

Interest Rate Fluctuation Effect on Commercial Bank's Fixed Fund Deposit in Nigeria

Okolo Chimaobi Valentine

Abstract—Commercial banks in Nigeria adopted many strategies to attract fresh deposits including the use of high deposit rate. However, pricing of banking services moved in favor of the banks at the expense of customers, resulting in their seeking other investment alternatives rather than saving their money in the bank. Both deposit and lending rates were greatly influenced by the Central Bank of Nigeria (CBN) decision on interest rate. Therefore, commercial bank effort to attract deposits via manipulation of her rates was greatly limited, otherwise the banks will be giving out more than it earned. The study aimed at examining the relationship between interest rate and fixed fund deposit of commercial banks, how policy-controlled interest rate affected commercial bank's fixed fund deposit. The researcher employed ordinary least square technique, using, multiple linear regression, unrestricted vector auto-regression, correlation matrix test, granger causality and impulse response graph in the analysis. Commercial bank's interest rates affected commercial bank's fixed fund deposit significantly while policy-controlled interest rate did not significantly transmit through the commercial bank's interest rates to affect fixed fund deposit. While commercial banks seek creative ways to expand their fixed fund deposit, policy authorities in Nigeria should better coordinate interest rate fluctuation and induce competition in the entire financial sector.

Keywords—Commercial bank, fixed fund deposit, fluctuation effects, interest rate.

I. INTRODUCTION

INTEREST rate as a tool of monetary policy is used to control liquidity, inflation, aggregate demand and to stabilize the economy. Seeking to control inflation or money supply, aggregate demand, investment to expand or contract the economy, monetary authorities such as the Central Bank of Nigeria (CBN) manipulate the interest rate which is transmitted to the economy through the commercial banks.

Keynes defined the rate of interest as "the reward of not hoarding but the reward of parting with liquidity for a specified period" [1]. According to [2], interest rates operate through their influence on the cost of capital to the investor, as well as on returns to various groups of savers. They continued that a change in the interest rates affects the debt-equity choice of a firm, the overall cost of capital and real interest rates, and thereby sets in motion a chain of responses influencing the desired level of the capital stock and its productivity as well as the availability of savings and consequent speed of adjustment of the actual capital stock to its desired level.

Buttressing this point, [3] re-echoed a study by the Wall Street Journal in the United States which suggested that an

efficient credit market facilitated by commercial banks significantly contributed to the high standard of living in the U.S. economy. Lending his voice, [4] stressed that finance remains a critical issue in the growth of the Nigerian economy. Therefore, commercial banks' ability to mobilize savings, boost investment and grow Nigerian economy must stem from a high quality of financial services provided by an efficient financial system.

A significant source of funds which commercial banks employ in mobilizing savings is through fixed deposit accounts. According to [5], fixed deposit is a financial instrument provided by banks which provides investors with a higher rate of interest than a regular savings account, until the given maturity date. Outlining the importance of fixed deposits to commercial banks, [6] opined that banks need fixed deposits for short term loans to businesses. In addition, [7] asserted that fixed deposits indirectly boost economic development of a country and therefore called for commercial bank practices geared towards increasing their fixed deposits.

This study was informed by the 2004/2005 bank consolidation in Nigeria, and shock of the 2008/2009 world economic meltdown, which also hit the banking industry in Nigeria leading to the existence of few strong participants. This further made the pricing of banking services move in favor of the banks at the expense of the customers, resulting in their seeking other investment alternatives rather than saving their money in the bank. Fixed fund deposit is more investible by commercial banks with greater certainty than the ordinary savings due to their maturity period. It therefore becomes imperative to x-ray interest rate manipulations and its effect in mobilizing fixed fund deposit in order to boost investment in Nigeria. The rest of the paper is organized into four sections. Section two is devoted to the review of the related literature. Section three presents the methodological framework while the discussion of results is in section four. Conclusion is presented in section five.

