

## ON INTEREST ELASTICITY OF COMMERCIAL BANK DEPOSITS IN NIGERIA—THE UNION BANK CASE STUDY

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### Abstract

*This paper is the report of an insider practitioner, who investigated his observation of an economic phenomenon which tended to contradict a priori expectation, that an increase in the nominal rate of interest would ipso-facto, trigger an increase in mobilized volume of Commercial Bank Deposits (CBD). It is recognized that CBD is the dominant predetermined variable that gives a definition to the supply side of financial intermediation; and that financial intermediation is the substratum, on which banks base their existence; hence, as the observation is inconsistent with postulations in McKinnon and Shaw, a simultaneous equations model is formulated and estimated with data which were extracted from the Bank's internal records and books of account. Using the 2SLS technique, the estimation produced results which identified the significant CBD determinants as the nominal rate of interest, level of technology, level of profitability, banking habit, lagged value of CBD and lagged value of interest rate. The coefficients of all explanatory variables were correctly signed, except that of the nominal interest rate, which had a wrong sign. Hence the conclusion is made, inter alia, that the nominal rate of interest is not a predictor of CBD in the Bank,*

**Keywords:** Interest rate; elasticity; commercial bank deposits (CBD)

### Introduction

The rate of interest is the price paid for loans of money and is determined by the supply of and demand for money (see Pratten 1985). Hicks (1967) made a reference to the "pure long term rate of interest" which he described as "the rate that is paid to a borrower of unimpeachable solvency for a loan of indefinite duration". In Anyanwu (1993) the rate of interest is defined as the price that must be paid to forego willingly, the advantages of liquidity. It performs the function of equilibrating the desire to hold wealth in the form of cash, i.e. the price of credit.. Also, as stated in Shackle ((1965), "Interest can appear as the pivot of the entire economic system and it seems to reign over the theories of employment, of money, of growth, of the general price level and of the balance of payment"..It is traditional to speak of the "rate of interest" but when Economists use the term, they have in mind, a whole spectrum of interest rates, depending on the duration and solvency of a loan. There is an obsession over the distinction between nominal and real rate of interest. The real rate of interest is the nominal interest adjusted by the rate of inflation during a year and is usually measured, using the Fisherian equation

$$r = n - p \text{ -----}$$

------(1)

Where r = real rate of interest; n = nominal interest rate; P = inflation rate

Equation (1) shows that **r** can be positive or negative, depending on whether the inflation rate is lesser or greater than the nominal interest rate.

It is recognized globally, that financial intermediation is the substratum on which commercial banks base their existence; and Commercial Bank Deposit (CBD) is the dominant exogenous variable, which gives a definition to the supply side of financial intermediation. As the price of CBD; and pivot that reigns over the profit maximization objective in conventional banking system, the interest rate variable is a sine qua non in a typical CBD model. Therefore, the question is brought to the fore on how CBD responds to a change in the rate of interest. For this purpose, the concept of elasticity has been identified as the appropriate tool for analysis.

As defined in Amacher & Ulbrich (1986, P.400), elasticity is a measure of the sensitivity of responsiveness of quantity demanded or supplied to changes in price. The concept was developed by the famous English Economist, in the name of Alfred

Marshall, in the late 1800s to compare demands for various products. It measures the way, a dependent variable responds to changes, to other independent variables. Chiang (1974) has given the procedure for using the concept to measure instantaneous changes in price at any point in the demand or supply curve.

This study is founded on an observed phenomenon which occurred during the period of interest rate deregulation in Nigeria's banking system. In the main, the author was a banking operator in the deregulated financial setting (i.e. between 1986 and 1991). as Branch Manager with responsibilities for financial intermediation and general businesses of a first generation commercial Bank in Nigeria. His bank and other first generation banks, maintained a low interest rate profile while the new generation banks offered high deposit rates to attract depositors. This caused apprehension of a possible drift of deposits from their banks to the newly licensed banks. However, this apprehension was short lived, as the phenomenon was observed that, rather than decrease, deposits in the author's branch of the Bank witnessed increases in multiples. Apparently, this phenomenon contradicted *a priori* expectation of decrease in supply of deposits of first generation Banks, following their low deposit interest rates. Therefore, the observation triggered the investigation, to ascertain the determinants of CBD mobilization in Nigeria and how CBD responds to a change in the rate of interest.

Union Bank of Nigeria PLC (the Bank) is the firm in the study. It belongs to the classification of Nigerian Banks that are referred to as "first generation". Its history, as chronicled in their web-site at <http://www.unionbankng.com/index.php/> states that the Bank was established in 1917 in the name of Colonial Bank. Currently, the Bank's ownership structure consist of Union Global Partners Ltd (UGPL), who control 65%; Asset Management Company of Nigeria (AMCON) 20%; and others who hold a paltry 15%.. The Bank operates a branch banking system from three hundred and forty locations; which is widely spread from the far north to the far south; and from the far east to the far west of Nigeria. Their

deployment of Flexcube Oracle software application, for their on-line banking operations, has enabled the warehousing of customers' information in a central Server; from where branches obtain any desired information. In effect, it is safe to state that an account with one branch of the bank is tantamount to an account in all three hundred and forty branches of the Bank.

This paper has benefitted from the firm level study in Egboro (2004). That firm level study utilized data which were sourced and extracted from internal records and books of account of the Bank; hence the publication of findings in that dissertation was delayed because, there was an agreed condition precedent, which disallowed publication of findings in any journal. At this moment however, the author feels a compelling need for the publication, which is now being made for several reasons. The first is effusion of time; and the fact of similar findings in the re-modeled and extended aggregate study in Eboreime & Egboro (2012).The second is that ownership structure and management of the Bank has changed hands and it is believed that this paper will assist the present management, in the area of policy direction and strategy formulation .The third is to contribute to the growing literature on interest rates and CBD mobilization; and lastly, to acknowledge and show appreciation to the Bank, for imparting the author's practical banking skills, in addition to facilitating his academic attainment, within the twenty-six years of his service with the firm..

The paper is organized in five sections; the first is the introduction which has set the tone and established the background and need for the study; the second is the review of relevant literature; the third shows the theoretical framework and model formulation; the fourth is empirical estimation and analysis; and the fifth, which draws conclusions and makes recommendations.

### **Review of the literature**

The study of macroeconomics includes the determinants of broad economic aggregates such as consumption, savings, investment etc and encompasses an examination of the inter-temporal determinants and hence movement over time of these key economic aggregates (Iyoha, 1996a). Therefore, this literature review has focused attention on CBD as a key economic aggregate. The rate of interest, being the price for deposits, has also received our attention.

