An Analytical and Theoretical Investigation of The Determinants of Deposit Money Bank's Investment in Treasury Bills in Nigeria (1970-2009)

Chris O Udoka, Ph.D, Roland Anyingang A

Department of Banking And Finance, Faculty Of Management Sciences University   Of Calabar, Calabar-Nigeria,
PMB 1115, Calabar

E-mail udokaco@yahoo.com and anyingangrol@yahoo.com

Abstract

This study is an analytical and theoretical   investigation of the determinants of deposit money bank's investment in treasury bills in Nigeria (1970-2009). One hypothesis was formulated to guide and direct the study. The hypothesis formulated was stated thus, there is no significant linear relationship between changes in each of the explanatory variables namely; treasury bill rate, total loan and advances, total liabilities, average lending rate, average liquidity ratio and deposit money banks investments in treasury bills. Data for the study was collected from the CBN statistical bulletin and annual report of various years up to 2009. Data were analyzed, tested using the ordinary least square estimation procedures. Findings resulting from the test showed that the five variables used were able to explain 97 per cent of the total systemic variations in bank's investments in treasury bills.   It was recommended that; the regulatory authorities should make treasury bill rate attractive to deposit money banks in other to ensure that they subscribe a significant percentage of the treasury bill issued by the central bank. Top management of banks should develop adequate and effective strategies aimed at mobilizing adequate deposit for their operations.

Key words: Determinants of deposit money banks' investments, Treasury bills.

Introduction

One of the basic economic problems confronting individuals, firms and even the government is how to allocate scarce financial resources among competing ends, in order to maximize wealth (Akinlo, 2005). For profit maximizing institutions like deposit money banks, this problem is basically that of portfolio management. This challenge is more pronounced in these banks because their major source of funds is through customers' deposits, which is mostly short term in nature. They are also payable on demand in the case of demand and savings deposits or after a very short notice in the case of time or fixed deposit (Udoka, 2007).

It should be remembered that the basic objectives of bank portfolio management are to provide the bank with liquidity, solvency and income (profitability) (Mbat, 2009). Liquidity implies that a bank's portfolio policies should be designed so as to enable the bank to maintain adequate degree of liquidity, necessary to meet varied demand for funds. Specifically, a bank should maintain highly liquid assets in sufficient amounts to meet depositors' withdrawals as well as legitimate loan requests. Solvency denotes that bank portfolio policies must be guided by prudence such that lending and investment are undertaken only when there is almost a complete assurance that the principal and interest will be repaid as they fall due (Albu, 2006). Thus, while the achievement of adequate liquidity level is a short – run objective, the achievement of solvency is a long – run objective of bank management. The objective of profitability implies that bank policies should be geared towards achieving sufficient income on bank portfolios, so that operating costs can be met and banks can also continue as a going concern. In order for banks to achieve the above dual objectives, they must achieve a certain pattern and distribution of their assets. Portfolio management is therefore the combination of various classes of assets in order to achieve an optimum balance between liquidity and solvency on the one hand, and income on the other.

Considering the dual role of bank's investments namely, serving their liquidity and profitability needs, the basic problem of this paper is to investigate empirically the factors that determine banks investments in treasury bills with a view to offering some suggestions which might ensure effective management of their portfolios. In view of the above scenario, the purpose of this study is three – fold, namely:

  i.   To determine the variables that affect deposit money bank's investments in treasury bills.
  ii.   To ascertain the relative importance of the variables identified in (1) above.

iii.   To suggest possible strategies that banks could employ for the effective management of their treasury bills
       investments.
       This study is of significance as the recommendations based on the research findings would indeed be useful
       to:
  i. The management of deposit money banks in effective planning of their investments in treasury bills, this would
      enable them satisfy not only the liquidity expectation of their depositors but also the profitability expectation
      of their owners.
 ii. The monetary authorities in their attempt to regulate the activities of the deposit money banks and particularly
     in mopping up excess liquidity from the banking system.
iii.   It is expected that other researchers who are interested in this area of research would key into it.
       For simplicity and ease of comprehension, this paper is divided into five sections. Section one is the
       introduction. It dwells on the allocation of financial resources into investible outlets for the purpose of
       maximizing wealth. Section two delves into the literature review, enunciating recent position of scholars on
       liquidity management. Section three is the methodology, in section four, data obtained are presented,
       analysed   and tested for informed judgment. Section five is the final section and dwells on emerging
       findings arising from the discussion of the paper for managerial considerations.