II. LITERATURE REVIEW

Reference [8] defined interest rate as the rate at which interest is paid by a borrower for the use of money they borrowed from a lender; adding that they are normally expressed as a percentage of the principal for a particular period. Reference [3] opined that interest rate can be regarded as prices and these prices affect decisions on the allocation of financial resources in the economy therefore serving as signals that direct financial resources in the economy. Making his contribution, [9] regards interest rate as mainly and purely a measure of cost of capital. Furthermore, [10] viewed interest

rate as the return or yield on equity or opportunity cost of deferring current consumption into the future. His examples of interest rates included savings rate (including fixed deposit rate), discount rate, lending rate, and Treasury bill issue rate.

Commercial banks in Nigeria offer their customers 'mouth watering' interest rates in an aggressive hunt for fresh deposits (especially fixed deposit) and in bid to out-perform their rivals. Hoque's assertion that high interest rates attract fixed deposits, recalled that in Dhaka, the number of 'fixed deposit scheme' increased by 10 percent as the banks provided attractive interest rate to customers [11]. Reference [6] remained firm that banks need fixed deposits for short term loans to businesses. Reference [12] opined that deposits are the most important source of funding for European banks, providing roughly 60 percent of the total. She recounts that the growth of deposits is mainly driven by an increase in nominal gross domestic product.

Reference [13] stressed that competition for deposits between banks and their rivals will have some consequences for the economy in general. Highlighting such consequences, [14] asserted that a successful deposit competition between the banks and the non-banks will affect credit policy by affecting the money supply, the financial power of the institutions and interest rates. He examined the case of banks' success in offering more attractive yield which persuades deposit holders to transfer all or a substantial part of their deposit to the banks. Reference [15] further explained that a successful competition for deposits by banks will have three main effects; increase in local deposits and therefore money supply (depending on the sector the deposits were won), lending power of banks would remain unchanged if the deposits were won from the private sector but would lead to a multiple credit expansion, and if the bank takes no action to restore the status quo, they will be unable to meet the credit demand of their clients.

Considering the monetary transmission mechanism, [16] stated that its success largely depends on a comprehensive understanding of how these channels work and the relationship between operating instruments of monetary policy and the ultimate goals. Reference [17] therefore, suggests that it is essential for monetary authorities to have an accurate assessment of the timing and effects of their policies on the economy. Reference [18] summarized the monetary transmission process as firstly, a change in the central bank's lending rate transmitted to private interbank market; secondly, private interbank market transmit the change to other market interest rates; thirdly, changes in market interest rates are transmitted to asset prices, exchange rates and expectations; fourthly, these changes in asset prices, exchange rate and expectations are then transmitted to aggregate demand; fifthly, changes in aggregate demand are transmitted to money supply; and lastly, changes in money supply transmitted to prices. However, the relevance off the first and second stage to the scope of study is considered.

Reference [19], interest rate pass-through is defined as "the degree and the speed of adjustment of retail interest rates to money market rates". Agreeing with him, [20] explained that interest rate pass-through, which is the extent to which

changes in policy controlled interest rates are reflected in short-term and long-term retail interest rates, is measured by the degree and speed of adjustment from policy rate to retail interest rates.

Examining the effectiveness of the central bank's monetary policy, [20] asserts that it greatly depends on how commercial banks adjust their range of lending and deposit interest rates to changes in the central bank's policy interest rate. They argued that the magnitude and speed of these adjustments in lending and deposit rates determines whether these tools of monetary policy are effective or not. This implies that the position and activities of banks as intermediaries make them very relevant in the transmission process of monetary policy impulses of the central bank to the economy [21]. Therefore, interest rate route becomes effective when commercial banks speedily transmit the changes in the monetary policy interest rate to their deposit and lending rates; otherwise, it becomes sticky or ineffective. While fixed deposit seemed under mobilized in Nigeria, scarce literature exists on both commercial bank rates and policy-controlled interest rate fluctuation on the fixed deposit of commercial banks in Nigeria.