### **The supply of commercial bank deposits**

It is stated in Todaro and Smith (2009), that one of the principal strategies of development, necessary for any take-off, is the mobilization of domestic and foreign savings in order to generate sufficient investment to accelerate economic growth. Money is a medium for banking deposit, as well as stock in the trade of Commercial Bank; and. it is described in Iyoha (1998) as a social contrivance which may be defined as anything generally accepted as a medium of exchange. Akinnifesi & Philips (1978) has postulated that savings deposit is a good proxy for money; and Pratten (1985), explained further that notes and coins are obviously money; and that since the great majority of large transactions in the economy are settled by transferring claims on the banking system (by writing cheques), most measures of money include deposits in current accounts of Commercial Banks. Hence in Nigeria, money supply has a narrow definition ( $M_1$ ) and a wider or broad definition ( $M_2$ ). As stated in Anyanwu (1993), the narrow definition of money is specified thus:

$$M_1 = C + D \text{ -----} \\ \text{-----}(2)$$

Where  $M_1$ ==Narrow definition of money supply; C==Currency outside Banks; D==Demand Deposits

The broad definition of money is the sum of  $M_1$ , Time deposits and Savings; that is:

$$M_2 = C + D + T + S \text{ -----} \\ \text{-----}(3)$$

where,  $M_2$  = Broad Definition of money supply; T= Time Deposits; S= Savings Deposits

Ajayi (1978) has contended that  $M_2$  is the appropriate definition of moey in Nigeria.

In Akinnifesi and Phillips (1978), a money supply and money demand function is specified with the objective of presenting a framework for predicting monetary behaviour by identifying the variables which determine the supply and the demand for money in the Nigerian economy. Their demand for money function is based on the Friedman's approach which states that the demand for money is dependent on the rates of return on all assets which are alternatives to money and total wealth. Both linear and log-linear relationships were

estimated using the OLS technique for the period 1962 - 1975, while the adaptive expectation approach was employed to convert the unobservable expected income and interest rates variables to their observable counterparts. Equations were specified and estimated for the two monetary aggregates  $M_1$  and  $M_2$ , as well as for their components—currency outside banks, demand deposits, time deposits and savings deposits - in real terms with variety of interest rates; i.e the savings, deposits and long-term rates as well as the minimum re-discount, average lending, treasury bill and Federal Savings Bank rates; in the equations. Their main conclusions, amongst others, were (1)Savings deposits is a good proxy for money; and (2) that Income elasticity values are positive and significantly greater than one; while interest rate elasticity values are negative as expected and significantly different from zero, thus implying that money balances are close substitutes for the financial assets considered.

Iyoha (1976) sought to test the applicability of the permanent income hypothesis to Nigeria by estimating a demand for money function; incorporating this variable as a determinant for the period 1950 - 1965. His secondary objective was to establish that interest rate play little or no role in the demand for money and that income elasticity is less than unity in the Nigerian economy. Two sets of regressions were carried out in both linear and log-linear using current income (and permanent income) and/or interest rate and/or lagged real balances. The permanent income variable used for his analysis was derived from a distributed lag of current and past income levels with exponentially declining weights. He concluded amongst others that (1)For current income equation, the income elasticity of demand for money is significantly greater than unity in both cases.(2)The permanent income equations seem to have provided slightly better overall fit than equations employing current income as the sole variable.(3)For permanent income equations, the short-run income elasticity was significantly less than unity while the long-run elasticity was about one.(4)Interest rate has little or no influence on the demand for money in Nigeria.

The aggregate study in Egboro (2004) estimated the model in (3.3) below (see equations 14 & 15 ); using time series aggregate quarterly data of the Nigerian Financial System for the period covering the third quarter of 1986 to the fourth quarter of 1999. The study was triggered by the author's observation of the above

stated economic phenomenon (see 1.2); hence the objective was to investigate and ascertain the determinants of aggregate CBD in Nigeria and the extent to which aggregate CBD can respond to a change in the rate of interest. Using the 2SLS estimation technique, the results gave postulations, which are represented in the following functions:

(a) Short-run Equation-----  $CBD = f(r_{(-1)}, Tech, BH, GDP, Dep_{(-1)})$ ----- (4)  
 $f_1, f_2 f_4 f_5$

$>0, f_3 < 0$

Where  $r_{(-1)}$ =One Period Lagged Value of Interest Rates; Tech= Level of Technology in the Aggregate Banking System; BH= Banking Habit (Number of Bank Branches as Proxy); GDP=Gross Domestic Product (Proxy For Level of Income);  $Dep_{(-1)}$ =One Period Lagged Value of Aggregate Deposits.  $f_1$ ---  $f_5$  are the respective elasticity coefficients of the system.

(i)Equation (4) postulates that aggregate CBD is a function of  $r_{(-1)}$ ;Tech; GDP;  $Dep_{(-1)}$  and BH, as well as a constant term.. All the variables were positively signed, but they were less than unity except BH which had a negative sign. (ii)The implication of the foregoing is that In the short-run, aggregate CBD is inelastic with respect to its determinant variables of  $r_{(-1)}$ , Tech, GDP and  $Dep_{(-1)}$ . In effect, an increase in any of these variables would trigger a less than proportionate increase in CBD. The fifth determinant, which is BH, has a wrong sign and is therefore, not a good predictor of aggregate CBD. However, it is noted that BH is proxy for prevalence of bank offices and bank branches; and that as branch banking is the norm in Nigeria’s banking system, this variable provides the pillar of support for other exogenous variables in the CBD model; hence it may be conjectured, that an under-banked situation in the financial system may have enabled other variables to subsume the impact/or contribution of the BH variable..

(b) Long-run Equation-----  $CBD = f(r_{(-1)}, Tech, BH, GDP)$  ----- (5)  
 $f_1, f_2 >0, f_3$

$<0 f_4 >1$

(iii)Equation (5) postulates that in the long-run, after all adjustments have taken place, aggregate CBD remains inelastic to the variables of  $r_{(-1)}$ , Tech, and BH. It is, however, elastic to GDP which is proxy for level of income in the community. As in equation (4), BH has a wrong sign hence it is not a long run predictor of CBD.

The foregoing aggregate study in Egboro (2004) was remodeled and extended in Eboime and Egboro (2012); with the formulation of a three equations model, to replace the original model (see equations 14 &15 for original model), for the purpose of further study on the effect of interest rate variations on aggregate CBD mobilization in Nigeria . The new model which is theoretically elegant, contains three endogenous variables namely CBD; Deposit Rate (DR);and Banking Habit (BH) in three stochastic equations; and having been specified in double log format, the coefficients of the system gave the respective elasticity values. The first equation adopted DR, Level of Technology (Tec), BH, GDP, CBD(-1) as well as a constant term as exogenous variables. The exogenous variables for the second equation were CBD, Total Investment Demand (VD), GDP, DR(-1), as well as a constant term . The exogenous variables for the third equation were GDP,  $M_2$  and a constant term. Using aggregate quarterly time series data of the Nigerian financial system for the period 1986 to 2008, the interest elasticity, with respect to aggregate CBD in Nigeria, was re-estimated and the results are expressed in the following set of equations:-

(i)Short-Run Equation:-  $CBD = f\{DR, BH, GDP, CBD(-1)\}$ ----- (6)  
 $f_1 <0, f_2 >1, f_3 <0, f_4 >0$

(ii)Long Run Equation-  $CBD = f\{DR, BH, GDP\}$ ----- (7)  
 $f_1 <0, f_2 >1, f_3 <0$

Equation (6) postulates that aggregate CBD is a function of DR, BH,GDP and CBD(-1);and Equation (7) postulates CBD as a function of DR, BH and GDP. Their elasticity values are encapsulated in the respective coefficients of the variables. The implications are summarized viz:-

(I)Average Deposit Rate (DR) and GDP are less than zero in the short and long-run. Thus they are wrongly signed. The economic implication is that none of these variables is a predictor of CBD; either in the short or long run. (ii)The lagged value of Deposits (CBD-1) in Equation (6) is greater than zero but less than Unity,

therefore it is inelastic in the short-run. The economic implication is that, on the short-run, an increase in the lagged value of Deposits would trigger a less than proportionate increase in the value of CBD. This variable did not show its presence in the long-run equation.(iii)The Banking Habit (BH) variable, which is proxy for number of Bank Branches, is greater than Unity in both equations; therefore, it is elastic both in the short and long runs. The economic implication is that an increase in the number of Bank Branches would trigger a more than proportionate value of mobilized CBD in the short and long runs.