2. Theoretical considerations /literature review

There is a large body of literature on bank liquidity management. The major ones are commercial loan theory,
otherwise referred to as the "traditional theory" or "real bills doctrine". Which posits that commercial banks, because
of their funding base, should make only short – term self – liquidity productive loans (Mbat, 1995). This is followed
by the shiftability theory enunciated by moulton and Mitchell (1925). They aver that any single bank will be in a
liquid position only if it possesses assets, regardless of their nature, which can be shifted (sold) readily to others
when funds are needed. According to the theory, the problem of liquidity is not so much a problem of maturing loans,
but one of shifting assets to other banks for cash at satisfactory prices. The third theory, which is the anticipated
income theory, developed by Prochnow (1949), depends on loan portfolio as the source of liquidity. It holds that a
bank's liquidity can be planned if scheduled loan payments are based on the future income of the borrower. It does
not, however, deny the applicability of the "real bills and "shiftability" theories. Rather ,it emphasizes the desirability
of relating loan repayments to income rather than relying heavily on collaterals. Also, it recognizes the influence the
maturity structure of the loan and investment portfolios have on bank liquidity(folawetvo,2002). The forth theory is
the liability management, developed in the 1960s. It posits that a bank can meet both short and long term liquidity
needs by bidding in the market for additional funds. According to woodworth (1971), this theory has been upheld by
most banks in developed countries. According to the liability management theory, a bank no longer needs to observe
traditional standards with respect to self – liquidating loans and liquidity reserve assets, since such funds can be
acquired in money market whenever a bank needs liquidity. In this way a bank can meet its liquidity needs by
creating additional liabilities (Roussakis, 1997). Thus, the present work is anchored on the liability management
paradigm.

Some studies aimed at investigating the behaviour of bank's investment portfolios are prevalent. Such studies
are those of mash(1978), Nwankwo (1980) and Roussakis,(1977) specified and estimated four commercial bank
equations for Pakistan using annual data from 1955/56 -1969|70. The four equations related to the determinants of

    (i) Supply of banks credit,
    (ii)   Demand for bank credit,
    (iii)   Bank's borrowings from the central bank, and
    (iv)   Bank's holding of government securities.

The fourth one provides the economic base for this study. in that estimation, the study found the determinants
of bank's holdings of government securities to include the volume of deposits, weighted average interest rates on
government securities, excess liquid assets, government deficit financing and the volume of loans and
advances.(Ayida, 2007).

In his analysis of commercial banks assets composition, Nwankwo,(1980) observed that investments act as a
cushion between liquid assets and loans. Consequently, they can be made   liquid to augment liquidity and thereby
increase loans and advances. Similarly, in periods of excess liquidity and poor or low effective demand for loans,
investments absorb excess liquidity. According to him, the volume of banks investments is a function of three factors
namely, their availability, the state of demand for loan and the state of liquidity.Roussakis (1977), examining the

establishment of banks investment portfolio, argues that maximizing income must not be taken to imply purchasing instruments that offer the highest yields. Rather, it means that the aim of a bank's portfolio policy should be to obtain the maximum income with the minimum exposure to risk. Thus, according to him in designing an investment portfolio, the board of directors must take into account a number of basic considerations namely, the quality of the securities to be bought, geographical and industrial diversification of risk, tax considerations , the general level of interest rates at the time that securities are being purchased and maturities in the portfolio.(Hannoun,2008). In addition the study observed that investment in securities may be used as collateral against the central bank advances can be the subject of repurchase agreement with security dealers and can be pledged against public deposits in compliance with such requirements.