III. METHODOLOGY

The study employed econometric analysis. The econometric analyses used are the ordinary least square and vector auto-regression. This was specified to help examine the influence of interest rate on commercial bank's fixed fund deposit in Nigeria. Fixed fund deposit is proxied by Time Deposit (TD) and interest rate was proxied by bank rates (commercial bank's lending and deposit rates) and policy-controlled interest rates (monetary policy rate and treasury bill rate). Data was sourced from Central Bank of Nigeria (CBN) statistical bulletin.

We hypothesize that interest rate fluctuation has not significantly affected commercial bank's fixed fund deposit in Nigeria.

The basic model for the study is:

$$TD = f(Lr, Dr).$$

While TD is a function of commercial bank's rates (lending rate and deposit rate), commercial bank's rates are dependent on policy-controlled interest rates. Such rates as monetary policy rate and treasury bill rate are tools of CBN to control credit and interest rates of commercial banks. Therefore, we cannot neglect the effect of these policy controlled interest rates transmitted via commercial bank's interest rate on time deposit or fixed fund deposit. However, the transmission effect will be revealed using the Vector Auto Regression (VAR). The main advantages of VAR is that it does not use any preconceived economic theory on which the model is built and it has practical ability to capture the dynamic relationships among economic variables of interests [22]. The model therefore becomes:

$$TD = f(Lr, Dr, MPr, TBr).$$

To make it stochastic

$$TD = B_0 + B_1Lr + B_2Dr + B_3MPr + B_4TBr + U \quad (1)$$

where, Lr = Lending rate; Dr = Deposit rate; MPr = Minimum Policy rate; TBr = Treasury Bill rate; TD = dependent variable (Time Deposit); U = error term; B₀, B₁, B₂... denote unknown parameters to be estimated.

$$TD_t = A_0 + \sum_{t=1}^k A_t - 1 U_t \quad (2)$$

where TD_t = (TD₁ +... TD_k) is a column vector of observation on the current values of all variables in the model, A, is K x K matrix of unknown coefficients, A₀ is a column vector of deterministic constant terms, U_t is a column vector of errors with properties of E(U_t) = 0 for all t.

IV. DISCUSSION

A Unit Root

TABLE I
AUGMENTED DICKEY-FULLER TEST FOR UNIT ROOT AND STATIONARITY

variables	t*	1%	5%	10%	URT in;
Td	-4.239611	-3.6171	-2.9422	-2.6092	2 nd diff
Lr	-6.146205	-3.6117	-2.9399	-2.6080	1 st diff
Dr	-3.904305	-3.6117	-2.9399	-2.6080	1 st diff
MPr	-6.586201	-3.6117	-2.9399	-2.6080	1 st diff
TPr	-5.835878	-3.6117	-2.9399	-2.6080	1 st diff

URT stands for Unit root test; Source: computed using e-views statistical software

Looking at the Augmented Dickey-Fuller test for unit root and stationarity showed that the independent variables passed the test at 1st difference. However, the TD passed the test at 2nd difference. Therefore, we conclude that there is no unit root problem with the data. Nonetheless, the variables were logged and used for further analysis.

B Multiple Linear Regression

TABLE II
MULTIPLE LINEAR REGRESSION RESULT

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.206527	1.420074	0.145434	0.8852
LNDR	-2.546863	0.459323	-5.544824	0.0000
LNLR	4.931564	1.161539	4.245716	0.0001
LNMPR	1.975102	1.638799	1.205213	0.2360
LNTBR	-1.407340	1.490999	-0.943890	0.3515
R-squared	0.765813	Mean dependent var		9.832310
Adjusted R-squared	0.739792	S.D. dependent var		2.707962
S.E. of regression	1.381347	Akaike info criterion		3.597844
Sum squared resid	68.69226	Schwarz criterion		3.806816
Log likelihood	-68.75580	F-statistic		29.43084
Durbin-Watson stat	0.584587	Prob(F-statistic)		0.000000

