation of an ECM with three lagged differences of the explanatory variables, a constant term and error correction term lagged one (ECT_{t-1}) The dimensions of the parameter space were then reduced to a parsimonious ARDL-ECM specification by using omitted and redundant variable test to exclude the statistically insignificant lags. The results of the reduced short-run dynamic policy model are presented in Table 4.

Table 4: Results of Parsimonious ARDL (2, 3, 3, 1, 0, 3) and ECM on Interest Rates and Saving Mobilisation in Nigeria

Variable	Coefficient (t)
Constant	0.928420(1.227851)
DLOG(SAV(-1))	0.25132(0.212611)
D(MLR)	-0.028265(0.013321)***
D(MLR(-1))	0.003089(0.005114)
D(MLR(-2))	0.02284(0.014177)
D(MRR)	0.028746(0.011939)**
D(MRR(-1))	-0.009405(0.014008)
D(MRR(-2))	-0.038166(0.011264)**
D(IRS)	0.029286(0.016593)
DLOG(GNI)	0.353201(0.341348)
D(DUM)	-0.691872(0.157151)**
D(DUM(-1))	(0.425654(0.10274)**
D(DUM(-2))	0.343668(0.227645)
ECT(-1)	-0.580738(0.2114843)**
R-Squared	0.8992
R- Bar-Squared	0.8976
D.W	2.19
F-Stat	628.71*

Notes: ***, ** and * indicate statistical significance at 10%, 5% and 1% levels, respectively. Figures in parenthesis are standard errors.

Source: Authors' compilation (2017)

As expected, the lagged error correction terms is negative, less than unity and statistically significant at 5 percent. The coefficient revealed that once there is disequilibrium in the system, it takes an average (annual) speed of 58.07percent to restore the long-run relationship between the interest rates and savings mobilisations. This finding was collaborated by Bannerjee, Dolado and Mestre (1998). Who asserted that a highly significant lagged error correction terms proves the existence of long-run relationship between interest rates and savings mobilisations and its ability to adjust from dis-equilibrium state towards equilibrium level.

The adjusted coefficient of determination (R-Bar-square), which was used to measure the goodness of fit of the estimated model, indicates that the model is reasonably fit in prediction. It showed that 89.92percent changes in saving deposits were collectively due to interest rate spread, minimum rediscount rate and minimum rediscount rate, gross national income and break point dummy while 10.08percent unaccounted variations was captured by the white noise error term. It showed that interest rate spread, minimum rediscount rate and minimum rediscount rate, gross national income and break point dummy had strong significant impact on the saving deposits within the period under study.

The F-statistic which is used to examine the overall significance of regression model equally showed that the results are significant, as indicated by a high value of the F-statistic, 628.71 which is significant at 5.0 per cent level.

The hypotheses formulated in this paper were tested using Wald test (F-statistic) and *p*-value. The level of significance for the study is 10percent, for a two tailed test. The Wald test computes a test statistic based on the unrestricted regression and tests for the joint significance of the coefficients. The Wald statistic measures how close the unrestricted estimates come to satisfying the restrictions under the null hypothesis. If the restrictions are in fact true, then the unrestricted estimates should come close to satisfying the restrictions.

Thus;

$H_0: \beta_1 = 0$ (Null hypothesis)

$H_1: \beta_1 \neq 0$ (Alternative hypothesis)

H₀₁: Maximum lending rates have no significant effect on Savings mobilization in Nigeria

Table 5: Results of Wald Test on Maximum Lending Rates and Savings Mobilization in Nigeria

Test Statistic	Value	df	Probability
F-statistic	6.041941	(3, 8)	0.0188
Chi-square	18.12582	3	0.0004

Source: Authors' compilation (2017)

The Wald-test in Table 5 indicated that the calculated F-value for maximum lending rates is 6.04 and its probability value is 0.018. Since the probability value is less than 0.10 at 10percent level of significance, it thus falls in the rejection region and hence, the first null hypothesis (**H₀₁**) was rejected. The result thus shows that maximum lending rates have a significant effect on savings mobilization in Nigeria.