3. Research methodology

This paper is on an empirical investigation of the determinants of deposit money bank's investment in treasury bills in Nigeria. Secondary data were obtained from the Central Bank of Nigeria (CBN) statistical bulletin (1970-2009), CBN annual report and statement of accounts from various years up to 2009 and the CBN, Nigeria's major economic, financial and banking indicators of various years. The data would be analyzed, tested and interpreted in order to facilitate a valid conclusion on the determinants of deposit money banks investment in treasury bills in Nigeria. The major statistical tool used in the study is the multiple regression statistical technique. The model formulated for the study is given by

$$TBI = \alpha_0 + \alpha_1 TRR + \alpha_2 TLA + \alpha_3 TDL + \alpha_4 ARL + \alpha_5 ALO + \mu$$

Where

LTBI = total value of deposit money banks in treasury bills (₦, Million)

TBR= Treasury bill rate

LTLA   = Bank Total loan and advances (₦, Million)

TDL = bank total deposit liabilities ((₦, Million)

ALR = Bank average lending rate (percent)

LALQ = Bank average liquidity ratio (percent)

μ = Error (disturbance) term which is incorporated in the model to capture the influence of omitted explanatory variable of the quantitative factor which could not be measured statistically

α_0 = constant or the intercept

$\alpha_0 - \alpha_5$ = equation parameters

The study tested the hypothesis that:

H_0 : There is no significant linear relationship between changes in each of the explanatory variables namely; treasury bill rate, total loan and advances, total liabilities, average lending rate, average liquidity ratio and deposit money banks investments in treasury bills.

H_1 : There is a significant linear relationship between changes in each of the explanatory variables namely; treasury bill rate, total loan and advances, total liabilities, average lending rate, average liquidity ratio and deposit money banks investments in treasury bills.

4. Data analysis

The results of the empirical test on the determinants of deposit money bank's investment in treasury bills in Nigeria, 1970-200, based on multiple least squares (MLS) estimate procedure are presented in Table 1

 The R^2 value of 0.97 in Table 2 indicates that about 97 per cent changes in the dependent variable   total value of deposit money banks in treasury bills   is caused by changes in the explanatory variables   namely   treasury bill rate, total loan and advances, total liabilities, average lending rate, average liquidity ratio and deposit money banks investments in treasury bills. This implies that only 3 per cent changes in the dependent variable is caused by others variables not found in the equation but measured by the error term.

The Adjusted R^2 value of 0.97 means that the model is about 97 per cent goodness fit. The F-value of 284.47 which is significant at 0.05 alpha level of significant means that there exist a significant relationship between the dependent variable of total value of deposit money banks in treasury bills is caused by changes in the explanatory variables   namely   treasury bill rate, total loan and advances, total liabilities, average lending rate, average liquidity ratio and deposit money banks investments in treasury bills.

The estimated coefficient for Treasury bill rate (TBR), bank total deposit liabilities TDL, and Bank average liquidity ratio (ALQ) are positive, indicating that increase in these variables will certainly leads to increase in total

value of deposit money banks in treasury bills (TBI). This result is in order with economic a priori condition. The results are all statistically significant at 0.05 level of significance.

The estimated coefficient for bank average lending rate (ALR) is negative, indicating that increase in the lending rate will certainly leads to a decrease in the total value of deposit money banks in treasury bills (TBI). This result is in line with economic expectations. The result is statistically significant at 5 per cent level of significance.

5. Summary of findings

All our explanatory variables namely, treasury bills rate, total loans and advances, total deposit liabilities, average lending rate, average liquidity ratio were individually and collectively found to significantly influence banks investments in treasury bills.

We also observed that the five variables stated above were able to explain 97 per cent of the total systemic variations in banks investments in treasury bills. This implies that only 3 per cent of the systemic variations was explained by factors omitted from our model. This finding underscores the importance of these variables in bank portfolio management and the need for top management banks and the monetary authorities to develop adequate and effective strategies in managing them.

Moreover, the study found that the five explanatory variables were not of equal importance in explaining the observed variations in banks investments in treasury bills. The variations were ranked in descending order of their importance as follows, total deposit liabilities, treasury bills rates, average lending rates, average liquidity ratios and total loans and advances. Again, this gives a pointer to both the regulatory authorities and top management of banks on which factors to focus their search lights on, in an attempt for the former to regulate the industry or the latter to manage bank portfolio effectively.