Source: computed using e-views statistical software

Observing the detailed estimation, it is evident that lending

rate and monetary policy rate had positive effect on time deposit while the deposit rate and treasury bill rate had negative effect. The coefficients of deposit rate and lending rate had statistically significant effect on time deposit (-5.544824 & 4.245716). Deposit rate had a negative sign which indicates an inverse relationship with the dependent variable. This does not follow the a-priori expectation. The expectation is that as deposit rate increases, it should spur customers to save more because they are getting more in return but the reverse is the case in Nigeria. Monetary policy rate and treasury bill rate did not have statistically significant effect on time deposit. This could however be as a result of weak monetary transmission mechanism. They transmit through commercial bank's rates (lending rate and deposit rate). Furthermore, the coefficient of determination is 0.739792 (73.98%), implying that variations in the dependent variable could be attributed to variations in the independent variables.

C Unrestricted Vector Auto-Regression Excerpt

TABLE III
VECTOR AUTO REGRESSION RESULTS

Variables	LNLR (-1)	LNLR (-2)	LNLR (-3)
LNTD	(-0.77571)	(-2.25264)	-1.72607
Variables	LNMPR (-1)	LNMPR (-2)	LNMPR (-3)
LNTD	-1.85489	-0.77071	-1.716
LNLR	(-0.17352)	-1.00814	-1.34455
LNDR	(-0.69832)	-1.98063	-0.97463
LNTD	-0.48567	(-0.33970)	-1.88572
Variables	LNTBR (-1)	LNTBR (-2)	LNTBR (-3)
LNTD	(-2.02460)	(-1.02289)	(-1.81187)
LNLR	-0.77846	(-0.65431)	(-0.97788)
LNDR	-1.34387	(-1.48130)	(-0.41951)

Source: computed using e-views statistical software

The vector auto regression result showed that lending rate and treasury bill rate had significant effect on time deposit, showing a deep connection to commercial bank's fixed fund deposit (time deposit). The effect as revealed in the regression result was negative. However, we deduce from the result of the VAR that treasury bill rate had significant effect just after one year. Lending rate had significant effect in the third year. Therefore, we can say that policy-controlled interest rate effect on commercial bank's fixed fund deposit in Nigeria is not sudden (interest rate pass-through is sticky in Nigeria). Commercial bank's interest rates need more adjustment to respond quickly to changes in policy controlled interest rates. Furthermore, looking at the effect of minimum rediscount rate and treasury bill rate on commercial bank's rates (lending rate and deposit rate) to find out the transmission effect, we discover that both policy controlled interest rates did not have significant effect on lending and deposit rate. We also discovered that their little effect was also negative. However, it is interesting to note that though treasury bill rate did not have significant effect on commercial bank's rates, it had significant effect on time deposit. It follows that time deposit should respond directly to commercial bank's rates and then commercial bank's rate to policy controlled rates. The fact that treasury bill rate directly affect time deposit when it did not

affect commercial bank's rates is a study that should be carried out in order to ascertain why this is so. oil price increase positively affect inflation and inflation negatively affect interest rate and interest rate negatively affect value of share traded.

Given the coefficient of determination, R² (73.98% & 99.67%) for ordinary least square and VAR respectively, we conclude that the regression is a good fit and that variations in the dependent variable could be attributed to variations in the independent variables.

D. Impulse Response Graph

Response to One S.D. Innovations ± 2 S.E.