### **The rate of interest**

The rate of interest is the pivot point for periodic monetary policies of the CBN; and It was the thrust of Nigeria's financial liberalization policies, which was a major component of Nigeria's Structural Adjustment Program (SAP). As defined in Balassa, (1981), SAP is policy response to external and internal shocks, carried out with the objective of regaining the pre-shock growth path of the national economy. Its origin in Nigeria has been traced to short-term trade arrears which by 1983 accumulated to over N4 billion (Anyanwu, 1993). The economic scene of the 1980's is regarded as years of acute economic crisis, characterized by falling per capita income, rising inflation, high unemployment, chronic balance of payment (BOP) disequilibrium and escalating external debt (see Iyoha 1996a). Thus Nigeria, under the Shagari regime, had to apply to the International Monetary Fund (IMF) for a three year extended facility loan of US \$2.4 billion. The IMF gave seventeen conditions around which negotiation dragged through the Buhari regime, through to the Babangida administration in 1985; when through public debate, the loan was rejected. In 1986, the Government adopted the SAP in a desperate and last-ditch attempt to combat the grave crisis which clearly threatened the very survival of the Nigerian economy. The economic crisis which necessitated SAP had arisen from macro-economic disequilibrium, distortions and maladjustments in the first half of the decade. The maladjustments were caused by a lethal combination of external factors and domestic macro-economic policy inadequacies.

Firstly, in the external front, the capitalist world was engulfed by economic crisis during the early 80s and this had devastating consequences on developing countries including Nigeria. For instance, by October 1987, Nigeria's external debt had risen to US \$23.44 billion. The BOP deficit created constraints for importation of agricultural and industrial equipment, industrial raw materials and spare parts. Secondly, there were internal problems which surfaced in the domestic scene and it included fiscal crisis, growing rate of unemployment, low capacity utilization in manufacturing industries, severe shortage of industrial raw materials and spare parts, low purchasing power and fast declining standard of living of the people. In the light of these, Nigeria had to put in place an adjustment policy, designed to fit the standard IMF – World Bank Structural Adjustment Program. Financial liberalization was the major institutional rearrangement of the Nigerian SAP. Government's interference with the price system in the sector had consisted of interest rate regulation and selection of credit controls. The policy of interference represented financial repression, liable to produce distortions in the economy.

The basic distortion was that the real rates of interest were driven below their equilibrium level; and such low negative real rates engender inefficiency in resource allocation, which usually manifest in the encouragement of: financial disintermediation; capital flight; acquisition of inflation hedges rather than financial assets; and excessive aggregate demand. All these distortions conspire to reduce the rate of growth of the economy (see Ikpeze 1988).

### **Financial liberalization and financial deepening models in less developed countries (LDCs)**

The Nigerian financial liberalization policy was crafted to be consistent with postulations in McKinnon (1973) and Shaw (1973). These postulations were products of conclusions from their separate studies; and have been christened as Financial Liberalization Paradigm for LDCs. In the main, both studies advocate interest rate deregulation in LDCs as a panacea for savings mobilization which, as hypothesised in Todaro and Smith(ibid); is one of the principal strategies of development, necessary for any take- off of economic growth.

Firstly, Mckinnon formulated his model, which implies that an increase in the real rate of interest will induce the savers in LDCs to save more, such as will enable

more investment to take place. This will raise the rate of growth of the economy. (McKinnon, 1973). Secondly, Shaw (1973) contended that Saving, Investment and Financial Intermediation would be sub-optimal when the real rate of interest is arbitrarily fixed at a point which is much lower than its equilibrium level; therefore, he postulated that the removal of Financial Repression via an increase in the real interest rate, will provide greater incentive to save and invest and lead to more efficient allocation of resources. In sum, the McKinnon-Shaw financial repression paradigm opines that financial repression impacts adversely on economic growth through high negative effects on the quality and quantity of real capital accumulation. Also, the paradigm favours financial liberalization, as opposed to financial repression. Financial repression is said to exist when government's tax and otherwise, distort their domestic financial markets (Fry 1982, 1988, McKinnon 1988), keeping real returns on financial assets low and shifting the nexus of decision-making on credit allocation, from the market to the government (Athukorala and Rajapatirana 1993). However, the Financial Liberalization model has been severely attacked by the "Neo-Structuralists development economists (see Van Wijnbergen, 1982; Taylor 1983, 1988). Using a Keynesian adjustment mechanism, a mark-up pricing frame work and a Tobin-type household portfolio model involving three assets (cash, bank deposits and loans in the unorganized money markets), these neo-structuralists seriously doubt the ability of high real interest rates to increase financial deepening and capital formation in developing nations.

The postulations in McKinnon and Shaw have been subjected to various empirical tests, using Nigerian data; among them are Soyibo and Adekanye (1992) **who** recognised the flaws of economic policy decisions in Nigeria, as in most developing economies; and took the position that economic policy decisions are based mainly on untested theories, rules of thumb, and hunches; and at the best, the experience of technocrats; and that very often, "Received Theories" cannot be transplanted. Hence, they adopted an ex-post analysis of the Nigerian Banking System in order to determine the impact of Regulation and Deregulation of the Nigerian Banking System on

the savings mobilization behaviour of Nigerians; using data generated between 1969 and 1989. Their analysis yielded results and conclusions (i) that there is support, albeit weak, for the position that financial liberalization in Nigeria, is a possible way of promoting savings. (ii) the Determinants of savings were identified as: Lagged aggregate Savings ratio; (iii) Lagged aggregate Savings (iv) Current Gross Domestic Product; (v) Foreign Savings, and (vi) Ex-Post real Interest rate. The Debt Intermediation Hypothesis of Shaw was found to be more relatively supported by Nigerian data than the Complimentarity Hypothesis of McKinnon. That the ex-post real interest rate is both a significant determinant of Savings and Real Stock of Money Demand in Nigeria; and finally, that the use of the adjusted ex-ante real Interest rate in savings equation and money demand equations though theoretically elegant, does not seem to make any difference empirically as they are, in most cases, not significant, and often tend to have the wrong sign.

Anyanwu (1995) examined the McKinnon-Shaw Hypothesis from the context of Financial Deepening and his study focused on Sub-Saharan African Economies under SAP and Financial Deregulation. He applied the McKinnon (1973) methodology of Financial Deepening measurement via the ratio of Broad Money ( $M_2$ ) and Gross National Product (GNP) --  $M_2/$ GNP – to reflect the degree of Financial Intermediation Development ; using Nigerian data from 1960 to 1992. The result of the Study showed that for the period 1960 to 1992, Interest Rates Deregulation did not positively affect Financial Deepening as predicted by McKinnon-Shaw paradigm. The results suggested rather, that the lukewarm performance of the financial deregulation comes principally from its half-hearted nature and macroeconomic policy inconsistencies that encompassed its implementation. In the main, Financial Liberalization in Nigeria has recorded limited success due to high and unstable inflation rate, high and unstable exchange rate for the Naira and huge and rising fiscal deficits; these operating through the interest rate variable and inflation rate had constituted hurdles for Financial Deepening in Nigeria.

Aigbokhan (1995) applied the Granger Causality Model to investigate the direction of relationship between Real and Financial Sector reforms in Nigeria, and investigated the two opposing hypothesis of Demand-Following on the one hand and Supply-Following on the other. The Demand-Following Hypothesis

postulates that growth induces an expansion of the financial sector i.e., development of the real sector generates demand for financial services, with new financial services developing in line with development of the real sector. The other view is the Supply-Following Hypothesis which postulates that development and expansion of the financial sector precedes the demand for its services. The financial sector mobilizes and channels resources from savers to investors and thereby induces real sector growth (Porter, 1996, McKinnon, 1993; Shaw 1973). Using quarterly data covering the period 1978-1993 for financial sector growth; and real GDP at 1980 prices for real sector growth, his modelling followed Granger Causality in the form which takes two variables to represent Real and Financial sector growth. The investigation revealed evidence to support the supply-following hypothesis that financial development which encourages increase in number of banks and bank offices promotes "banking habit", liberalizes interest rates, and tends to induce investment. Thus financial development induces real sector growth. This evidence is consistent with the view that LDCs are characterized by supply-leading relationship until sustained modern growth process is under way.

The findings seem to suggest, therefore, that recent financial sector reform experiments in Nigeria may have yielded some of the desired results. Some policy implications of the findings is that there is need to ensure that interest rates (lending rates) are not at such levels as to discourage investment. The results suggest further that growth rate has been declining throughout the period, which may suggest that mobilized savings are not fully channelled into investment necessary for growth. Also, too high inflation rate, usually above 25% threshold, is generally considered to inhibit growth. Average inflation rate of 35% may therefore explain why the reforms are not seen to translate to higher growth. This is where inflation control measures would need to be properly implemented and monitored. Lastly, efforts are needed to promote "savings habit" in the economy; this includes greater financial deepening than so far observed. The results suggest further that growth rate has been declining throughout the period, which may suggest that mobilized savings are not fully

channelled into investment necessary for growth. Also, too high inflation rate, usually above 25% threshold, is generally considered to inhibit growth. Average inflation rate of 35% may therefore explain why the reforms are not seen to translate to higher growth. This is where inflation control measures would need to be properly implemented and monitored. Lastly, efforts are needed to promote "savings habit" in the economy; this includes greater financial deepening than so far observed.

### **Theoretical framework and model formulation**

#### **Theoretical foundation**

Profit maximization is the dominant objective of Banks, (Oyejide, 1986). Thus, like other business organizations, Commercial Banks attempt to maximize their profits over a period of time. This is done by managing their assets and liabilities in such a way that the total sum of interest payments on deposits and the cost of servicing their loans, advances and deposits fall below the interest income on loans, advances and other investments (Oyejide and Soyode, 1986). However, Soyibo (1994) sees management of banks' portfolios as being concerned with the selection of the best mix of banks' assets and liabilities for the attainment of the objective of liquidity, solvency and profitability and these objectives usually conflict. In Nigeria, Commercial Bank Deposits are categorized into three; The first is Demand Deposits, which may be withdrawn by the depositor or transferred to another party, usually by cheque, at any time without previous notice to the bank. They are maintained by depositors who need a liquid balance for immediate payment or withdrawal by cheque. The second and third are Savings and Time Deposits. Both are interest bearing and subject of minimum maturity or notice for withdrawal as agreed. (See Nwankwo 1991).

#### **Bank portfolio management theories**

Commercial Bank Deposits (CBD) constitute the major component of Commercial Banks' liabilities and consequently, a function of banks' portfolio management. Additionally, commercial bank deposits form the bulwark of the community's savings; and bank portfolio management theories, provide the framework for its analysis. Bank portfolio management is guided by theories of bank assets and liabilities management and five of these theories, which suggest the basic explanatory variables in a CBD model, have been identified (Nwankwo 1991; Elliot 1984; Adekanye

1993; Osofisan 1993). They are the Liquid Assets theory; the Commercial Loan theory; the Shiftability theory; the Anticipated Income theory; and the Liability Management theory.

(i) The Liquid Assets Theory dates back to the time of goldsmiths banking and precious metal coinage. Its argument is that banks must hold large amounts of liquid assets as reserves against possible demands for payment of notes. In modern times, the emphasis is on holding short term assets as a prudent cushion in the face of uncertainty.

(ii) The Commercial Loan Theory was known previously as the Real Bills Doctrine. As stated in Nwankwo (1991) the theory postulates that bank funds should principally be invested in short-term self liquidating loans for working capital purposes, confined to financing the movement of goods through the successive stages of production cycle (i.e. production, transportation, storage, distribution and consumption) excluding loans for long-term purposes (i.e. financing plan, equipment, real estate etc).

(iii) The Shiftability Theory recognizes the long term more permanent types of financing provided by banks; and acknowledges the substantially diminishing significance of short-term self-liquidating loans and the growing importance of investment banking with holdings of marketable stocks and bonds. It emphasizes the shift ability, transferability or marketability of bank assets as a more appropriate guide or criterion for investing bank funds (Nwankwo, 1991). With shiftability theory, the test of an acceptable bank asset becomes whether it can be shifted to another owner at no financial loss (Elliot, 1984). In sum, liquidity is tantamount to shiftability (Lockett, 1984).

(iv) The Anticipated Income Theory emphasizes the earning power and reputation of the borrower as the ultimate guarantee to liquidity obligations. The theory points to movement towards self-amortizing commitments by banks and stressed that systematic repayment schedules on many types of loans and serial maturity of debts could provide an automatic liquidity schedule out of the repayment capabilities of the

borrower. The resulting cash flow thus becomes an important source of fund for the lender.

(v) The Liability Management Theory was stimulated by the micro-electric revolution and it argues that since large banks can buy all the funds they need, there is no need to store liquidity on the asset side of the balance sheet. The theory assumes that increasing the interest rate offered for funds will pluck increased supply and provide for liquidity needs (Nwankwo, 1991). It takes a more aggressive stance in the management of bank assets. Its primary strategy is for raising funds for investment by actively seeking liabilities whenever attractive investment opportunities appear and market conditions permit (Elliot, 1984).

#### **Other influences on bank portfolio management**

Banks do not operate in a vacuum; hence cognizance must be taken of other moderating influences in the banking environment. These are classified under internal and external factors.

The internal factors consist mainly, of the corporate objective as well as strengths and weaknesses of bank management. As explained in Nwankwo (1991), the achievement of the corporate objective is dependent on available resources and this includes the level of technology. Capital for instance, has to be adequate in terms of minimum legal requirement on capital asset and capital deposit ratios. Deposits and assets require to be structured in terms of volume, distribution and term consistent with prudence, safety and internal/external regulatory requirements.

Strengths and weaknesses are a function of quality of management. This is endorsed by the fact that banking history, the world over, is replete with bank failures occasioned primarily by inefficient management, resulting from poor internal controls and ineffective checks and balances.

The external factors are institutional, socio-political and regulatory environments. The institutional environment is provided by the financial system, made up of financial institutions and instruments which deal wholly or exclusively in financial assets and liabilities; and whose operations determine quantitatively, the financial flows in the economy. Also crucial is the political, economic and social environment. According to Nwankwo (1991). "The banker must reckon with political structure, the governmental structure and the political philosophy.... Then follows the economic



environment in terms of the topography of the economy, the resource base and its distribution and location as well as the economic significance".

The social environment includes the crucial element of population, its size and growth rate, density and distribution particularly, as between productive and non productive dependent population. This is added to the social traits which include the extended family system, low or poor attitude to work and the social ethic that adores wealth (Nwankwo, 1991). The community's banking habit is also an important factor. As hypothesized in Lewis (1955), "as savings institutions are – pushed right under the individual's nose – people save more". The import of this factor is that banking habit tends to develop with increase in the number bank branches, improvement in level of income and education as well as greater confidence in the commercial banking system tend to have a positive effect on the Community's banking habit. Finally and very importantly is Government regulation. This refers to the prevailing regulatory framework in the economic environment (see Soyibo 1994, Nwankwo 1991). The type of banking regulations, monetary and fiscal policies pursued by government have strong influences on the choice of portfolio management approach of banks.

**Variables of the model**

This study recognizes the position in Oyejide and Soyode (1986) that CBD in Nigeria depends in some form, on income or wealth, interest rates and seasonal factors. This position was taken during the pre-SAP financial repression era of the Nigerian Financial System. The adoption of SAP brought with it, financial deregulation and liberalization which, besides enlarging the banking system, engendered keen competition. The behaviour of the various competing units became atomistic, giving rise to several innovations, which has necessitated consideration of other determinant variables for mobilization of CBD. The variables are viz:-

**Commercial bank deposits (CBD)**

It is conjectured that the desired level of deposits mobilized by a Commercial Bank will depend on

the level of income of the community, interest rate, level of technology and banking habit of the community. Other factors which tend to influence changes in CBD include profitability in commercial banks and existing level of deposits. The foregoing notwithstanding, the fact remains that the total volume of CBD in a country is ultimately determined largely by that country's Central Bank (or similar monetary authority) in the light of the needs and objectives of the economy (Oyejide & Soyode, 1986). This relationship can be written as

$$\begin{aligned}
 \text{CBD} &= f(Y^c, r^c, T^b, H^c, P^b, G_o, \text{CBD-1}) \text{-----} \\
 &\text{-----}(8) \\
 &f_1 f_2 f_3 f_4 > 0; f_5 f_6 \geq 0
 \end{aligned}$$

Where

- $Y^c$  = Income level of Community (GDP)
- $r^c$  = Nominal interest rate on savings.
- $T^b$  = level of technology in the bank (Fixed Assets as Proxy)
- $H^c$  = Banking Habit of Community (Number of Branches as Proxy)
- $P^b$  = Profit Performance of Commercial Banks
- $G_o$  = Government Policies (taken as given or autonomous)
- CBD = Commercial Bank Deposits supplied by savers.
- CBD-1 = Lagged Value Of CBD

**The rate of interest**

The rate of interest is an ubiquitous variable, which is always present (either as an endogenous or exogenous variable), in models that attempt to capture many economic systems such as banking, consumption, savings, investment, balance of payments, money supply and money demand etc. The management of interest rates in Nigeria has involved three approaches. The first is direct regulation, which is a tool generally used in LDCs. In LDCs like Nigeria, interest rates were for many years administered i.e. set by fiat (Iyoha 1996a); The second approach is the free market determination of interest rates, which, is a fall-out of financial liberalization policies. Following the adoption of SAP in 1986, the CBN introduced a market based interest rate policy which placed the responsibility of interest rate determination, on financial institutions who fixed their lending and deposit rates. The third approach is guided deregulation which was introduced in 1994.

According to CBN(1995), wide variations; and rates that were unnecessarily high had been observed, following complete deregulation. The policy allowed for a band within which deposit rates were negotiated; and lending rates, unlike in the past, were not specified for activity sectors. It allowed room for negotiation up to the specified limit of 21 per cent per annum. This third approach was significantly different from what prevailed during the era of regulation. Soludo (2008) avers that rates are prices and must be right and attractive to reward depositors and encourage long-term savings. However, unlike other prices, they are usually expressed as percentages of the amount borrowed or lent; and, like other prices, they are determined by supply and demand for loanable funds. The main sources for the supply of loanable funds are savings (summarized principally in CBD), while the major sources of the demand for loanable funds are investment demands. Movement of these two variables which are accentuated by the scale of economic activity (which supplies the enabling environments), determine the changes in interest rates. The moderating influence of government may also be taken into account.. The described scenario can be summarized in the following relationships.

$$r = r(CBD, I, A^c, G_o) \text{-----}$$

(9)

$$r_1 < 0; r_2 > 0, r_3 > 0$$

Where 1 = Investment Demand (Proxy for Loans and Advances)

A<sup>c</sup> = Level of Economic activity of the Community (GDP as proxy).

CBD = As previously defined

r = Nominal rate of Interest on savings.

In equilibrium, the intersection between the demand for, and the supply of loan able funds will determine the interest rate. The a priori signs in (9) originate from elementary economic analysis which states that if the demand (of investment) rises, or the supply (of CBD) falls, then the interest rate rises and vice versa. The effect on interest rate of any shift in demand or supply will depend on the elasticity coefficients of both demand and supply curves.

### Distributed lag adjustment

The models presented here incorporate distributed lag adjustment. It can be demonstrated that habit persistence is a characteristic of human behaviour. The existence of lagged adjustment may be explained by the prevalence of institutional inertia and/or a positive cost of adjustment (Iyoha, 1976) Furthermore, as Koutsoyiannis (1977) puts it:“Indeed lags are involved in all economic behavior, we live in a dynamic world of continuous adjustment. Clearly an adjustment process takes time, the length of the time period depending on the nature of the particular phenomenon ..... Lags are often of paramount importance for decision making. It is crucial for the government officials to know how fast, after how many time periods the economic units will react to changes of various policy variables (or instruments)”Lagged values of variables are important explanatory variables in most economic relationships, because economic behaviour in anyone period is to a great extent determined by past experience and past patterns of behaviour.

A popular distributed lag model is the Koyck’s Geometric lag scheme (see Koyck, 1954), Koyck’s distributed lag model assumes that the weights (lag coefficients) are declining continuously following the pattern of a geometric progression. The original model includes only exogenous lagged values, viz:

$$Y_t = a_0 + b_0 X_t + b_1 X_{t-1} + b_2 X_{t-2} + \text{-----} + U_t \text{-----}$$

(10)

Koyck’s geometric lag-scheme implies that more recent values of X exert a greater influence on Y than remoter values of X. In particular, the lag coefficients of this model decline in the form of a geometric progression:

$$b^1 = \lambda b_0 \text{-----}$$

(11)

$$b^2 = \lambda^2 b_0 \text{-----}$$

(12)

### The complete model specification

The complete model of our interest elasticity measurement of CBD in Nigeria is specified by putting equations (8) and (9), together in structural forms. However, we have included a dummy variable in each of the equations to explain the impact of omitted factors; which cannot be avoided in economic reality. As explained in Koutsoyiannis (1977, P.51):“One could compile an almost un-ending list of such factors. However, not all the factors influencing a certain variable can be included in the function---- Even if all

factors are known, the available data, most often are not adequate for the measurement of all factors influencing a relationship. This is particularly so when we use time series, which are usually, short". In this study, some of such factors include the impact of deregulation on commercial bank deposits, political considerations, tribal sentiments, seasonality, social inclinations of depositors with a particular bank's proprietors or managers etc. The dummy variable takes a value of one, from 1987 to 1999 and zero otherwise. The complete specification of the model is viz:

$$CBD = C_0 + C_1r + C_2 \text{ Tech} + C_3 \text{ BH} + C_4 \text{ GDP} + C_5 \text{ Pft} + C_6 \text{ Dep}_{.1} + U_1 \text{ --- (13)}$$

$$r = r_0 + r_1 \text{ CBD} + r_2 \text{ Inv DD} + r_3 \text{ GDP} + U_2 + r_{(-1)} \text{--- (14)}$$

Where

- CBD = Commercial Bank Deposits
- r = Nominal Rate of Interest
- Tech = Level of Technology in the Banking System (Fixed Assets as proxy)
- BH = Banking Habit of the Community (Number of Branches as Proxy)
- GDP = Gross Domestic Product (Representing Total Income of the Community and level of Community's Economic Activity)
- Dep<sub>.1</sub> = Lagged value of Commercial Bank Deposits
- r<sub>(-1)</sub> = Lagged value of Interest rate
- Inv DD = Total Investment Demand (Total Loans and Advances as proxy)
- Pft = Profitability in Commercial bank
- U<sub>1</sub>, U<sub>2</sub> = Dummy Variables.

The structural form of the model, represented by equations (13) and (14), are linear in specification, the linearity being in parameters rather than in variables, thus the model conforms to the assumptions of linearity. In its log-linear form, the coefficients of the system will automatically represent the respective elasticity coefficients. The simultaneous equation's model contains two endogenous variables, i.e CBD and r, in two stochastic equations where U<sub>1</sub> and U<sub>2</sub> are dummy

variables. Also, it contains seven predetermined variables, namely:GDP, r, Tech, BH, Pft, Dep-1 and Inv DD. All the equations in the system are over-identified and the implication is that the coefficients to be estimated are the true coefficients of the functions; hence, the model can be estimated, using the least squares technique. The same model was applied in the aggregate study.

### Empirical estimation and analysis

#### Sources of data

The data, which we have utilized in this study, are quarterly time series numerical values of the exogenous variables. They were extracted from the internal records, books of accounts and internal memoranda of the Bank. They are raw, unedited and unaudited; hence they may vary from figures in the published accounts. The observations cover the period, which commenced from the third quarter of 1986; and terminates with the fourth quarter of 1999. Number of observations is fifty-four.

#### Estimation procedure

Econometricians have stated that the best procedure for estimating the values of parameters is to indicate *a priori* or in a vacuum. It depends on what the researcher wants to do with the estimates; the sample data available, the type of model to be estimated etc (see Iyoha, 1997 P.3). In this study, we have applied the 2SLS estimator, which is a technique for obtaining consistent estimates of the structural coefficient of a simultaneous equations model by direct estimation.. According to Koutsoyiannis (1978; p384) "the elegance of the 2SLS estimation, lies in the fact that it aims at eliminating the problem of simultaneous equations bias resulting from the endogenous variables in the explanatory variables". The parameter estimates which we have obtained, using the technique, are deemed to possess the properties of consistency and asymptotic efficiency; and because our system of equation is over identified, it gives estimates of structural parameters by minimizing the sum of squared residuals.

#### Empirical analysis

Our model in equations (13) and (14) is behavioral and it indicates the presence of lagged independent variables. For instance, equation (13) hypothesizes that CBD depends not only on contemporaneous values of r, Tech, BH, GDP and Pft, but also on a one period lagged value of CBD. This hypothesis applies also to equation

(14) which postulates  $r$  as a function of  $CBD$ ,  $InvDd$ ,  $GDP$  and one period lagged value of  $r$ . In this regard therefore, both relations are dynamic and subject to Koyck's transformation (see 3.2.3 above).

The MICROFIT (MFIT 4) computer software package, as developed by Pesaran and Pesaran (1997) was utilized in estimation of the logarithmic form; therefore the estimated parameters for each exogenous variable constitute the corresponding elasticity coefficient.

**Determinants of CBD and measure of interest elasticity:**

Using the quarterly data, extracted from the internal records and books of account of the Bank, for the period 1986 through 1999, we estimated the specified equation using the 2SLS regression technique and obtained the following results:-

$$\begin{aligned} \text{LnBCBD} = & -3.32 - 0.78\text{Lnr} + 0.23\text{LnBTech} + \\ & 0.26\text{LnBInvDD} + 0.6\text{LnBPft} \\ & (-0.56) \quad (-1.42) \quad (1.62) \\ (0.09) & \quad (1.32) \\ & +1.12\text{LnBBH} - 0.2\text{LnGDP} + 0.4\text{Lnr}_{(-1)} + \\ & 0.53\text{LnBCBD}_{(-1)} \text{-----} \\ \text{-----} & (15) \\ (4.33) & \quad (0.83) \quad (-0.27) \quad (1.32) \end{aligned}$$

$R^2 = 0.982$ ;  $R^{2(BAR)} = 0.980$ ;  $SEE = 0.18$ ;  $F(5, 45) = 303.06$ ;  $DW = 2.02$ ; Durbin's h-stat = -0.15 where t-values are reported in parenthesis; and  $r$  = nominal rate of interest;  $BCBD$ =The Bank's level of Commercial Bank Deposits.  $Btech$ =The Bank's level of Technology;  $BInvDD$ =Level of the Bank's Investment Demand;  $BPft$ = The Bank's level of Profitability;  $GDP$ = Gross Domestic Product (Proxy for Community's Income and Level of Economic Activity);  $BBH$ = Banking Habit (Number of Bank Branches as proxy)  $r_{(-1)}$ =

Lagged value of the rate of Interest;  $BCBD_{(-1)}$  =The Bank's lagged value of  $CBD$

In this over-parameterized representation, the following characteristics are evident:-  $R^2$  exceeds 98%; and F-statistic is highly significant; The DW statistic shows absence of serial correlation. The one period lagged value of the dependent variable, (i.e.  $BCBD_{(-1)}$ ) is highly significant, passing the two tailed test at the 2.5% level. Other explanatory variables did not pass the significance test at the 25% level; hence it was decided to drop insignificant variables except  $r$ . The result is a parsimonious representation in equation (32) viz:-

$$\begin{aligned} \text{LnCBD} = & - 0.7\text{Lnr} + 0.25\text{LnBTech} + 0.63\text{LnBPft} + \\ & 0.34\text{LnBBH} + 0.37\text{Lnr}_{(-1)} \\ & (-2.29) \quad (3.60) \quad (2.15) \\ (3.05) & \quad (1.62) \\ & + 0.56\text{LnBCBD}_{(-1)} \text{-----} \\ \text{-----} & (16) \\ & (5.02) \end{aligned}$$

$R^2 = 0.982$  ;  $R^{2(BAR)} = 0.980$ ;  $F(5, 48) = 509.98$ ;  $SEE = 0.71$ ;  $DW = 2.03$ ; Durbin's h-statistic = -0.17

In this parsimonious representation of the model, six explanatory variables explain over 98% of the systematic variation in deposits of the Bank. These are  $r$ ,  $BTech$ ,  $BPft$ ,  $BBH$ ,  $r_{(-1)}$  and  $BCBD_{(-1)}$ . The F-statistic passes the significance test at the 1% level. This indicates existence of linear relationship between the dependent and explanatory variables. Unfortunately, the Durbin's h-statistic is undefined; thus we are unable to determine unequivocally, the presence or absence of serial correlation. The fact that a lagged dependent variable is used as an explanatory variable reduces the power of the DW statistic as an effective test for first order serial correlation (see for instance, Oresotu and Mordi, 1992). Equation (17) is In log-linear form, therefore the coefficients of the system are automatic representation of their respective elasticity coefficients; these are summarized in Table 1

Table 1: Short- run elasticity coefficients for CBD determinant variables

Variable	Elasticity coefficient
(1)Nominal Rate of Interest (r)	(0.71)
(2)Level of Technology (BTech)	0.25
(3)Level of Profitability (BPft)	0.63
(4)Banking Habit (BBH)	0.34
(5)Lagged Value of Interest Rate(r(-1))	0.37

(6)Lagged Value of CBD(BCBD(-1)) 0.56

**Measure of long run (steady state) elasticity**

In their simultaneous equations-based study, Hughes et al (2008), averred that the fully adjusted coefficients –steady state – are generally interpreted as long-run elasticities. (see also Eboreime & Egboro, 2011).For the purpose of further progress in analysis of the regression results, we calculated the long-run (steady state) elasticities, to measure the effect of sustained changes of explanatory variables on the dependent variable. This was done by allowing the value of the dependent variable to be stationary (that is, set  $\text{LnCBD} = \text{LnCBD} (-1)$ ) and solve the expression,  $\alpha/1-\beta$ . The foregoing procedure is explained in Iyoha (2001), see also Green (2003). Egboro (2004);.

The equations for calculation of the long-run elasticity values are set out as follows

$$\text{LnBCBD} - 0.56\text{LnBCBD} = -0.71\text{Lnr} + 0.25\text{LnBTech} + 0.63\text{LnBPft} + 0.34\text{LnBBH} + 0.37\text{Lnr}_{(-1)}$$

Table 2: Long- run elasticity coefficients for CBD determinant variables

Variable	Elasticity coefficient
(1)Nominal Rate of Interest (r)	(0.61)
(2)Level of Technology (BTech)	0.57
(3)Level of Profitability (BPft)	1.43
(4)Banking Habit (BBH)	0.77
(5)Lagged Value of Interest Rate(r(-1))	0.84
(6)Lagged Value of CBD(BCBD(-1))	0.56

As shown in Table 2, the steady state elasticity values are greater than their short-run counterparts because they measure the impact of sustained changes of explanatory variables on the dependent variable after all adjustments have taken place. In sum, our econometric analysis has made the following vital revelations/postulations as regards the behaviour of CBD with respect to its determinants/variables:-

- (1) Equation (16) postulates that the determinants of CBD in the Bank, are r, BTech, BPft, BBH,  $r_{(-1)}$  and  $\text{CBD}_{(-1)}$ . However, r appears in the equation with a wrong sign and it is insignificant.
- (2) In the short-run, CBD in the Bank is inelastic with respect to its determinants of r, BTech, BPft, BBH,  $r_{(-1)}$  and  $\text{CBD}_{(-1)}$ . Since r appears with a wrong sign and insignificant, it is not a good predictor of deposits in the Bank .

$$+ 0.34\text{LnBBH} + 0.37\text{Lnr}_{(-1)}$$

(17)

That is:

$$1-0.56\text{LnBCBD} = -0.71\text{Lnr} + 0.25\text{LnBTech} + 0.63\text{LnBPft} + 0.34\text{LnBBH} + 0.37\text{Lnr}_{(-1)}$$

(18)

Expression (19) transforms into

$$0.44\text{LnBCBD} = -0.711\text{Lnr} + 0.25\text{LnBTech} + 0.63\text{LnBPft} + 0.34\text{LnB} + 0.37\text{Lnr}_{(-1)} \tag{19}$$

Dividing Expression (20) through by 0.44 we have

$$\text{LnBCBD} = -0.61\text{Lnr} + 0.57 \text{LnBTech} + 1.43\text{LnBPft} + 0.77 \text{LnBBH} + 0.84\text{Lnr}_{(-1)} \tag{20}$$

Being in the logarithmic form, the parameter estimates in expression (20) are the respective long-run steady state elasticity values.. They are summarized in table 2 viz

(3) On the long-run (see equation 20), CBD in the Bank is inelastic with respect to its determinant variables of r, BTech, BBH and  $r_{(-1)}$ . It is however, elastic with respect to the variable of profitability.

From the above analysis, the resulting postulations can be summarized in the following representations:

(a)Short-Run Equation

$$\text{B CBD} = f(r, \text{BTech}, \text{BPft}, \text{B BH}, \text{BCBD}_{(-1)}) \tag{21}$$

$$f_1 < 0, f_2, f_3, f_4, f_5, f_6 > 0$$

**Long-run equation**

$$\text{BCBD} = f(r, \text{BTech}, \text{BPft}, \text{BBH}, \text{BCBD}_{(-1)}) \tag{22}$$

$$f_1 < 0, f_2, f_3, f_4, f_5, f_6 > 0$$

**Discussion of results**

The results of this study show a *sine dubio* defiance of *a priori* expectation that an increase in the rate of interest would *ipso facto*, trigger an increase in CBD mobilisation. This defiance is implicit in the findings, which, as shown in Tables 1 and 2 and equations (21) and (22), indicate that the coefficients of the explanatory variables are correctly signed except that of the nominal rate of interest, which has a wrong sign for the short-run and long-run coefficients. The economic implication is that the rate of interest is not a predictor of volume of CBD mobilisation in the Bank. This result may seem surprising, however; it is not a first time outcome of empirical studies. For instance, Ajewole (1989) tested the relevance or otherwise of the Mckinnon model of demand for money in Nigeria; and one of his findings was that interest rate does not significantly influence money demand in Nigeria. Also, the study in Soyibo and Adekanye (ibid) is very specific in one of their conclusions that the use of the adjusted ex-ante real Interest rate in savings equation and money demand equations, though theoretically elegant, does not seem to make any difference empirically as they are, in most cases, not significant and often tend to have the wrong sign. Very importantly, Haines (1979 pp 131-132) has stated that an investment equation was estimated by Hines and Catephones (1970) using UK quarterly data for the period 1956-67 and discovered that the coefficient of the explanatory variables had the correct sign except the interest rate variable which had a negative sign. These findings however, should not be seen to diffuse the importance of the rate of interest variable in conventional banking; because, as the measure of return on all investments made by conventional banks e.g. loans, advances and money market operations etc, as well as parameter for determining and estimating costs of CBD, it remains the pivot which defines the level of profitability in conventional banking.

It is interesting to note that while the nominal rate of interest variable has a wrong sign, its counterpart lagged value of interest rate is correctly signed with a positive coefficient of 0.37 on the short run and 0.84 on the long run, and hence it is inelastic during the short and long runs. The economic implication is that an increase in the lagged value of interest rate would trigger a

less than proportionate increase in CBD; and this is true in the short and long runs. This result can be explained with Koyck's distributed lag model (see Koyck, 1954 and Koutsoyiannis 1977). In addition, Iyoha (1976) has clarified the position that the distributed lag model demonstrates the attribute of habit persistence as a characteristic of human behaviour and that the existence of lagged adjustment may be explained by the prevalence of institutional inertia and / a positive cost of adjustment. In effect, it takes some time, before depositors would make-up their minds on the issue of deposit placements, following a change in the rate of interest.

The long-run coefficient for the profitability variable is 1.43; and it is the only elastic variable, albeit, on the long-run. Its short run elasticity coefficient is 0.63 implies that this variable is inelastic on the short run and this can be attributed to the human characteristic of habit persistence, as explained previously. The economic interpretation of the result is that, on the short-run, an increase in profits will trigger a less than proportionate increase in CBD. However, depositors tend to exhibit a more than proportionate response to the Bank's profitability, after a period of adjustment. This result is consistent with one of the conclusions in Akinnifesi and Philips (ibid) that Income elasticities are positive and significantly greater than one. It is also consistent with findings in the aggregate study (see Egboro, 2004 ibid); in which GDP, as proxy for aggregate income in the community, was found to be inelastic on the short run but elastic on the long run. Profitability is income to the Bank and it impacts positively on the public's perception of the Bank's safety; hence as stated in Agu (1992) "Profits and profitability of commercial banks have received increased attention of bank managements, supervisory authorities as well as stockholders"; and Rose (1981) has cautioned that there is an increased tendency for managements, regulatory authorities, the stockholders and the investment community at large to look at the "bottom-line" profitability, as measure of how a commercial bank is performing.. In effect, profitability, being income to the Bank, is the most important variable in long-run quest for CBD mobilization.

The variable of Banking Habit, which is proxy for the prevalence and number of Bank offices and branches, is not less important. In this study, it exhibited a short run elasticity coefficient of 0.34; while the long run coefficient was 0.77. This indicates that Banking Habit

is inelastic, on the short and long runs. The implication is that an increase in the number of bank branches can trigger a less than proportionate increase in CBD mobilisation. This notwithstanding, the postulation in Lewis (1955) that “as savings institutions are pushed right under the individual’s nose, .....people save more”, is very important; especially as it is supported by the Supply Leading hypothesis which states that development and expansion of the Financial Sector, precedes the demand for its services. The financial sector mobilizes and channels resources from savers to investors and thereby induces real sector growth (Porter 1936; McKinnon 1973; Shaw 1973). Most importantly, the study in Aigbokhan (1995), concluded amongst others that “efforts are needed to promote savings habit in the economy and that “this includes confidence building measures in the banking system, to encourage greater financial deepening than so far observed”. Taking cognizance of the postulation in Lewis (ibid), the Supply Leading hypothesis and the conclusion in Aigbokhan (1995 ibid) we posit that the number of bank branches in a community, play a positive role; and places the Bank in a vantage point to advantageously influence the community’s banking habit in favour of the bank. It is the pillar which lends support to other CBD mobilization variables. It integrates and coordinates the variables for optimum performance through provision of an enabling environment, thus, the fact of its inelastic result seems to show that, as at the period of the study, the Bank had not exploited this very important variable to its advantage by strategically locating branches in every nook and cranny and in every neighbourhood in every community. It is believed that the branches of the acquired Banks, most of which are sited close to existing branches of the Bank, may not have made much difference because; they were located ab initio, to compete with the Bank, as opposed to promoting its strategic interest.

The coefficient of the level of Technology variable is estimated at 0.27 on the short-run, and 0.57 on the long-run; hence, both are inelastic. The indication is that an increase in the level of technology would trigger a less than proportionate increase in CBD. This result, though significant, is believed to be understated because the data

gathering process was unable to distil actual values of technological assets, from values of other fixed assets; hence the total values of fixed assets were used as proxy for Level of Technology variable. Nevertheless, it is incontestable that modern banking practice depends mostly on up-to-date developments in information technology systems; hence, its importance cannot be sufficiently underscored.

The last variable, which is lagged value of CBD gave a coefficient of 0.56 for the short-run and long-run estimations. The implication is that the variable is significant, but its increase will trigger a less than proportionate increase in deposits. However, the variable is important because some depositors may consider the level of existing or past deposits as parameter for measuring the public’s level of confidence on the Bank. In other words, the tendency, for the lagged value of deposits to exert an influence on prospective depositors, cannot be over emphasised.

### Conclusion

This study has achieved its primary objective of investigating an observed economic phenomenon; and we were able to identify the significant variables that can influence the mobilization of CBD. In the main, the findings have justified the observed economic phenomenon and the following are a summary:-

- (1)The significant variables for CBD mobilization in Union Bank PLC are
  - (i)Nominal rate of interest.
  - (ii)Lagged Value of the rate of Interest.
  - (iii)The Bank’s Profitability.
  - (iv)Banking Habit which is proxy for number of Bank Branches
  - (v)Level of Technology.
  - (vi)Lagged value of CBD
- 2)The coefficient of the explanatory variables had the correct sign, except that of the nominal interest rate variable which had a negative sign; and this implies that the nominal rate of interest, though significant, is not a predictor of CBD in Union Bank.
- (3)Only the Profitability variable was elastic on the long run and this indicates that increased profitability would trigger a more than proportionate increase in CBD after a period of adjustment
- (4)Other explanatory variables were inelastic and this indicates that an increase in any of them would trigger a less than proportionate increase in CBD.

## Recommendations

The recommendations have been crafted to reflect the main finding of the study which implies that as the rate of interest, is not a predictor of CBD, it is ipso facto, not a constraint in CBD mobilization. In other words, the CBD mobilization objective can be met under any condition of increase or decrease of interest rate, Thus on the assumption that a well trained and motivated workforce; and adequate security are in place, it is appropriate that the Bank should focus attention on promotion of other deposit determinant variables as analyzed above to enhance profitability. This is encapsulated in the following points:-

(1)The postulation in Lewis which advocates the practice of bringing banking services to the door step of the individual; and the supporting Supply Leading Hypothesis, are relevant, Therefore, we abstract from these postulations to take a position, that the branch; being the pillar of support for banking service delivery, integrates other CBD determinant variables for optimum performance; hence, we recommend unequivocally, that the Bank should establish branches in every neighborhood of every community, such that the individual will not need to move a long distance before accessing the services of the Bank; and this is in addition to installation of cash dispensing machines (ATMs) in strategic locations, to augment the services of branches.

(2)Up-to-date Technology in today's financial landscape is inevitable, hence it is imperative on the Bank to regularly update its operating technology in a manner that is consistent with good service delivery, cost minimization and fraud control; and this should include effective and automated communication with customers especially, in regard to up-to-date state of their individual accounts.

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