H₀₂: Minimum rediscount rate (MRR) has no significant relationship with savings mobilization in Nigeria.

Table 6: Results of Wald Test on Minimum rediscount rate and savings mobilization in Nigeria

Test Statistic	Value	df	Probability
F-statistic	1.856315	(3, 8)	0.2153
Chi-square	5.568944	3	0.1346

Source: Authors' compilation (2017)

The Wald-test in table 6, indicated that the calculated F-value for minimum rediscount rate was found to be 1.85 and its probability value is 0.2153. Since the probability value is greater than 0.10 or 10percent level of significance, which fell in the acceptance region and hence, we accepted the second null hypothesis (**H₀₂**) and conclude that minimum rediscount rate has no significant impact on savings mobilization in Nigeria between 1987 and 2015.

H₀₃: Interest rate spread has no significant influence on savings mobilization in Nigeria

Table 7: Results of Wald Test for Interest Rate Spread and Savings mobilisation in Nigeria

Test Statistic	Value	df	Probability
t-statistic	2.019528	8	0.0781
F-statistic	4.078494	(1, 8)	0.0781
Chi-square	4.078494	1	0.0434

Source: Authors' Compilation (2017)

The Wald-test in Table 7, indicate that the F-value for interest rate spread was found to be 2.01 and its probability value is 0.0781. Since the probability value is less than 0.10 or 10percent level of significance, which fell in the rejection region and hence, we reject the third null hypothesis (H_{03}) and conclude that interest rate spread also has had a significant influence on savings mobilization in Nigeria between 1987 and 2015

H_{04} : Gross national income has no significant effect on savings mobilization in Nigeria

Table 8: Results of Wald Test for Gross National Savings and Savings mobilisation in Nigeria

Test Statistic	Value	df	Probability
t-statistic	0.671395	8	0.5209
F-statistic	0.450772	(1, 8)	0.5209
Chi-square	0.450772	1	0.5020

Source: Authors' compilation (2017)

Finally, from the Wald-test in Table 8, indicated that the calculated F-value for gross national income was found to be 0.671 and its probability value is 0.5209. Since the probability value is also greater than 0.10 or 10percent level of significance, which fell in the acceptance region also and hence, the fourth null hypothesis (H_{04}) was accepted. Therefore, we conclude that gross national income also had no significant influence on savings mobilization in Nigeria between 1987 and 2015.

Sensitivity (or Stability) Analysis of Interest Rates and Savings Mobilisation in Nigeria

The paper conducted various post estimation diagnostic tests to ascertain the appropriateness and stability of the model as well as the robustness of the results. Thus, for reliability of estimates, we obtained series of residual and stability tests such as the serial correlation Lagragian Multiplier test (for higher order autocorrelation), the heteroscedasticity test, normality test and the Ramsey RESET specification test. Both the F-statistic and product of observation with the square coefficient of correlation (NR2) were obtained.

The decision rule for accepting the null hypothesis for any of these diagnostics tests is that the probability-value (p-value) of each has to be greater than 0.05 or 5percent level of significance.

Table 9 thus presents the residual test results;

Table 9: Results of Residual Test of Interest Rates and Savings Mobilisation in Nigeria

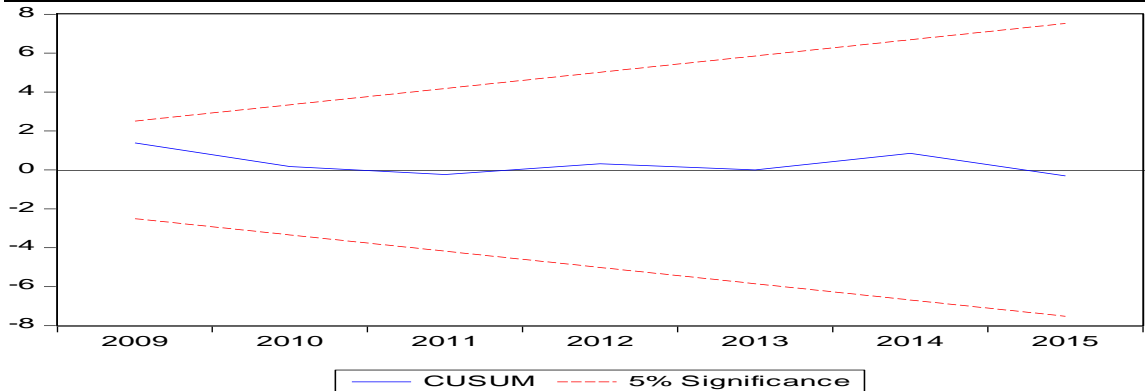
Tests	Outcomes		
		Coefficient	Probability
Heteroscedasticity-Breusch-Pagan-Godfrey Test	F-stat.	0.703775	0.7427
	NR ²	15.58134	0.0696
Breusch-Godfrey-Serial-Correlation Test	F-stat.	3.348291	0.1055
	NR ²	13.71323	0.0011
Normality Test	Jarque-Bera	3.21477	0.1002
Ramsey Reset	F-stat.	0.818159	0.3898

Source: Authors' Compilation (2017)

The result as presented in Table 9 revealed that there were no evidences of serial correlation and heteroskedasticity in the estimated ARDL-ECM model as the p-values of both (0.1055 and 0.7427) were found to be greater than 0.05 or 5percent. More so, the Ramsey Regression Specification Error Test (RESET) specification error test showed that the model was well mathematically

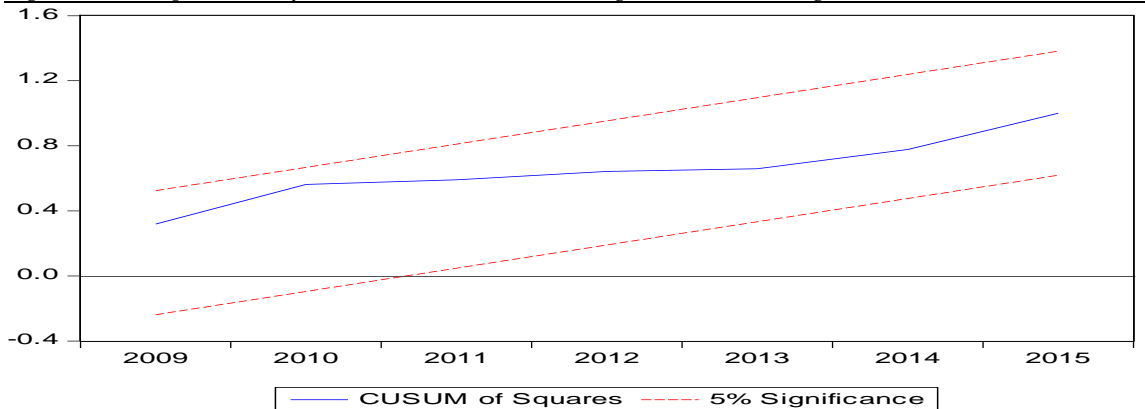
specified as the p-value of 0.3898 was found to also be greater than 0.05. Furthermore, Jarque-Bera test for normal distribution revealed that the result attained a normal distribution with a bell shaped symmetrical distribution at 10percent significance level. Lastly, the cumulative sum (CUSUM) stability tests (CUSUM and CUSUMSQ) in figure 1 and figure 2 revealed that the model is stable and the regression equation is correctly specified as the plots of the charts lie within the critical bounds at 5percent significant level.

Fig. 1: CUSUM Stability Tests of Interest Rates and Savings Mobilisation in Nigeria



Source: Authors' Compilation (2017)

Fig. 2: CUSUM Square Stability Tests of Interest Rates and Savings Mobilisation in Nigeria



Source: Authors' Compilation (2017)

Discussion of findings and Policy Implications

It was discovered from the analysis that maximum lending rates has a significant effect on savings mobilization in Nigeria. It showed that interest rates charged on loans and advances have indeed enhanced adequate saving mobilization within the period under study. This is agreement with Gaire (2015) whose findings revealed that there is a long-run relationship between real interest rate and saving behaviour. His estimated coefficients of correlation further indicate that the real interest rate have a strong positive correlation with gross domestic saving ratio. However, a contrary finding was earlier discovered by Bwire, Mukungu, Luganda & Ilukor (2010) whose results showed that liberalized interest rate is a necessary but not a sufficient condition for stimulating national savings. More so, Onwumere, Okore, Amah and Ibe (2012) study revealed that interest rate liberalization had negative non-significant impact on savings and negative significant impact on investment in Nigeria. They stated that interest rate

liberalization, though a good policy was counterproductive in Nigeria. They suggested that this might probably be as a result of improper pace and sequencing.

The study revealed that Minimum rediscount rate (MRR) has had no significant relationship with savings mobilization in Nigeria within the period under review. This was in agreement with Oluwatoyin and Adebipe (2013) who found out that real interest rate though remains a critical factor at determining savings in the country has not efficiently enhanced adequate savings mobilizations. They suggested that there is an urgent need, for the government to review its interest rate policy and consistently pursue effective monetary policy and reforms aimed at enhancing the workings of this policy variable (interest rate). Their study further suggested a broad based main economic policy geared towards improved and sustainable income level, which has to be rigorously and persistently, pursued especially its economic and banking sector reforms.

It was discovered from the analysis that interest rate spread also has had a significant influence on savings mobilization in Nigeria between 1987 and 2015. This suggests that there is a narrow variations and relatively affordable rates of interest after its deregulation in Nigeria. This was in agreement with the findings of Rahman and Uddin (2014) whose results revealed that the growth rate and real rate of interest spread had a positive impact on saving rate. Their findings also confirm the saving-growth simultaneity reflecting that saving and growth positively affect each other and go hand to hand.

Lastly, gross national was found to have an insignificant and negative effect on saving mobilizations in Nigeria between 1987 and 2015. This is in-line with Obute, Adyorough, and Itodo (2012) whose research revealed that real deposit rate does not have significant impact on total savings before and after the deregulation exercise, real lending rates also does not have significant impact on investment before and after the deregulation exercise, investment has a positive and significant impact on economic growth before and after the deregulation of interest rate, and, real lending rates does not have a significant impact on economic growth before and after the deregulation exercise. This may be due to the incomplete deregulation of interest rates as its value is still tied to the monetary policy rate even after the deregulation exercise

CONCLUSION AND POLICY RECOMMENDATIONS

In conclusion, the study showed that interest rates have had no significant effects on savings mobilization in Nigeria. This was in total divergence to the widely established significant relationship between interest rate and these variables, as presented by the Mckinnon-Shaw financial liberation hypothesis. This may however, be due to the policy inconsistency exercise witnessed in Nigeria over the years. The real interest rates are still being repressed, thereby limiting its role in financial intermediation for investment and savings growth.

The paper thus recommends that:

- i. The monetary authorities should embark on routine efforts at bridging the widened gap between lending rates and savings rates to foster a moderate rise in nominal interest rates and stabilize inflationary pressure. This would encourage savings mobilizations and generates needed loanable funds for investment in Nigeria. To effectively mobilize savings in an economy, the deposit rate must be relatively high and inflation rate stabilized to ensure a high positive real interest rate which motivates investors to save from their disposable income.
- ii. More so, monetary authorities should focus on ways of reducing the abysmally high rediscount rates of deposit money banks so as to encourage savings. It should also devise means of substantially reducing the interest rate spread.

- iii. There is need for authorities to carry out far reaching reforms that would enhance the role of money market in funds mobilization and disbursement for investment purposes. This may include the complete deregulation of interest rates which would allow their values to be determined absolutely by market forces and not by any administratively determined rate.

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