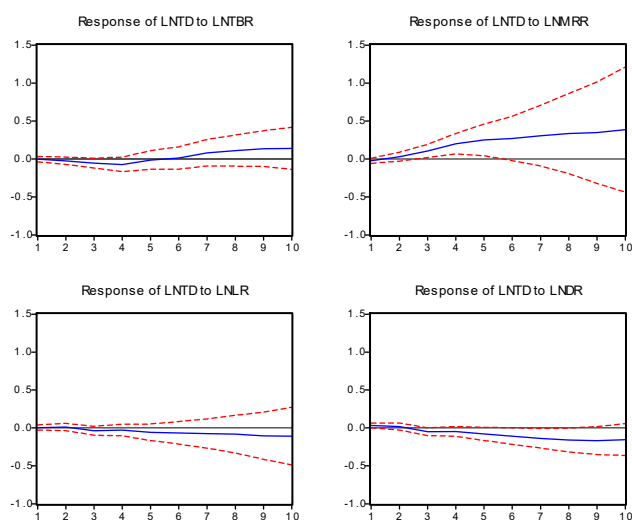


Fig. 1 Impulse Response of Lof of Time Deposit (Lntd) to Log of Monetary Policy Rate (Lnmpr), Log of Treasury Bill Rate (Lntbr), Log of Commercial Bank Lending Rate (Lnr) and Log of Commercial Deposit Rate (Lndr) where MRR represents MPR
Source: computed using e-views statistical software

The graph shows the response of time deposit to the independent variables. For the purpose of the study, we will focus on the responses to time deposit and particularly the response of time deposit to lending and deposit rate.

The response of time deposit to lending rate and deposit rate moved along zero (0) line until period 3 for lending rate and period 2 for deposit rate. From period 3 and 2 respectively the response became negative throughout the period 8 when it became negative and declined through period 9 and 10. While the response of minimum rediscount rate was positive and move upward from zero (0) throughout the period, the response of time deposit to treasury bill rate moved below zero (0) just before period 2 and returned to zero (0) level in period 5 and moved upward.

E Test of Hypothesis

Given the significance of commercial bank's deposit and lending rate on time deposit (fixed fund deposit) as observed using the ordinary last square and the significance of treasury bill rate and commercial bank's lending rate on time deposit at different periods, we can conclude that interest rate fluctuations had significant effect on commercial bank's fixed

fund deposit in Nigeria. Furthermore, Observing the F-statistics i.e. F^* , which is 29.43084 for ordinary least square and 24.85450 for VAR; we conclude that the independent variables had a significant effect on time deposit.

V. CONCLUSION

Commercial bank's interest rate affects commercial bank's fixed fund deposit significantly. However, the bank's interest rate does not respond effectively to policy-controlled interest rate. The ineffective pass-through and sticky adjustments of commercial bank's interest rates in Nigeria could in part be as a result of poor coordination of monetary policy tools to achieve specific objectives and this has further affected the level of mobilization of fixed fund deposits by commercial banks. While [23] believed that interest rate policy in Nigeria is probably the most controversial of all financial policies, stemming from the fact that interest rate policy has direct bearing on many other economic variables, monetary authorities must guide commercial banks towards achieving desired economic objectives.

There is need for commercial banks to repackage the fixed fund deposit or create new product and make it more flexible and attracting to customers (savers). A new type of fixed deposit could be created with lesser maturity period to attract those savers who might not be able to wait as long as in the traditional fixed deposit period. Funds gained from these customers could be invested in products or services with quicker yield before the maturity period. However, while commercial banks seek creative ways to expand their fixed fund deposit, policy authorities in Nigeria should better coordinate interest rate fluctuation and induce competition in the entire financial sector.

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Chimaobi V. Okolo (B.Sc. [econ], B.Sc. [acc], M.Sc., ACE, Ph.D [in view]) holds a Bachelor of Science degrees in economics and accounting, from Enugu State University of Science and Technology and University of Nigeria respectively, both in Enugu State of Nigeria. The author had his Master of Science degree in economics with specialization in monetary economics and quantitative methods in economics, from Nnamdi Azikiwe University, Awka, Anambra State of Nigeria.

He has been a member of the Institute of Chartered Economist of Nigeria (ICEN) since 2008 and briefly an editorial board member of the International Journal of Innovative Research in Management (IJIRM). He is a lecturer in the department of economics, Enugu State University of Science and Technology and is currently studying for his doctorate degree in economics.