Conclusion

This study attempted an empirical determination of the variables that affect banks investments in treasury bills as well as their relative importance. Using the ordinary least squares method, it was found that all the explanatory variables, namely, treasury bills rates, total loans and advances, total deposit liabilities, average lending rates and average liquidity ratios were individually and collectively significant in explaining variations in banks investments in treasury bills. In particular, it was observed that these variables as a group explain 97 per cent of the systemic variations were found to exert unequal impact on banks investments in treasury bills. While total deposit liabilities exerted the greatest influence, total loans and advances exerted the least influence. The treasury bills rates, average rates and average liquidity ratio ranked second, third and fourth respectively.

On the basis of our major findings, we have offered some policy recommendations aimed at ensuring a more effective management of banks deposit liabilities, loans, and advances, excess liquidity assets as well as a more effective management of treasury bills rate by the central bank of Nigeria.

Recommendations

On the basis of the findings of this study the following policy recommendations:

i.   Top management of banks should develop adequate and effective strategies aimed at mobilizing adequate deposit for their operations. This can be accomplished by improving the quality of their services to customers, adopting modern marketing technique in marketing their services and enlightening customers on the range of accounts they operate and additional product or services they can offer. In addition, bank employees should be encouraged to develop the right and positive attitude to work and banks should enhance good bank – customer relationship. The recent practice in the industry whereby some banks try to de –market others using various reasons such as distress or inability to meet consolidation dead line with a view to attracting customers to themselves is unprofessional, unethical and hence completely uncalled for.

ii. The regulatory authorities should make treasury bill rate attractive to deposit money banks in other to ensure that they subscribe a significant percentage of the treasury bill issued by the central bank. A situation whereby the central bank issues the bills and buys back a significant proportion of it because of unattractiveness of the rate is not healthy for the banking system. In particular, the central bank may not be in a position to effectively regulate the banking system or mop up excess liquidity if the treasury bills rate is not made attractive to the banks.

iii. The banks should ensure a more effective management of their loan portfolio. In particular, they should adopt proper and effective loan appraisal and review procedures to minimize the incidence of bad and doubtful debts. Funded projects should be adequately supervised and loan collection policies regularly reviewed.

These measures, apart from improving the quality of their loan portfolios may also improve their overall liquidity position as the cash necessary to meet new loan requests could be obtained from the loan portfolio.

References

Akinlo, A, E (2005). Impact of macro-economic factors on total factor productivity in Sub-Saharan countries. *World Institute for Development Economic Research Paper, 39:* 231-254

Albu, L (2006). Trends in the interest rate investment in GDP growth relationship. *Romanian Journal of Economic Forecast. 3*: 26-32

Ayida, O.E (2007). Structural adjustment financial development and economic prosperity in Nigeria. *International Journal of Financial Economics, 19:* 104-114

 CBN (2009). Statistical bulletin   Vol 20. Abuja

Folawetvo, N (2002). Interest rate policy and the promotion of savings: interest and resource mobilization in Nigeria. Ibadan, Research Report 24 Development policy center

Hannoun, H. (2008). Financial deepening without financial excesses, Bank of International Settlement

Mbat, D.O (1995). *Money banking and financial market: An introduction*. Calabar: University of Calabar Press

Mbat, D.O (2009). Monograph series on Bank lending and loan administration, University of Calabar, Nigeria.

Masih, A.M.M (2008). Specification and estimation of commercial banks equation in a developing economy: The case of Pakistan. *The Nigeria Journal of Economic and Social Studies 20* (1) 23-32

Michell, W. F (1999). *The use of bank funds*. Chicago: University of Chicago Press

Prochnow, H.V. (1949). *Term loan and theories of bank liquidity*. New York: Prentice Hall, Inc

Nwankwo, G.O (1980). *The Nigerian financial system,* London: Macmillan Press

Moulton, H.G (1918). Commercial banking and capital formation. *The Journal of Political Economy. 26*(7). 32-38

Roussakis, E.N (1977). Managing commercial bank fund. New York: Praeger Publisher

Udoka, C.O (2007). Sound bank lending imperatives as a panacea for bad and doubtful loans   in Nigeria, 1980-2005. *Tropical Focus 8* (3)89-100

Reed, E.N (1976). *Commercial banking*. Englewood Cliff: Prentice Hall Inc.

Woodworth, G. W. (1971). *Theories of cyclical liquidity management of commercial banks*. Homewood: Richard Irwin

Table 1:   Major   variables used in the study

Year	TBI	TBR	TLA	TDL	ALR	ALQ
1970	786.1	4	351.3	624.7	7.5	93.9
1971	562.9	4	502	656.9	8.5	55.5
1972	455.8	4	619.5	793.8	8.5	58
1973	796.5	4	753.5	1013	8.5	47.3
1974	1430.3	4	938.1	1693.9	8.5	65.4
1975	1614.4	3.5	1537.3	2839.2	7.5	56.4
1976	1669.8	2.5	2122.9	4167.3	8	47.7
1977	2182.5	3	3074.6	5237.1	6	38.2
1978	2056.8	4	4109.7	5378.1	9	31.4
1979	3991.2	4	4624.4	6975	9.25	53.1
1980	6096	5	6779.4	10642.7	8.5	42.2
1981	5443.2	5	9316.7	11559.2	8.88	36.5
1982	7545.6	7	11303.8	13220.8	11	61.6
1983	15805.2	7	12285.5	15434	10.75	56.9
1984	24793.2	8.5	13189.2	18042.7	12.75	70.4
1985	29817.6	8.5	13973.2	20192.5	10.5	65.8
1986	22465.2	8.5	18475	21306.8	11.25	36.9

1987	17404.8	11.75	21633.2	26469.7	18.35	44.3
1988	21421.2	11.75	24470.6	33882.7	17.06	44.9
1989	14774.4	17.5	28163.8	30990.6	27.6	43.5
1990	16686	17.5	33916.1	43869	27.74	45.1
1991	28142.4	15	43626.6	59476.7	20.62	33
1992	32935.2	21	54799.9	87738.2	32.8	28.1
1993	19482	26.9	75076	129284.3	44.03	31.6
1994	32935.2	12.5	107075.8	163903	21	53
1995	36020.4	12.5	168170.9	196818	20.7	38.7
1996	79761.6	12.25	193469.4	239284.4	20.36	39.3
1997	163168.8	12	272074.2	295164.7	19.46	38.5
1998	136438.8	12.95	317569.8	349313.9	21.2	41
1999	347979.6	17	386108.8	508807	25.83	53.1
2000	868679.2	12	548290.9	769011.8	21.85	55.2
2001	686183	12.95	748144.2	947182.9	19.82	55.1
2002	998915.5	15.02	845682	739532.9	21.48	58.2
2003	1394845	15.02	1041664	1337296.2	21.48	49.7
2004	1403052	14.21	1294450	1661482.1	19.89	52
2005	1257195	7	1519243	2036089.9	19.49	50.2
2006	771570	8.8	2524298	3245156.5	18.7	55.7
2007	587315	6.91	4813489	5001470.5	18.36	48.8
2008	383700	4.5	6885598	7610296	18.7	44.3
2009	435785	4.5	6701646	8332820.2	22.9	30.7

TBI = total value of deposit money banks in treasury bills (N, Million), TBR= Treasury bill rate

TLA = Bank Total loan and advances (N, Million), TDL = bank total deposit liabilities ((N, Million)

ALR = Bank average lending rate (percent), ALQ = Bank average liquidity ratio (percent)

Table 2:   Regression result of the linear relationship between changes in each of the explanatory variables namely; treasury bill rate, total loan and advances, total liabilities, average lending rate, average liquidity ratio and deposit money banks investments in treasury bills

Model		Unstandardized Coefficients		T	Sig.
		B	Std. Error		
1	(Constant)	-.232	.206	-1.126	.268
	TBR	.088	.014	6.091	.000
	LTDL	.952	.035	26.877	.000
	ALR	-.063	.012	-5.267	.000
	ALQ	.010	.003	3.583	.001

R^2 = 0.97
Adj R^2 =   0.97
F –Statistics =   284.47
DW=   1.58

Dependent Variable: LTBI

CALL FOR PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** http://www.iiste.org/Journals/

The IISTE editorial team promises to the review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request from readers and authors.

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar